

INNODOCT/14

"STRATEGIES FOR EDUCATION IN A NEW CONTEXT"

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UNIVERSITAT
POLITÈCNICA
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EDITORIAL
UNIVERSITAT POLITÈCNICA DE VALÈNCIA

Colección Congresos

Los contenidos de esta publicación han sido evaluados por el Comité Científico que en ella se relaciona y según el procedimiento que se recoge en <http://innodoc.webs.upv.es/es/>

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© 2014, de la presente edición: Editorial Universitat Politècnica de València
www.lalibreria.upv.es / Ref.: 6184_01_01_01

ISBN: 978-84-9048-272-8 (versión CD-Rom)

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INNODOCT 2014. Valencia 8 y 9 de Mayo.

ESTRATEGIES FOR EDUCATION IN A NEW CONTEXT

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PRÓLOGO

En un mundo que camina hacia la inmediatez y la masividad de contenidos y estímulos, se hace cada vez más necesario un compromiso con la educación y la formación. Las nuevas generaciones acceden de manera diferente a los conocimientos, que están a su alcance desde multitud de medios.

Cuando estos estímulos masivos se convierten en permanentes, nuestra capacidad de atención se ve modificada e incluso nuestra estructura mental alterada, de manera que los contenidos que permitimos no van más allá de titulares o breves descripciones. Por otro lado, las (no tan) nuevas tecnologías han cambiado también la manera en la que accedemos e interactuamos con la información. Inmediatez y ubicuidad se confunden, generando nuevos modelos de interacción y habilidades que hoy ya se consideran transversales.

Por todo ello, resulta indispensable disponer de nuevas metodologías docentes que estimulen y motiven tanto a los alumnos como a los profesores. Es ante esta situación que se hacen necesarios eventos como INNODOCT, promoviendo la innovación en la educación y generando espacios de debate en torno a los nuevos modelos de interacción educativa.

Bolonia es sinónimo ahora de conceptos como "docencia activa", "evaluación continua" o "aprendizaje a lo largo de la vida". Conceptos que no se acaban de asumir en la práctica, en un momento en el que confluyen pensamientos y actitudes tradicionales con necesidades y generaciones nuevas.

Este documento que tiene el lector en sus manos contiene aproximaciones y propuestas que acercan a la realidad estos conceptos, a través del uso de las tecnologías de la información y de nuevas metodologías que, a veces, no son más que la conversión de ejercicios ya existentes en procedimientos acotados.

La ETS de Ingeniería informática no puede más que celebrar la realización y edición de estas notas, animando a su lectura, reflexión, debate y, por qué no, a su experimentación en otros contextos.

Eduardo Vendrell Vidal
Director de la ETS de Ingeniería Informática

INDEX / ÍNDICE

ENGLISH

1. The use of Masscapital in Education . Authors: F. Garrigos and Y. Narangajavana.
2. Fostering Interaction Using Clickers in L2 Clasroom (Nº 25)
Author: Ryoo Hye Jin Agnes.
3. Design and development of a Webquest for the course: “English Applied Linguistics: An Introduction”. Evaluation of its Educational Role in the Classroom (Nª113). Authors: Carolina Girón García, M. Noelia Ruiz Madrid.
4. Accounting and the built environment student: The introduction of simulated cas estudies to augment student learning. (Nº 78).
Author: Hera Antoniades.
5. Risk Analysis Related to the Teaching Plan of a Bachelor´s Degree Course (Nº 9). Authors; Marta Fernández Diego, Ester Guijarro and Eugenia Babiloni.
6. English corpus linguistics: abstract analysis (nº46) Author: Giovanna Carloni.
7. Educational Innovation through Participatory Activities (Nº72).
Authors: Kasper V. Roldsgaard, Fco. Borja Trujillo Ruiz and Monica L. Sieben.
8. Demotivating factors in English classroom: a case study of Iranian guidance (Nº69). Authors: Nasser Rashidi and Elham Reimuri.
9. Cognitive theory and the design of education to work connection (Nº94) Author: Bijan Gillani.
10. Implementation and Efficiency of Education in Law and Administration arranged by Oulu University of Applied Sciences, Finland. Authors: Lea Isopoussu-Koponen and Ismo Koponen.(Nº 23)

11. Physics teacher's creative approach to digital technology - exploring the projectile motion. Authors: Lukáš Bartošovič and Peter Demkanin.(N°27)
12. The experienced physics teacher and her first experience with data-logger. Authors: Michaela Velanova, Peter Demkanin, Bianka Gergel'ová and Diana Demkaninová.(N°29)
13. Use of infomercials as a method of active learning. Authors: Camilo Prado Román, Ana Cruz Suárez, Alicia Blanco Gonzalez and Francisco Diez Martin.(N°62)
14. Literacy and the new technologies in EFL settings: How do university students really cope with reading comprehension through online task-based activities?. Author: Carolina Girón García.(N°83)
15. Teaching aid model handheld algorithm of missed contraceptive pills. Authors: Mon Mon Yee and Maher Fouad Sefein.(N°102)
16. Disagreements in EFL: (Im)politeness and pragmatics in Foreign Language Learning and Instruction. Author: Maria Dolores García Pastor.(N°105)
17. “Digital Learning Space” Social Media and Education: The positive effect of Facebook in education. Authors: Dimaki Georgia, Nikolidakis Symeon, Manos Georgios and Ariadni Tsoukleidi.(N°107).
18. How does the Sensory Satisfaction Affect the Vegetable Intake of Elementary School Children? Authors: S. C. Kao, T.T. Chang, Ta-Yu, Lin and S.Y. Lee
19. The study of curriculum design in the international convention banquet.Authors: Tuan-Liang Hong, Chu-Hua Hsieh, Ta-Yu, Lin
20. Augmenting knowing with WikiNizer™ Research. (N°106)
Authors: A.G. Benedek, C.P. Goodman and G. Lajos

POSTERS

- A) The strategic design of distance vocational training literature review. Author: Fernanda Nogueira.
- B) Science Education and Science Communication by online interaction. Authors: Alexandra Nobre and João Calafate.

CASTELLANO

21. Formación Continua para el nuevo entorno: Creat-Inn-Pact e Innodoct. Autores: F. Garrigos y Y. Narangajavana.
22. CSCL: Los Guiones de colaboración y la redacción de los acuerdos grupales como instrumentos para estructurar la interacción.(Nº53). Autores: Nuria Hernández Sellés, Pablo César Muñoz Carril and Mercedes González Sanmamed.
23. Resultados de una intervención para aminorar las brechas digitales en el Sistema Educativo de Tamaulipas, México.(Nº88) Autores: José Rafael Baca Pumarejo, Leticia Varela Salas, Gerardo Haces Atondo, Abigail Hernández Rodríguez y Annabel Echavarría Sáenz.
24. La creación de valor compartido y la innovación social como herramientas estratégicas en la relación entre universidad y empresa. (Nº26) Autores: Heriberto Niccolas Morales, José Pablo Nuño de la Parra y Bernardo Reyes Guerra.
25. La universidad virtual en el Espacio Europeo de Educación Superior: análisis de una experiencia (Nº64). Autora: Carolina Hernández Rubio.
26. El cyberbulling. Conocer para actuar (Nº 33). Autores: Margarita Vives Barceló, Lydia Sanchez Prieto, Carmen Orte Socías y Liberto Macías Gonzáles.

27. Tras la bondad competencial: Liderazgo y trabajo en equipo, dos competencias transversales. (Nº93). Autores: Alexis J. Bañón Gomis, Luis Cortés, Natalia Lajara Camilleri y Marta Perez de los Cobos.
28. La música de Moros y Cristianos en el aula de secundaria. Estudio de sus posibilidades didácticas. (Nº58). Autoras: Ana María Botella Nicolás y Sonsoles Ramos Ahijado.
29. Un programa Curricular de Enseñanza de Estrategias de Aprendizaje para la mejora intelectual en Educación Primaria (Nº18) Autores: Mónica Espada García y Bernardo Gargallo López.
30. Micro Entornos de aprendizaje en dispositivos móviles (Nº100). Autores: José Manuel Pastor y Antonio Ruiz.
31. Las redes de relaciones de los estudiantes en el aula universitaria: un análisis desde el contexto social y académico en el Grado de Ingeniería en Diseño Industrial. (Nº36). Autores: J.V. Tomás Miquel, M. Expósito Langa y Débora Nicolau Juliá.
32. Nuevas metodologías de aprendizaje en ciencias psicosociales aplicadas a los cuidados de Salud.(Nº57).Autoras: Beatriz Montes Berges y María Aranda López.
33. Un paseo por la bioquímica. (Nº67) Autores: Josep M. Fernandez Novell y Carme Zaragoza Domenech.
34. Investigación y difusión de las plataformas tecnológicas de software libre para formación online masiva y abierta. (Nº1) Autores: Oihana Sanzberro, Nora Álvarez de Eulate, Malen Jareño, Olaia Etxeberria, Unai Manterola y Coro Martínez.
35. El cine y el documental como herramientas de apoyo en la docencia de organización de empresas en las ingenierías: una aproximación a la realidad empresarial. (Nº2). Autora: Rocío González Sánchez.
36. El debate en la enseñanza de la economía: El cine como herramienta de innovación docente. (Nº3) Autores: Fernando

- Bermejo Paton, Raúl Del Pozo Rubio, Nuria Legazpe Moraleja y Alba María Priego de La Cruz
37. Análisis y valoración de los nuevos enfoques aplicados en la adaptación de la asignatura ‘Taller experimental de prototipos’ al Espacio Europeo de Educación Superior.(Nº8) Autores: José Luis Navarro, Francisco Felip y Santiago Martín.
 38. La pedagogía aprendizaje-servicio: Conceptuación y práctica en el ámbito universitario(Nº11) Autores: Rocío González Sánchez y Fernando Enrique García Muiña.
 39. Economía política: Valoración de los alumnos ante la adaptación al proceso de Bolonia. (Nº12) Autores: Consuelo Calafat Marzal, María Luisa Martí Selva and Rosa Puertas Medina.
 40. Gestión docente de la creatividad en la Escuela Politécnica Superior de Gandía: Creación de empresas y capacidad de trabajo en equipo.(Nº15). Autores: Cristina Santandreu Mascarell, Lourdes Canós Darós and José Ramón Marin Roig.
 41. La empresa llevada a clase en el Grado en Telecomunicaciones.(Nº16) Autora: Cristina Santandreu Mascarell.
 42. Aplicación del puzzle de Aronson para trabajar el aprendizaje colaborativo y el desarrollo de competencias genéricas de los estudiantes (Nº17). Autoras: Ester Guijarro, Eugenia Babiloni y Marta Fernández-Diego.
 43. Diccionario de Competencias del Graduado en Gestión y Administración Pública. (Nº19) Autoras: Eugenia Babiloni, Ester Guijarro y Marta Fernández-Diego.
 44. Mejora de los servicios tecnológicos de la Universidad Politécnica de Valencia mediante el uso del concept mapping.(Nº111) Autores: Carlos Pons Morera, Lourdes Canós Darós y Ignacio Gil Pechuán.
 45. ¿La composición y la dinamización de equipos son factores importantes para el éxito del trabajo colaborativo? Experiencia con equipos organizados según los estilos del Aprendizaje

- Preferencial Complementario.(Nº21). Autores: Margarita Díaz Roca and Francisco Gil Cordeiro.
46. Técnicas de diagnóstico, coaching educativo y dinámicas de grupo para la mejora de la docencia en estudiantes universitarios. (Nº22) Autores: Fidel L. Rodríguez Legendre and Yolanda Cerezo López .
 47. Grados bilingües. Ventajas e inconvenientes (Nº30). Autores: Montserrat Domínguez Pérez, Esther Rilo, Sandra García-Garabal y Oscar Cabeza.
 48. La aplicación de rúbricas para la evaluación de competencias. Desarrollo y evaluación de una experiencia aplicada en el grado de ADE. (nº31) Autores: Manuel Expósito Langa, José Vicente Tomás Miquel and Débora Nicolau Juliá.
 49. Diferencias de género en el uso de la telefonía móvil en alumnado de un programa universitario para adultos mayores (Nº32). Autores: Liberto Macías, Margarita Vives Barceló, Carmen Orte Socías y Lydia Sánchez Prieto.
 50. Comparativa de experiencias docentes en la formación de la mejora de procesos en empresas y en formación reglada universitaria. (Nº34). Autores: Clemente Lobato Carral y Carlos Andrés Romano.
 51. El trabajo de competencias éticas en la educación universitaria. (Nº35). Autora: Zahara Blázquez Soria.
 52. Adaptación cultural y validación del cuestionario “Ethics Orientation Scale” en población universitaria española. (Nº37). Autores: P. Rohlfs Domínguez, D.Collado Mateo, Z. Blazquez Soria, J.C.Adsuar, A. Romano Peris, A. Prado Solano, H.A. Corzo, M.A.Hernándezmocholí, F.J. Domínguez Muñoz, N. Gusi
 53. Aprendizaje activo y sus determinantes: un enfoque multidisciplinar (Nº38). Autores: Amparo Soler Dominguez, Emili Tortosa Ausina, Juan Carlos Matallin Saez, Lucia Morales, Josep Ramos Mezquita and Enric Portales Llop.

54. Incorporación de las TIC,s en los resultados de aprendizaje en grupos numerosos. Aplicación en la materia de Economía y Gestión Empresarial en la formación de arquitectos. (Nº39). Autoras: Alicia Lloca Ponce and Laura Fernández Durán.
55. Aprendizaje cooperativo aplicado a la docencia universitaria, revisión de literatura.(Nº40) Autor: Conrado Carrascosa.
56. Evaluación continua del desempeño de una asignatura a través de un blog. Análisis de un caso práctico. (Nº41). Autores: Conrado Carrascosa y Ana Reig.
57. La dirección de Trabajos de Fin de Carrera en la Facultad de ADE-UPV desde las perspectivas de : las Tecnologías de la Información y Comunicación y de la Gestión por Competencias. (Nº43). Autores: Aurelio Herrero Blasco, Gonzalo Grau Gadea.
58. El estilo de aprendizaje de los egresados en ingeniería de edificación.(Nº49) Autores: Francisco Javier Carcel Carrasco, Manuel Rodriguez Méndez, David Alfonso Solar y Elisa Peñalvo López.
59. La formación en seguridad laboral en el ámbito de la empresa.(Nº50). Autores: Francisco Javier Carcel Carrasco, Manuel Rodriguez Mendez, Carlos Vargas Salgado y Rafael Roig Arnau.
60. El papel de las herramientas tecnológicas como soporte del trabajo colaborativo en entornos en línea.(Nº54). Autores: Nuria Hernández Sellés, Pablo César Muñoz Carril and Mercedes González Sanmamed.
61. Valoración cruzada. (Nº56). Autores: Gregorio Rius, Amable Juarez Tárraga, Jose Miguel Albarracín Guillem and Marta Palmer Gato.
62. Importancia de la autoevaluación. (Nº68). Autores: Josep M Fernández-Novell and Carme Zaragoza Domènech.

63. Valoración de microeconomía por alumnos del grado en ADE. (nº84) Autores: Maria Luisa Marti Selva, Rosa Puertas Medina y Consuelo Calafat Marzal.
64. Creación de pruebas de evaluación para valorar el progreso y acreditación de competencias en la asignatura Vibraciones Mecánicas(Nº89). Autores: Andres Rovira, Mónica Clemente Císcar, Natalia Lajara Camilleri y José Felipe Villanueva.
65. Grado de adquisición de competencias específicas y transversales en la asignatura de Estadística: diferencias en los métodos de evaluación. (Nº90). Autores: Mónica Clemente Císcar, Andres Rovira, Ángel Trinidad y Alexis J. Bañón Gomis.
66. Propuestas de experiencias docentes en el desarrollo y evaluación de la competencia “trabajo en equipo y liderazgo”. (Nº92). Autores: Natalia Lajara Camilleri, Luis Cortés Meseguer, Alexis J. Bañón Gomis y Angel Trinidad.
67. Experiencia de aprendizaje cooperativo mediante puzle de aronson: aplicación en Ingeniería de Organización. (Nº95). Autores: Fco. Borja Trujillo Ruiz y Raúl Oltra Badenes.
68. Tutorías grupales planificadas fuera del aula en el aprendizaje por descubrimiento.(Nº103). Autoras: Laura Fernandez Duran y Alicia Llorca Ponce
69. El perfil de los estudiantes en las prácticas docentes con enfoque de Educación para el Desarrollo para la Ciudadanía Global. Una aproximación exploratoria a la docencia en los títulos de grado. (Nº104) Autora: Ana Cano Ramírez.
70. Tutorías en Asignaturas a Extinguir (Nº108) Autores: Sofía Estellés Miguel, Teresa Barbera Ribera, Aurelio Herrero Blasco y Marta Peris Ortiz.
71. La rúbrica como instrumento para la evaluación de competencias genéricas: Análisis de una experiencia en Ingeniería de la Energía. (Nº109) Autores: Teresa Barbera Ribera, Carlos Manuel Dema Perez y Sofía Estellés Miguel.

72. Adaptación del estilo docente en una asignatura con un reducido número de estudiantes. (Nº110). Autores: Amable Juarez Tarraga, Gregorio Rius Sorolla, Jose Miguel Albarracin Guillem y Marta Palmer Gato.
73. La WIKI en el aprendizaje de los estudiantes universitarios de ingenierías.(Nº112). Autores: Sara Blanc y Pedro Yuste.
74. Aprendizaje basado en problemas en gestión empresarial. Autores: Carlos A. Devece; Marta Peris-Ortiz; Carlos Rueda-Armengot; Vicenta Fuster.
75. Pautas para el empleo de redes sociales en la docencia de materias de Organización de empresas: una propuesta. Autores; F.J. Garrigós, J.V. Oltra, J.O. Montesa

PORTUGUÉS

76. Gestao Democrática da Escola Pública: Novas Demandas para Educação Brasileira (Nº97). Autores: Cecilia Cabral Mascarenhas De Santana, Evandro José Santos Ramos, Marcelo Santana Silva and Angela Machado Rocha.
77. As Personalidades de Jogar à luz dos interpretantes semióticos peirceanos. (Nº74). Autor: Roger Tavares
78. .Promoção de Educação Ambiental através de jogos didáticos (Nº101). Autores: Francisca Medeiros, Nicki Maia, Cicero Cavalcante, María Rodríguez, Juliana Cabral, Victoria Ferreira.
79. As plataformas colaborativas e de apredizagem e as ferramentas de autoria de conteúdos educativos. Estudio de Caso num Curso de Formação pedagógica inicial de formadores. (Nº70). Autor: Vitor Barrigao Gonçalves.
80. Teobs Online Comunnity. (Nº24). Autores: Márcio Sampaio, Rui Lopes y Cristina Mesquita.

81. De Gutenberg a Livro na era Digital repercussoes nas bibliotecas (Nº44) Autores: Sindier Alves and Bento Duarte Silva.
82. Gestao da Informacao científica e repositórios: o caso da Biblioteca Digital do IPB (Nº63) Autores: Clarisse Pais, Albano Alves, Orlando Rodrigues.
83. Pesquisas acadêmicas em biodiesel no Brasil: Uma análise dos grupos do Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPQ). (Nº98) Autores: Marcelo Santana Silva, Angela Machado Rocha, Fábio Matos Fernandes, Paula Meyer Soares and Fabio Konishi.
84. Humor em Comunicação de Ciência – Microrganismos aos quadradinhos. (Nº51). Autores: Alexandra Nobre y Daniel Ribeiro.

THE USE OF MASSCAPITAL IN EDUCATION

F. GARRIGOS¹, Y. NARANGAJAVANA²

Abstract

The new educational frameworks is affected by major changes. The dynamicity of the environment, the new innovations, and the behaviour of the new students, require the implementation of new methodologies, new teaching cultures and innovative pedagogical approaches of learning and teaching. Moreover, in the new organizational arena, the traditional strategic and management theories of organization are becoming obsolete to face the new era of globalization. In the new frame, some mechanisms such as the Crowdsourcing, defined as the outsourcing to the crowd; but essentially the capturing, management or use of what we call “Masscapital”, defined as the capabilities of the mass relevant for the organizations, have the answer to face the new changes, and have transformed all organizations behavior, including educational organizations. This paper analyzes the importance of the Crowdsourcing, and its evolution in the called management of the “Masscapital” and how they are becoming the new model that is changing the arena of organizations effectiveness. The paper defines mass capital, explain its importance, and analyzes the use of Masscapital in education as an important mechanism to improve the learning process

Key words: Masscapital, Crowdsourcing, Knowledge, Technology, Innovation.

Acknowledge. We want to thank financial support from Universitat Politècnica de Valencia, PIME 2013-2014.

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1. INTRODUCTION

The new environment of the Web 3.0 is definitively impacted by the advances of the new information and communication technologies, and by the preponderance of social networks. The technology has expanded horizons [1] and in the new frame the organizations are the ones who have to advance and satisfy constantly the needs of their customers, clients, or in our case students (by harvesting information before, during and after the contact with them (ibid)), and to reinvent their structures to remain update and competitive in a globalized world. In the new arena, the innovation is growing in all the areas of the educational organizations, and these organizations cannot respond only with their own capabilities or with the capabilities of their partner firms to face the growing complexity of their environment. While in the last centuries the outsourcing of the diverse processes (while maintaining the core resources and capabilities of the organizations, Hamel, Wernerfelt), promoted by the new technological advancements, were seen as key elements to remain updated and competitive, in the new globalized environment these perspectives alone are remaining obsolescent. Why?

Last centuries, the key success factor of many organizations, among them educational organizations, have consisted in the creation of global networks of organizations that can work together to innovate and face the globalization processes. The new technologies have allowed the new networks, in the last decades, to combine the strengths, capabilities, and innovations of the diverse organizations in the different phases of their activities, and then to overcome, with the flexibility of the own networks, possible disadvantages. However, in the new arena this is not enough. Why?

Nowadays the information cannot be controlled, and the innovation is generally characterized as a process that consists of two broad stages: idea generation and idea implementation [2]. Then, the only thing that organizations can do to remain updated is to know and implement the information and new ideas before others, and with a broad extend. Here, the constant innovation in the diverse task is essential to be competitive and to provide the best education to students, in our case, but the groups of networks are not flexible enough to cope with the diverse innovations that continually appear in the globalized world. In addition, the organizations cannot maintain and promote only by their own their core resources and capabilities long time. Why the networks of organizations are not flexible enough, and why they cannot develop by themselves their own internal resources and capabilities? Because if previously the innovations of the organizations and those of the diverse components of the networks help them to overcome the other networks competitiveness, the consolidation of networks of organizations means the consolidation of their own rigidity, and nowadays, the individuals, the crowd, overcome the advantages of the networks of organizations. Why?

The development of the outsourcing processes for many task of the organizations, and the consolidation of networks of organizations, mean that, the organizations that remained as the centre or the core of the networks, were the organizations who had to search for efficient and powerful partners to remain competitive, and even to find which resources and capabilities they had to develop first. However, this means to remain inflexible to the new innovations, because these central organizations cannot control and have all the information about where are the new innovations. Why?

Because the sources of innovations are not in the organizations but in the individuals and it is impossible that organizations can find, by searching for, and continuously, who has innovate and in which area. We have to take into account, that although our teachers can exercise an important role, the creative ideas of individuals, not belonging to their organizations also can and must make a substantial contribution to innovation [3][4][2]. Such as Prahalad and Ramaswamy [5] point out, the future lies in a new approach to value creation based on an individual-centered co-creation of value between consumers, in our case students, and organizations. The co-creation with the virtual participation of customer is essential nowadays [6], and without the participation of users we could not understand not only the new business environment [7] [8], but also the important organizations transformations, and here the educational organizations are also included. However, customers, or in our case students or partners, are not the only ones who can co-create. The co-creation should conduce to a “value network” in which value must be co-created by a combination of players in the network [9]. Diverse and dispersed individuals without previous relation with the organizations can also contribute, and the co-creators can be now all over the world. Hence, how to overcome this situation?

Organizations have to be creative. If the innovations are in the brains of the individuals all over the world, and it is impossible that each organization can find constantly these individuals in the crowd, let us change the perspective. How? The way is not looking for them but creating the conditions that allow them to find us and contribute for our organizations. How? By using and improving the crowdsourcing processes?, by extending this processes to the use and management of the “Masscapital”?. We think that the focus on the Masscapital is the solution.

2. FROM OUTSOURCING TO CROWDSOURCING, FROM CROWDSOURCING TO MASSCAPITAL

The analysis of the outsourcing is broad in the literature. Specially, the outsourcing process is justified by the classical managerial literature of the resource and capabilities based view. According to this perspective, the organizations must focus on the development of only the activities linked with their strategic resources, capabilities

and core competences [10], and outsource the other activities [11]. In this vein, corporations who outsource non-core aspects of their activities can substantially reduce costs and concentrate in their core activities. Educational organizations are not an exception.

However, the specialized entities are more and more broadly dispersed, and due to the globalization process it is difficult that organizations, and in this case also the lecturers, could have information about where are the best organizations that can provide the best innovations for their diverse tasks, or better the “value network” [8] [9] of the organizations. In this arena, the organizations must concentrate in creating the mechanism to attract these organizations instead to search for them. Moreover, nowadays they are not the entities, but freelancers and individuals dispersed in the mass, the ones who can provide the best innovations, in order to improve each and all the activities and tasks. In addition, organizations not only need the information from individuals, but also other kind of help that the crowd or mass can provide. In this vein, organizations must concentrate in capturing and using the capabilities of the entities or the crowd that are closely related with the organization, what we can call “folk capital” or “community capital”, or more broadly the “global capital” or “Masscapital” from individuals that can have, or not, a previous direct relationship with the organization. Focusing in this aspect, in this work we conceive and define the “Masscapital” as the capabilities from all the individuals or organizations, related closely or not to the own company or organization, which can help it to innovate or improve any of their activities or processes. In our opinion, the core competences are not anymore inside the firm, the core competences are outside. Hence, the organizations that can create the conditions to capture and manage first, on time, and broadly, the continuous core competences needed to compete and to improve their behaviours, which remains in the individuals outside, what we call “Masscapital”, will be the successful organizations in the new environment.

But how to get this. There are many mechanisms, and to realize about them we only have to take a look at the most successful firms and organizations nowadays.

For instance, some authors point for the importance of Crowdsourcing processes. Crowdsourcing can be viewed as a development of the classical “self-service” which emerged with the evolution of department stores and the introduction of the first vending machines at the end of the nineteenth century [8] or as a combination of the classical outsourcing, with the participation of a wide number of stakeholders or crowd in the process. Crowdsourcing can be widely applied for the production processes in firms and organizations, but also for the idea generation or specific problem solving, or broadly as a new source of innovation in almost every steps of the tasks done by organizations [8]. In our point, the key importance of the crowdsourcing in front to other networking mechanisms, is that organizations and their members do not have to find the partners. The partners are the ones who find

out for the organization, if they can provide a firm or organization with a solution to its problem and if this solution is interesting for themselves. However, organizations cannot get continuously the participation of the crowd by launching open calls. In addition, the crowdsourcing is mainly based on the fact that is the organizations who identifies the problem and who ask for the solution of the problem. However we think that this fact is reduced, especially in one environment when many individuals outside the organization can detect better than the own organizations where are the possible problems, or the tasks that can and must be improved.

In this vein some successful organizations have founded the formula to create mechanisms to capture continuously what we call “Masscapital”, the capabilities of the mass, by using more broad crowdsourcing techniques, by rewarding, or not, the individuals in diverse forms (from money to social relevance), without launching open calls and without asking for a solution of concrete problems. For instance, Wikipedia has created a tool to capture the “masscapital”, using the peer-product ion in order to create their encyclopedia by using the participation of the crowd. In addition, some authors [12] point for the importance of what they call the “crowd capital”, that’s mean, ”heterogeneous organizational knowledge resource, generated by the organization’s Crowd Capability”, by focusing on the importance of having IT mechanism to capture the information of the crowd. Actually, these improvements were already pointed by Garrigos et al [1], when stressed the relevance of the Web 3,0 Technologies to capture and apply the information from the mass, and when posited that “New networks and the advances in so-called Web 3.0 technologies are changing firm structures and value chains or value networks, and the configuration of decision-making processes for managers” (ibid, pp.1881).

However, we think that the main capabilities are not in the organizations, but outside, in the mass, so the organizations have to focus on them and in formulating the way to capture or take advantage of them, this fact is important of organizations in general, but specially for educational organizations. In addition, the “Masscapital” cannot be reduced to the management of information or even the knowledge from the crowd, because there are capabilities that are not related with simple information and knowledge. For instance, such as Garrigos et al [1, pp.1883] stress, the web 3.0 technology “not only allows the use of semantics but also space, images, sounds and feelings in a concept where the traditional static web is transformed into another very interactive one. In the new context, intelligent machines read, understand, interrelate, and can manipulate data from cyberspace, allowing this process to be adapted by different users or firms according to their own needs”. Thirdly, the organizations can manage some of the Masscapital, but some of it escapes to the control of the own organization. Fourthly, the management of the Masscapital cannot be reduced to the use of technological mechanisms. Fifthly, as in the case of crowdsourcing, “Masscapital” cannot be reduced to the participation of the partners of the customers, it must also include the participation of all kinds of stakeholders

who are not employees of the organizations [1], amateurs or even the general public, “students, young graduates, scientists or simply individuals” [13, pp.196], in order to improve the production processes, carry out any of the organization's tasks, and undertake the solution of problems and the generation of open innovations by the crowd. Finally, we have to consider the importance of space, time, and the volume, in the success of using the “Masscapital”

3. THE USE OF MASSCAPITAL BY EDUCATIONAL ORGANIZATIONS AND INDIVIDUALS

Actually, many successful companies and organizations are using our “Masscapital” without the use of reduced crowdsourcing processes, and without the use of the “open calls”, or the fact of asking for the solution of specific problems. In addition, this “Masscapital” is sometime used with the participation of the mass in processes where the crowd are not conscious of the crucial importance of their diverse contributions for the own firms, or simply do not know their involvement in the process.

Some companies have used the new technologies to appropriate of some of the Masscapital or capabilities of their customers [1]. For instance, we can think in the success of companies such as Google or Microsoft, which use their software or search engines, utilized by the mass, based on the cookies and information provided by the people that for instance connect to Internet, visit some webs, or use and storage information in some programs, and which tastes and preferences help these firms for instance to promote and expand their business and product, and to improve the efficiency of their products, such as software, or even efficiency the of the algorithms in the searchers, or the impact of their publicity about their clients (for example with SEO and SEM techniques). When visiting one webpage, or when looking to one product or firm, the customer are indicating these companies their tastes, and hence which similar pages could search, which publicity must offer to him/her, or how to manage this individual, or the products of their suppliers that will have successful offered, so they can take advantage of these individuals personally and individually. Educational institutions such as universities could do the same, in order to analyze the interest of students for planning the educational programs, both in order to supply the best subjects, to improve the schedule of the subjects lectured, or even to recruit the best lectures for the most demanded and interesting programs demanded by students. The use or analysis of students and their preferences, or even the analysis of the participants of the webs of educational organizations, is still a pending task for educational institutions.

Other firms and organizations use some of the “Masscapital” efficiently through innovations in the classical “self-service” or “self-producing” In this vein we can

highlight the relevance of the change in the conception of the organizations value chain especially in cases where both the product and supply chain are digitalized, such as in sectors as banking, insurance, telecommunications, news, entertainment, music, advertising, and certain areas of the public sector [8][9]. In our point, the educational sector is also one example. We have to think how the teaching processes are changing. Previously lecturers were the ones who provide most of the information and knowledge to students. Nowadays, students prefer that lecturers provide them keys to find the information, and prefer discover the information by themselves and work in team to generate and share information. Here, the task of the lecturer is carrying to a point of developing capabilities of coordination and to guide students more than to provide them with the material. Of course the knowledge of lecturers is essential, but this knowledge must be enhanced continuously with the participation of students, as generators of ideas, examples and as builders of advanced knowledge. Before were the educational institutions who provide the curriculum, or complete group of courses designed by the same institutions. Nowadays, students can or should be able to create or design their curriculum adapted from diverse institutions, and according to their interests...

The use of technologies has allowed also the incorporation in the systems of people that are not clients of the organizations, in our case, stakeholders or external personnel, who are not even students or personnel of the educational organizations, can participate in the learning processes of our students. In this point, diverse authors [1] posit for the importance of the work of community managers, to promote the participation of stakeholders and other possible individuals in the relationship with the organizations, and the use of crowdsourcing techniques to enhance the crowd participation and so, to increase of what we call the appropriation of the "Masscapital", or individual capabilities of the crowd. Accordingly, many organizations are promoting the use of communities, essentially with customers who have specific knowledge about the problems with the products and that are motivated to freely contribute with new ideas [6] with communities that allow organizations to create and innovate in their products, reformulate the structures of their organizations, and to promote their brands. Obviously, the promotion of these communities are also important for educational organizations, who realize about the importance of old students and other participants, that can enhance not only their reputation and brand, but also can provide these institutions with practical, professional, and theoretical innovations than cannot be produced only within the same organizations. In addition, the networks or educational institutions, with the sharing of students and lecturers or teachers are also important. But, how about the "community managers" of educational institutions to enhance the organizations, or to enhance the creation and sharing of knowledge and innovation that are essential for the development of the same organizations and their members?

For instance, and in our case, let us think also for example of user-generated content for social media Websites such as Facebook, Twitter, Youtube, or even TripAdvisor, that uses the advice that customers give to other customers. These firms use, and their business model are based on, the information and/or media from the “Masscapital”, from individuals that sometimes unconsciously, and without any monetary remuneration, are acting as supplier of their content. The aggregators of news, or the use in the lectures of material from internet are examples of the contribution of mass capital to the enhancement of the education. We have to think that some of these organizations were created for educational purposes, such as Facebook. But, how about the use of these mechanisms by lecturers or educational organizations?. How about the creation of similar “organizations”, but with educational, learning or researching purposes?

Apart from these questions, however, the “Masscapital” cannot be always captured or used through simple mechanism. In addition, sometimes cannot be managed by the organizations: it only can be used by them.

For instance, and actually, the promotion of the “worth of mouth” (both in internet or outside), the called “viral marketing”, some operational marketing activities, the fact of doing publicity by customers, or the creation of the publicity spots by the mass can be considered also as mechanisms to capture and promote the “Masscapital” that can be important for the organization competitiveness of business firms and other organizations, as it influences the loyalty of customers and the image of the brands. And these mechanisms are recognized as some of the key factors of success of important companies. However, this “Masscapital”, that is also produced with the participation of the crowd, cannot be interiorized inside the organization, (although it can be effectively used and promoted by the firm), as in the crowdsourcing processes, a fact that do not make them less important. Educational organizations, should analyze the business success models of some organizations, and try to adapt them to enhance their success and the quality of their developments.

Some Masscapital is also in the space or the specific environment where the organizations are located, and cannot be also captured with technological tools. We have to think for instance on the importance of the theories of management that emphasize on the industrial districts or clusters of firms. Actually this is similar to the traditional and classical “educational districts”, where the best universities locate, and the best students try to apply. Let us think for instance about important universities, or areas with important educational institutions such as Boston, Cambridge, Oxford or other educational areas of excellence in almost every country, or even in the most important conferences where knowledge is transmitted, where scientists and students together help each other to improve science and learning basically through networking. In this case, of course the “Masscapital” is interiorized

through the students and scientists with their relationships with this environment, it is in the “ambience” of the specific territory, environment or space, and although available for the organizations, it is not captured with IT techniques. The relevance of the “Masscapital” is also when we look at some of the essential conditions of the general or even competitive environment of the organizations and its influence to the success of the companies, but this is more an entrepreneurial matter.

Finally, the use of the “Masscapital” has also a temporal dimension, a timing, and a dimension of volume. The organizations have to think for instance in the innovations in technology that were not successful at the beginning of our century, and that now are getting success, just when the mass is prepared for these innovations, or when the “Masscapital” of the capabilities of the mass have been already developed. In this vein, the “Masscapital” has to be considered mainly a source of the innovations, but also a receptor and potential element of the innovation, as if they are not prepared its potential cannot be used (i.e. the advances of new technologies cannot be used, or applied to the crowd, or with the use of the mass, if the people do not have capacity for use them). In addition, the innovations from the mass have a caducity, so the important is not only to capture them, the importance is when the organization started to capture them, and if they are able capture them massively before competitors. Let us think for instance the example of some business companies, which model is tried to be replicate by others companies, but what is impossible to do it in the same way, as the previous ones have captured massively the “Masscapital” related to their business, as they innovated first and quicker than their competitors, so no company can now compete with them effectively and efficiently, as they arrived late to capture the essential and the great volume of the “Masscapital” related with their business.

4. CONCLUSION

In the nowadays environment, the main capabilities needed to the organizations in general and specifically educational organizations to remain competitive do not remain anymore inside the company, but outside, in the mass. In this paper we postulate for the importance of what we call “Masscapital”, that is, the capabilities from all the individuals or organizations, related closely or not to the own company, which can help it to innovate or improve any of their activities or processes. The paper explains how this theory of “Masscapital” is an evolution of the theory that includes innovative mechanisms such as the crowdsourcing processes, the use of the Web 3.0 or the use of the social networks for the improvement of the effectiveness of the organizations. The paper give examples and ideas on how our “Masscapital” is used and is the basis of the success of important organizations. The paper also emphasize in the importance of the timing, the space and the volume of the “Masscapital” for the success of its use, and also stress that although it is im-

portant its use, sometimes the firms cannot manage it, just used it, and that when it is possible its management, this management is not always related to technology.

This paper opens new visions to be considered by practitioners and authors, in the search for the keys of the competitive advantage of the organizations in general, and specifically educational institutions, in their aim of improving teaching and researching processes. The paper is important for directors of educational institutions as it explain some success factors for their institutions, and opens to new ideas to be used to create successful educational organizations. It also opens new developments and fields in several theoretical perspectives. For instance the work overcomes the classical strategic theories that focused in the environment or in the resources and capabilities of the organizations, offering a perspective that include both but that extend them highlighting and focusing on the importance of the capabilities of the mass, our "Masscapital". The paper refers to the importance of the managerial information systems as an important mechanisms to capture the essence of the "Mascapital" sometimes, and to integrate it with the aims and the information of the organizations, but overcomes its importance, as focusing in the capabilities of the individual more than on the technological capabilities, as the key success factor, and by considering some important factors outside the technology that are key to the success of some organizations, opening new topics of research in the area of technology. The paper also postulate for the relevance of factors further the management of the knowledge, and opens new areas of research inside the "Knowledge management" literature, as considering the "Masscapital" as an essential capital to provide knowledge, and to be manage and studied. Our postulates also open new themes of research onto the analysis of the structure or the design of the effective organizations, as our "Masscapital", opens to the development of new organizational forms that overcome the classical "networking" structural organizations. The work also opens new spheres of research to the classical human resource management perspectives, as the "Masscapital" opens the management of the human capital to individuals that are non employees of the organizations. Obviously, the paper provides new and innovative ideas to manage educational institutions, and to improve learning processes. Finally, the paper opens new questions of research in the literature about innovation, as formulating some critical sources of innovation and on some key success factors for future entrepreneurs, and specifically students, to be considered in their development and when designing their curriculum.

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FOSTERING INTERACTION USING CLICKERS IN L2 CLASSROOM

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Abstract

This study aims to find a method to promote interaction in L2 classrooms. Active interaction in L2 classroom plays an important role in language acquisition. In light of this, L2 classroom would benefit from the help of learning tools such as Clickers which helps learners to express their level of understanding during the process of learning itself. This is because the anonymity of Clickers allows learners to express their needs without the social risks associated with speaking up in the class. Eventually this tool promotes participation from learners, This is in turn, believed to be effective in fostering classroom interaction. This study is finalized by presenting the result of an experiment conducted to verify the effectiveness of this approach when teaching pragmatic aspects of Korean expressions with similar semantic functions. The learning achievement of learners in the experimental group was found higher than the learners' in a control group.

1. INTRODUCTION

This study aims to find a method to promote interaction in L2 classrooms and introduce an effective tool for learning. In exploring how to accelerate language learning by promoting interaction, we need to look into learners' cognitive process.

According to Richards(2002), learners' cognitive process in L2 classroom follows four steps as follows:

Noticing: Learners recognize differences between forms they are using and target-like forms.

Discovering rules: Learners identify the grammatical variables that operate in the target language and account for the specific linguistic characteristics of that language.

Accommodation and Restructuring: Learners reorganize their own underlying and developing language system, to frame and try out new hypotheses and to act upon the feedback received

Experimentation: Learners forms hypotheses about the target language and use it tentatively and in an uncertain way.

In the stage of discovering and restructuring rules by their own, learners develop and try out hypotheses to reorganize their own developing language system. These verifying stages are where actual learning takes place. Verification will be based on feedback on their own output from their peer learners or their teacher. Learners' outputs made in the interaction with other members in the classroom are very important role in classroom interactions.

Learners' outputs include not only sentences generated during interaction such as class activities, performing tasks given by the teacher but also all forms of outputs generated during the process of learning: hypothesis in the process of being developed, discussions done in L1 or L2 between peers. As long as interaction in L2 classroom is a key factor for learning, increase in learners' output will lead to active interaction in the classroom which will result in help for language acquisition

In this study, a Learner Response System was introduced as a tool to increase outputs among learners during classroom interaction. Learner Response Systems, what are usually referred to as clickers, are composed of three components: Keypad, Receiver, and Software. Keypads allows learners to select a preferred option for the question and transmit their response to the receiver. Receivers transmit the information to the voting software on a computer in the class. The software displays a bar chart of the results immediately using a data projector.

2. CLICKERS IN L2 CLASSROOMS

Theoretical Background

There are two supporting theories for the introduction of clickers to promote L2 interaction: According to Vygotsky's Interaction Theory, learners moves from actual development level to potential development level by scaffolding tutor's questions and interaction with peers. The area between the two levels, the proximity development zone, is where learners develop, verify and restructure hypotheses by interacting with peers or teachers. Interaction takes place in various ways, e.g. during discussion using their first or second language or expressing their opinions and receiving the feedback from others. But in L2 classroom, where not everybody participates in interaction eagerly, there is always some need to promote learners' outputs during the classroom activities. This is because of social risks most of language learners experience during interaction in the classroom. L2 learners must express themselves verbally in their non-native language and they experience anxiety or embarrassment. Krashen(1981) referred this psychological state as Affective Filter. According to his hypothesis, learners' apprehension,

especially that of individuals with shyness, quietness, and reticence, inhibits verbalization and production of outputs, which comes to block acquisition.

Considering learners' psychological state of anxiety and needs to promote learners' outputs and interaction, we can introduce a tool which allows learners to express their ideas and opinions anonymously in the classroom interaction. This tool is the Learner Response System, or 'clicker'.

Learner Response System

Learner Response Systems, called Clickers, are composed of three components: keypad, receiver and software. Keypads allows learners to select preferred option for the question and transmit to the receiver which transmits the information to the voting software on a computer in the class. Once the software collates the data from learners, it displays a bar chart of the results instantly using a data projector.

Cardoso (2012) summarized the efficacy of clickers as follows:

- 1) Motivation: Increase learners' motivation and the general interest in the class
- 2) Involvement: Increase involvement and participation in the classroom
- 3) Self-Assessment: Allows learners to self-assess
- 4) Comparison: Allows learners to compare their performance in relation to that of their peers
- 5) Interaction: Forster interaction in the classroom
- 6) Learning : Enhance the quality of learning and teaching

3. EXPERIMENT

In order to prove that clickers are an efficient tool in promoting interaction in L2 classrooms, an experiment was conducted in a Korean language classroom.

Experiment Method

Learners were to distinguish pragmatic differences in usage between two Korean expressions with similar semantic functions: '-겠-' and '-(으)ㄹ 것-'. Learners need more complicated cognitive process to distinguish the pragmatic difference of expression compared to syntactic or morphological distinctions.

Learners group is composed of adult Singaporean who've undergone 100 hours of elementary level Korean.

As for the methodology, Q-methodology was adopted to convert the qualitative to the quantitative and Quasi-Experiment method that divides learners into two groups:

Control Group which does not use Clickers in learning and Experiment Group which use Clickers

Experiment Materials

First of all, Clickers were given to all the learners in the experiment group. Earlier in the experiment, learners from both control group and experiment group had undergone grammar performance tests to make sure that both groups possessed similar standards of Korean Language Acquisition.

Teacher prepares 10 slides of Powerpoints (PPTs) to be used in the hypothesis development stage (the 'notice' stage). Another set of slides is to be used in the hypothesis verification stage.

Survey questions for Learners' perceptions about the use of clickers in the classroom were prepared. To verify the validity of result of performance test, SPSS21 was used.

Process of Experiment

The experiments was conducted in the following process.

Experiment group	Control group
Pre-test	
PPT with clickers	PPT only
Post-test	
Survey	

Each group had 12 students under the same tutor. Their understanding of the Korean Language prior to the experiment was also verified, revealing a p value greater than 0.5 This may be taken to assume that the learners in both the experimental and control groups possessed similar levels of understanding of Korean.

In the control group, teacher presented questions using PPTs and asked them to demonstrate their understanding by raising hands to answer questions. Students discussed about the answer using their L1 or L2 and correct answers and explanation were given by teacher.

In the experiment Group, teacher presented questions using Turning point PPTs and every student was asked to respond by giving their answers through the clickers. Students discussed about the answer using their L1 or L2 and correct answers and explanation were given by teacher.

In the post-test, both experiment group and control group showed improvement in marks 28.03 and 20.08 respectively when compared to that of the pre-test. Slight decrease in standard deviation was shown in both groups but experiment group showed greater reduction in deviation of test scores.

The survey containing questionnaire in 6 categories about efficiency of Clickers were conducted. The categories are Motivation, Involvement, Comparison, Self-Assessment, Interaction, and Quality of Learning. Details of questionnaire are as follows:

- Motivation
 - The class was interesting.
 - I can confidently apply the contents of lesson to real life context.
- Involvement
 - I felt apprehensive about speaking up in class or expressing your opinions in class.
 - I made an effort to answer all questions that were open to the class.
 - I usually participate in class actively.
- Comparison
 - My peers' answers to questions affect my own answers
- Self-Assessment
 - I was able to evaluate my own progress during the course of the lesson.
- Interaction
 - The classroom interactions was dynamic
- Learning quality
 - In general I had a quality learning experience.

4. DISCUSSION

The results of the Pre / Post Test showed that Experiment group performed better than Control group.

Motivation: the interest level for both group was considered high. 70% of Experiment group responded that using Clickers was fun

Involvement: Learners involved themselves more actively in answering the question, discussing with peers, expressing their ideas without social risks when they use Clickers. The survey showed that there exists a certain level of apprehensiveness when speaking up in class. Hence, there is a demand to minimize this classroom anxiety, which is in turn addressed through mediums like clickers that help learners express their ideas anonymously.

Comparison : Learners face difficulties when they have answers which are different from the ones accepted by the majority. While control group responded that they are affected by other people's answer, experiment group responded that they were not affected by answers from others.

Self-Assessment: While answering the question by participating in polls, Clicker users could receive the feedback promptly and used the feedback as a resource for peer discussion and self assessment. Learners could have more chances to reorganize their own underlying and developing language system, to frame and try out new hypotheses and to act upon the feedback received

Interaction : Learners in experiment group responded that the interaction between teacher to learners as well as learner to learner was active and dynamic at the stage of verifying hypothesis

Quality of Learning: Overall quality of learning was satisfactory and learners have built up the confidence in differentiating the usage of two Korean expressions with similar semantic function

5. CONCLUSION

From the learners' perspective, the anonymity of Clickers enabled them to express their ideas without the social risks associated with speaking up in the class.

From the teachers' perspective, it enabled teachers to judge the degree of understanding of learners by displaying the number of learners who selected the correct answers.

By accommodating learners' social and emotional needs in the classroom, clickers led to a greater enhancement in the cognitive aspect of language acquisition. And the experiment showed that Clicker is a useful tool for promoting learners' participation and fostering interaction in the classroom.

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DESIGN AND DEVELOPMENT OF A WEBQUEST FOR THE COURSE 'ENGLISH APPLIED LINGUISTICS: AN INTRODUCTION' (EA0914). EVALUATION OF ITS EDUCATIONAL ROLE IN THE CLASSROOM (*)

C. GIRÓN-GARCÍA

N. RUIZ-MADRID

Abstract

The purpose of this investigation is to provide students of the EA0914 subject of a virtual environment that complements the face-to-face teaching activities and materials that encourage continuous and autonomous learning on the part of the students of this subject.

More specifically, we aim at planning online task-based activities (WebQuests) (Dodge, 2001; Koenrad, 2003; Blin, 2010; Girón-García, 2013) that encourage the development of the theories on the acquisition and teaching and learning of second languages and foreign languages. Accordingly, with this type of tasks we provide students a wide range of online resources (web pages) (Luzón, 2003; Luzón & Ruiz-Madrid, 2008; Luzón, Ruiz-Madrid & Villanueva, 2010), so that the management of ICTs should be encouraged. In addition, we aim at integrating these activities into the program of the course to assess their pedagogical function from the teaching-learning point of view.

The results that we expect to derive from this project might be of great interest to (a) the teachers involved in the development of these materials; and (b) the 'English Studies Department' (future teachers of the subject EA0914), as well as for prospective students, to know whether the objective with this course really favors a better action and involvement of students and leads to an improvement in the process of learning by the learners. In addition, this study could reveal interesting data to both a quantitative and qualitative level about the role of the WebQuest, as well as about online materials (Comas-Quinn, de los Arcos & Mardomingo, 2012) as tools that favor the learning process outside the classroom (Lier, 2007; Hampel, 2010; Hampel & Pleines, 2013).

1. INTRODUCTION

The training in media literacy becomes central, since media are the main focus of our cultural background. At this point, educators face the challenge of teaching media literacy through online materials in order to contribute to advancing multicultural education.

Following from this, we believe that working with on-line task-based activities (Cybertasks) might involve students' active participation, where both teachers and students learn media literacy skills and competencies.

For the purpose of the present study, we take into account the design of a Cybertask which helps in the students' development of an autonomizing reading competence (Luzón & Ruiz-Madrid, 2008).

2. TASK-BASED LEARNING ACTIVITIES: TRANSITION TO 'CYBERTASKS'

The presence of the Internet as a teaching tool for language learning has become a fact in present days, and thus it might be considered a way of engaging students with real-life materials (Brinton, Snow & Wesche, 1989). In fact, it should be borne in mind that engaging students in authentic communication when they carry out a specific task in the classroom demands the teachers' responsibility in training and guiding their students.

In our context, a task-based learning activity is designed to engage students in searching information through the Internet in order to collect, use and transform information concerning the field of 'Applied Linguistics'. In fact, this kind of task-based activity may help students to: (a) Develop their metacognitive skills in order to learn how to guide their learning on their own (Luzón, 2003), and (b) use the Internet as a tool for their personal learning plan.

This Cybertask consists of a WebQuest (Dodge, 1997; 2001) based model activity to be realized and completed as one of the complementary activities ('Written Assignment') to be given one point at the end of the semester. It is designed with the purpose of collecting, using, and transforming information within the field of 'Applied Linguistics'. Thus, this task is an objective that students covered in the subject 'English Applied Linguistics: An Introduction' (EA0914).

3. CYBERTASK DESIGN: 'ENGLISH APPLIED LINGUISTICS: AN INTRODUCTION' (EA0914)

Before presenting the Cybertask, we will discuss the objectives involved in each of the activities of the Cybertask. These objectives will help us justify the students'

score in each of the activities. Regarding the purpose of our present study, the results obtained in each of the activities will determine to what extent these online task-based activities favour students' learning process outside the classroom.

(Q1): How would you define Applied Linguistics? (Use your own words).

This question tries to highlight the following features:

- (a) Use of information aims at know how to use specific language concepts and expressions (in English).
- (b) Information search is related to identifying information in different texts, and finding common traits in the information found on the Web.
- (c) Information organization is understood as coherence and cohesion. Coherence is adequacy of the text and semantic consistency; on the other hand, to what cohesion is concerned, textual organizers to cohere a text (between lines, sentences and paragraphs) are taken into account.
- (d) Content used is relevant to answer this question. Thus, information relevance is important when students select ideas from the Web pages provided.

(Q2): Which of the branches of Applied Linguistics do you find more interesting? Justify your answer.

- (a) Use of information regarding specific language terminology in English.
- (b) Information search in terms of identifying and finding common features in the information provided in the different Web pages offered to answer this question.
- (c) Content: Relevance of information employed regarding this question is important to attain an excellent score.

(Q3): Which of the three approaches (Environmental Approach, Nativist Approach, and Interactionist Approach) to language learning do you disagree the most? Why? Justify your answer.

- (a) Use of information aims at know how to use specific language concepts and expressions (in English).
- (b) Information search is related to identifying information in different texts, and finding common traits in the information found on the Web.
- (c) Information organization is understood as coherence and cohesion. Coherence is adequacy of the text and semantic consistency; on the other hand, to what cohesion is concerned, textual organizers to cohere a text (between lines, sentences and paragraphs) are taken into account.

- (d) Content used is relevant to answer this question. Thus, information relevance is important when students select ideas from the Web pages provided.

(Q4): Create your own PowerPoint with only four slides where you will have to summarise how each dimension (Contrastive Analysis, Error Analysis, Performance Analysis, and Discourse Analysis) is understood in Second Language Learning (SLL) contexts.

- (a) Content: Students are expected to provide relevant information to answer this question and get an excellent result.
- (b) Creativity is a very important feature to bear in mind, since students are expected to create their own PowerPoint presentation summarising each one of the dimensions mentioned for the purpose of giving answer to this question.
- (c) Information organization: Students should consider coherence and cohesion; not only between paragraphs, lines, and sentences; but also between the slides employed for their presentation design.
- (d) Presentation should be clear and concise, bearing in mind key concepts and short sentences for their further development.

(Q5): You are an English teacher and you have to create a reading activity for two different types of students: (1) Secondary students (12 years old) and (2) Baccalaureate students (17 years old). The topic for the reading is "Christmas". Justify the design of the activity bearing in mind the age and motivation factors.

- (a) Vocabulary and grammar are two relevant traits to answer this question. Students are expected to employ the adequate vocabulary around the topic "Christmas", and correct grammar use for the purpose of this activity.
- (b) Presentation is of paramount importance for this activity, because students should adapt the design of the activity considering the 'age' and 'motivation' factors, with regards to the objectives of the activity.

(Q6): You are an English teacher and one of your colleagues has a problem and cannot teach on Friday. He asks you to develop one listening activity for a very special group: since 10 out of 20 students enrolled are very visual and the other 10 students are verbal, how would you cope with this diversity when designing materials?

- (a) Creativity becomes a crucial feature when designing materials for students with different profiles.
- (b) Presentation of contents should be adapted and understandable, considering the students' diversity (in terms of learning profiles).

- (c) Vocabulary and grammar should be taken into consideration when designing materials for students.

(Q7) FINAL ACTIVITY: Write a short report about the following questions in your own language (Spanish or Catalan).

(Q7.1): How long have you been working on this activity?

(Q7.2): Did you find it interesting? Why?

(Q7.3): How do you think this task is related to the objectives of the program?


(Q7.4): Do you think this task has helped you to face the final exam' Why?

Interests and motivation: This activity expected to expand students' interest and motivation with regards to every single activity proposed in this Cybertask. Motivation is a very important factor to bear in mind if we want our students to engage in a particular task. Learners need to feel motivated in order to keep their attention, not only in the university setting, but also outside the classroom. For this reason, we propose this Cybertask to university students because it provides them a topic of interest: 'English Applied Linguistics: An Introduction' (which corresponds to one of the subjects of the English Studies degree). We need to highlight the fact that students' attention by means of a Cybertask that provides them with a topic they are interested in. Accordingly, students' answers to this final activity provides valuable information concerning: (1) students' improvement in their learning process through better action and involvement in each single activity in the Cybertask, and (2) role of WebQuest and online materials.

After the description of the several objectives involved in each of the activities of the Cybertask, we now present the digital version of the Cybertask as it is presented to the students:

HOME
Introduction
Task
Process
Resources
Evaluation
Conclusion

**A Cybertask for
An Introduction to Applied Linguistics:
English Language (EA0914)
2nd English Studies Degree**



Designed by
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Last updated on November 13th 2013. Based on a template from <http://xahquest.org>

HOME

Introduction
Task
Process
Resources
Evaluation
Conclusion

Introduction

This task is a **WebQuest based model activity** that consists in carrying out a search through the internet. The **goal** is to collect, use and transform information concerning the field of Applied Linguistics

This task may help you to:

- *Develop your metacognitive skills* in order to learn how to guide your learning on your own, and
- *Use the internet* as a tool for your personal learning plan

HOME

Introduction
Task
Process
Resources
Evaluation
Conclusion

Task

The task proposed deals with the field of **Applied Linguistics**. More specifically, you will learn about:

- (1) The nature of Applied Linguistics: analysis, source disciplines, and areas of study
- (2) First language acquisition (L1)
- (3) Second / Foreign language learning (L2/FL)
- (4) Learner characteristics which are encountered in L2 success

In this task you will find several activities and/or questions ([see PROCESS](#)) that you may solve using the information provided in the different web links ([see RESOURCES](#)). Accordingly, you are expected to answer the activities proposed.

In this process of completing the task you will:

- **Evaluate** your previous knowledge in the field of Applied Linguistics
- **Make a selection of online resources** according to your needs and objectives
- **Follow a non-linear navigation** so as to create your own navigation path, thus, you may not follow the exact order of web links proposed
- **Build your own knowledge** in order to answer the activities proposed

[HOME](#)

[Introduction](#)

[Task](#)

[Process](#)

[Resources](#)

[Evaluation](#)

[Conclusion](#)

The Process

To accomplish the task:

- You do not need to surf all the resources proposed, but only the ones that you think are going to be the most interesting ones to carry out the task
- You may also choose a different order of the resources to answer the activities proposed

In order to answer each one of the activities you will need to:

- Read carefully the links provided in [RESOURCES](#)
- Select the appropriate information
- Contextualize the information with the task and its objectives; in other words, build the necessary knowledge adapting it to the situation

***** ACTIVITIES *****

Question 1 (Q1): How would you define Applied Linguistics? (Use your own words).

[HOME](#)

[Introduction](#)

[Task](#)

[Process](#)

[Resources](#)

[Evaluation](#)

[Conclusion](#)

***** ACTIVITIES *****

Question 1 (Q1): How would you define Applied Linguistics? (Use your own words).

Question 2 (Q2): Which of the branches of Applied Linguistics do you find more interesting? Justify your answer.

Question 3 (Q3): Which of the three approaches (Environmentalist Approach, Nativist Approach, and Interactionist Approach) to language learning do you disagree the most? Why? Justify your answer.

Question 4 (Q4): Create your own PowerPoint with only four slides where you will have to summarise how each dimension (Contrastive Analysis, Error Analysis, Performance Analysis, and Discourse Analysis) is understood in Second Language Learning (SLL) contexts.

Question 5 (Q5): You are an English teacher and you have to create a reading activity for two different types of students: (1) Secondary students (12 years old) and (2) Baccalaureate students (17 years old). The topic for the reading is "Christmas". Justify the design of the activity bearing in mind the age and motivation factors.

- HOME
- Introduction
- Task
- Process
- Resources
- Evaluation
- Conclusion

Question 5 (Q5): You are an English teacher and you have to create a learning activity for two different types of students: (1) Secondary students (12 years old) and (2) Baccalaureate students (17 years old). The topic for the reading is "Christmas". Justify the design of the activity bearing in mind the age and motivation factors.

Question 6 (Q6): You are an English teacher and one of your colleagues has a problem and cannot teach on Friday. He asks you to develop one listening activity for a very special group; since 10 out of the 20 students enrolled are very visual and the other 10 students are verbal, how would you cope with this diversity when designing materials?

Question 7 (Q7) FINAL ACTIVITY: Write a short report about the following questions in your own language (Spanish or Catalan).

(Q7.1): How long have you been working on this activity?

(Q7.2): Did you find it interesting? Why?

(Q7.3): How do you think this task is related to the objectives of the program?

(Q7.4): Do you think this task has helped you to face the final exam? Why?

<ul style="list-style-type: none">HOMEIntroductionTaskProcessResourcesEvaluationConclusion	<h2>Resources</h2> <p>In this section, you will find a wide range of resources. Hereby you will have access to information related to the field of Applied Linguistics. You will need to surf these links in order to give answer to the activities proposed in PROCESS</p> <h3>LIST OF RESOURCES</h3> <p>AULA VIRTUAL (EA0914): https://aulavirtual.uji.es/course/view.php?id=28629</p> <p>Question 1 (Q1): How would you define Applied Linguistics? (Use your own words).</p> <ul style="list-style-type: none">- http://www.youtube.com/watch?v=T7dbWW83a74- http://www.youtube.com/watch?v=1j3MYC0bEU- http://www.slideshare.net/jahanzebjahan/an-introduction-to-appliedlinguistics <p>-</p> <p>http://www.cambridge.org/servlet/file/store7/item5633198/version1/Article_What%20is%20applied%</p> <p>Question 2 (Q2): Which of the branches of Applied Linguistics do you find more interesting? Justify your answer.</p> <ul style="list-style-type: none">- file:///V:/volumes/SUBJECTS/EA0914%20-%20APPLIED%20LINGUISTICS%202013-2014/AULA%20VIRTUAL/UNIT%201/1.3.%20Branches/Language%20Assessment/forms_of_assessment.ppt- http://www.youtube.com/watch?v=Wn0_H-kyxkU
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HOME

Introduction
Task
Process
Resources
Evaluation
Conclusion

<http://www.youtube.com/watch?v=acX9o6P2wns>

https://www.academia.edu/2507617/Current_Perspectives_on_Sociolinguistics_and_English_Language_Ec

Question 3 (Q3): Which of the three approaches (Environmental Approach, Nativist Approach, and Interactionist Approach) to language learning do you disagree the most? Why? Justify your answer.

<http://www.youtube.com/watch?v=eTVbdstaiI>

<http://www.wcc.wvu.edu/Resources/CIRCLE/Articles/SLA%20Escamilla%20Grassi.pdf>

<https://www.csun.edu/~ghagopian/Documents/FLA.pdf>

Question 4 (Q4): Create your own PowerPoint with only four slides where you will have to summarise how each dimension (Contrastive Analysis, Error Analysis, Performance Analysis, and Discourse Analysis) is understood in Second Language Learning (SLL) contexts.

<http://www.youtube.com/watch?v=QvQbSZ5Q8Lk>

<http://www.youtube.com/watch?v=rmYsi6sG8w>

<http://www.ingilish.com/performance-analysis.htm>

[http://www.stanford.edu/~hakuta/Publications/\(1977\)%20-%20TRENDS%20IN%20SECOND%20LANGUAGE%20ACQUISITION%20RESEARCH%20.p](http://www.stanford.edu/~hakuta/Publications/(1977)%20-%20TRENDS%20IN%20SECOND%20LANGUAGE%20ACQUISITION%20RESEARCH%20.p)

Question 5 (Q5): You are an English teacher and you have to create a reading activity for two different types of students: (1) Secondary students (12 years old) and (2) Baccalaureate

HOME

Introduction
Task
Process
Resources
Evaluation
Conclusion

Question 5 (Q5): You are an English teacher and you have to create a reading activity for two different types of students: (1) Secondary students (12 years old) and (2) Baccalaureate students (17 years old). The topic for the reading is "Christmas". Justify the design of the activity bearing in mind the age and motivation factors.

<http://www.slideshare.net/videoconferenciasutpl/individual-differences-in-second-language-learning>

<http://www.slideshare.net/cupidlucid/3-factors-affecting-l2-learning-presentation>

<http://eprints.lancs.ac.uk/10748/1/kormos%20Bcsizer-LLpreprint.pdf>

http://skemman.is/stream/get/1946/15018/35741/1/BA_EinarG.pdf

<http://web.firat.edu.tr/sosyalbil/dergi/arsiv/cilt11/say2/217-224.pdf>

Question 6 (Q6): You are an English teacher and one of your colleagues has a problem and cannot teach on Friday. He asks you to develop one listening activity for a very special group; since 10 out of the 20 students enrolled are very visual and the other 10 students are verbal, how would you cope with this diversity when designing materials?

<http://www.youtube.com/watch?v=YaT7Qa12FYA>

<http://www.youtube.com/watch?v=zXb0Bj97yDU>

<http://www.learning-styles-online.com/overview/>

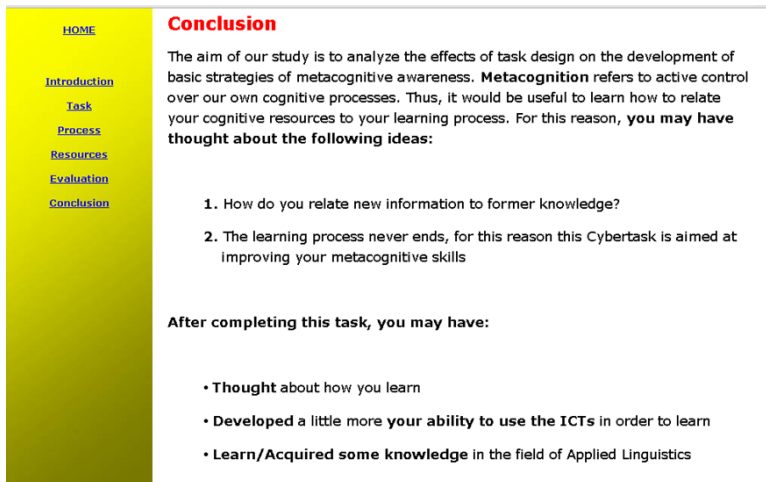
<http://www.youtube.com/watch?v=fQYW6vYSGXs>

<http://www.youtube.com/watch?v=NoEee9I9nCW>

<http://hdl.handle.net/10803/125440>

HOME	<ul style="list-style-type: none"> - http://www.youtube.com/watch?v=NoEee9I9nCw - http://hdl.handle.net/10803/125440
Introduction	<p>Question 7 (Q7) FINAL ACTIVITY: Write a short report about the following questions in your own language (Spanish or Catalan).</p> <p>(Q7.1): How long have you been working on this activity?</p> <p>(Q7.2): Did you find it interesting? Why?</p> <p>(Q7.3): How do you think this task is related to the objectives of the program?</p> <p>(Q7.4): Do you think this task has helped you to face the final exam? Why?</p>
Task	<p>ONLINE DICTIONARIES</p>
Process	<ul style="list-style-type: none"> - Cambridge Dictionaries Online: http://dictionary.cambridge.org/ - Merriam-Webster: http://www.merriam-webster.com/ - Oxford Dictionaries: http://www.oxforddictionaries.com/es - Longman of Contemporary English: http://www.ldoceonline.com/
Resources	
Evaluation	
Conclusion	

HOME	Evaluation							
Introduction	QUESTIONS	SKILLS	SCORES					SCORE IN EACH ONE OF THE QUESTIONS
Task			1 VERY WEAK	2 WEAK	3 GOOD	4 VERY GOOD	5 EXCELLENT	
Process	Q 1	Use of information Information search Information organization Content						
Resources	Q 2	Use of information Information search Content						
Evaluation	Q 3	Use of information Information search Information organization Content						
Conclusion	Q 4	Content Creativity Information organization Presentation						
	Q 5	Vocabulary & Grammar Presentation						
	Q 6	Creativity Presentation Vocabulary & Grammar						
	Q 7	Interests & Motivation						
	FINAL SCORE: ___ / 35							



The screenshot shows a web page with a navigation menu on the left and a main content area. The navigation menu includes links for HOME, Introduction, Task, Process, Resources, Evaluation, and Conclusion. The main content area is titled 'Conclusion' and contains the following text:

The aim of our study is to analyze the effects of task design on the development of basic strategies of metacognitive awareness. **Metacognition** refers to active control over our own cognitive processes. Thus, it would be useful to learn how to relate your cognitive resources to your learning process. For this reason, **you may have thought about the following ideas:**

1. How do you relate new information to former knowledge?
2. The learning process never ends, for this reason this Cybertask is aimed at improving your metacognitive skills

After completing this task, you may have:

- **Thought** about how you learn
- **Developed** a little more **your ability to use the ICTs** in order to learn
- **Learn/Acquired some knowledge** in the field of Applied Linguistics

After the completion of this Cybertask, students think about their own knowledge with the development of the new technologies (ICTs) in order to learn and/or acquire some information in relation to the field of Applied Linguistics.

The next section is devoted to the ‘Methodology’ carried out in this study, which will lead to the choice of the case studies under investigation in the present work.

4. METHODOLOGY

The aim of this study consists of the analysis of a task whose main goal is to encourage the development of the theories on the acquisition and teaching and learning of second languages and foreign languages.

The study was carried out in three stages (Girón-García, 2013: 233):

- 1- Elaboration and design of a Cybertask
- 2- Implementation in a language programme
- 3- Realization of the Cybertask by the students

The “Cybertask” ‘English Applied Linguistics: An Introduction’ (EA0914) deals with different strategies used. It took several days, depending on the needs of every student, which consists of seven activities.

In addition, a number of 58 participants were selected from the group taking the subject ‘English Applied Linguistics: An Introduction’ (EA0914) in the 2nd year course of the English Studies degree at ‘Universitat Jaume I’ (Spain). Among these 58 students, only 2 were selected for the purpose of case studies.

The study took place in the first semester (September-December) of the 2013-2014 academic years and students' participation was presented as one of the compulsory written assignments to be given one point to the final mark at the end of the semester.

In order for results to be available, students had to submit online their Cybertasks to a 'Moodle' platform called 'Aula Virtual' (i.e. Virtual Classroom), so as to have access to all their tasks. Apart from this, students were asked to complete a 'Learning Styles Questionnaire' (Girón-García, 2013) as a complementary activity in the classroom in order to determine students' learning profile, as well as write their personal learning profile regarding the percentages obtained in each of the variants (i.e. active vs. verbal, dependent vs. autonomous, and so forth).

The main instrument for our study has been the 'Cybertask English Applied Linguistics: An Introduction'. Nevertheless, we have used other instruments endorsed for data collection: (1) 'Learning Styles Questionnaire', and (2) 'Final Exam'.

The 'Learning Styles Questionnaire' (<http://www.giapel.uji.es/testestilos/Proyecto.html>) is conceived in such a way that the student is able to choose strategies that belong to different styles. These learning styles are grouped into eight different pairs: (1) Active vs. Thoughtful, (2) Visual vs. Verbal, (3) Synthetic vs. Analytic, (4) Inductive vs. Deductive, (5) Cooperative vs. Individualistic, (6) Dependent vs. Autonomous, (7) Emotional vs. Rational, and (8) Positive attitude towards ICTs vs. Negative attitude towards ICTs.

Regarding Learning Styles, in order to establish a specific type of learning for every student the following detailed description is provided (Villanueva & Navarro, 1997; Girón-García, 2013: 238-241) taking into account the following statements:

Active: The student believes that to learn a language, immersing himself in practice without having planned and thought about it must use this (i.e. language). In this respect, reflection can come later.

Thoughtful: So as to have a thoughtful style, a student thinks that before using the language it is necessary to carry out learning activities related to its use. In addition, a thoughtful student likes planning and reflecting before communication in the language s/he learns takes place. In conclusion, the student believes that it is worth thinking things twice.

Visual: Visual students tend to relate their thoughts to images. In fact, they retain information better if this is presented with tables, graphics, and so forth. Furthermore, students prefer that long texts are accompanied by images, because they think that one image worth a thousand words.

Verbal: So as to have a verbal profile, students relate their thoughts to words and/or expressions because they believe that written information generates ideas for them.

Synthetic: Synthetic students better addresses their tasks by making up general ideas of a problem and thus reaching a more concrete idea. In fact, the student with this learning style best retains the general ideas instead of the small details. Sometimes it happens that while the student is in the process of developing a task s/he may feel bothered by small details about the language, as s/he believes that they have no importance.

Analytic: The student who has an analytic learning style seeks to move forward little by little and does not pass to the next step if the previous one is not clear. In addition, s/he does not like handling different sources of information because these are generally considered to be unreliable.

Inductive: An inductive student likes inquiring into the language and observing it until s/he discovers the rules by himself/herself. Besides, this type of student considers this process as fun and even a discovery game. In addition, inductive subjects believe they have the ability to go from general to specific ideas.

Deductive: Deductive students are reluctant to discover the rules of a language by themselves, but instead, they prefer to have the rule first and then apply it. Otherwise, they believe that going from concrete ideas to general ideas is a waste of time. In addition, they learn the grammatical rules of a language through simple sentences applied from a rule. The deductive students believe that it is better to learn a language with practical exercises using a rule.

Cooperative: Cooperative students love working in groups because interchanging ideas and debating is very important for them. Sharing different points of view when working with other people enriches their work outcomes.

Individualistic: An individualistic student prefers working alone because organizing group work is a waste of time for him/her. In addition, this type of students has the impression of advancing at a low pace.

Dependent: Dependent students like their teacher to take control and responsibility over their language learning. Furthermore, they prefer to receive an external evaluation, either positive or negative. Generally, these students believe that best results are obtained if there is a competitive environment.

Autonomous: Autonomous students do not feel the need to have a control of their work, since they are considered self-sufficient to assume that responsibility. In this way, unlike dependent students, these do not feel the need of a competitive environment in order to move forward. Their own self-improvement is their best stimulus.

Emotional: The student believes that s/he learns better when s/he is surrounded by a warm atmosphere. Cultural features of the language are of paramount importance

for emotional students and they would like being able to discuss positive and negative aspects of native speakers in the classroom with the teacher and their peers.

Rational: Rational students feel insecure or even bothered when they find language exceptions in their learning process.

Positive attitude towards ICTs (+ ICTs): Students with a positive attitude toward the use of new technologies to learn languages consider that the Internet is an important tool as it offers many resources to learn languages. These students cannot live without their computers.

Negative attitude towards ICTs (- ICTs): Students with a negative attitude toward new technologies believe that there is so much information on the Internet that they do not know how to handle it. For this reason, they prefer a book instead of a computer, as computers and they do not get on well.

The 'Final Exam' was presented as a compulsory written test to be given up to a 70% to the final mark at the end of the semester. The students' result in this test is necessary so as to find correlations among (a) students' answers in the Cybertask, (b) their cognitive learning profile, and (c) their 'Final Exam' result. These three elements will might help us devise whether the course objectives really contributes a better action and involvement in the students' learning process.

5. RESULTS AND DISCUSSION

In this section, we present the different results obtained and which derive from our experiment with the Cybertask. These results reveal the students' learning styles, their personal opinion regarding the Cybertask (Activity 7), and their exam result. In addition, due to the relevant features of some of the students who participated in our study, we will analyse and discuss a total of 2 case studies out of 58 students.

The observations and conclusions obtained in the group study presented herein, acquire a new dimension from the point of view of an analysis of particular cases. The qualitative analysis of the responses allows us to discover a network of strategies, behaviours and emotional, cultural and cognitive trends that offer a different perspective in the study of the learning profiles concerning the use of ICT's as a learning resource (Navarro, Luzón & Villanueva, 1997: 139).

For each of these two case studies we will summarise their cognitive profile (learning style), their exam result, and their personal opinion concerning the Cybertask (Activity 7). Accordingly, we will discuss in detail the profiles of each of these two case studies ('Student A' and 'Student B').

‘STUDENT A’:

(a) Learning Style:

- Active (25%) / Thoughtful (100%)
- Visual (0%) / Verbal (100%)
- Synthetic (0%) / Analytic (60%)
- Emotional (100%) / Rational (0%)
- Inductive (50%) / Deductive (25%)
- Cooperative (66.67%) / Individualistic (66.67%)
- Dependent (33%) / Autonomous (100%)
- (+) ICT’s (100%) / (-) ICT’s (66.67%)

As far as the Learning Styles Questionnaire is concerned, this student describes her cognitive language profile as follows:

“Taking into account these results, we can see that I am a thoughtful person, because I prefer to think carefully about what my actions are going to be, and the steps to take; also, I consider myself a verbal person, since I learn better with texts, the longer the better; moreover, I am quite analytic, I like focusing on details more than on general ideas, and so I tend to be inductive, as I am able to take a general idea from specific information; another important trait is that I am emotional, because my learning is based on calm and relaxed atmospheres; and my view on ICT’s is more positive than I expected, I like using electronic devices, but I believe that there is too much data. A result I have found interesting is that I am both a cooperative and autonomous person. Although the cooperative-individualistic style is rather equal, I consider that I tend to be cooperative, as I do not mind playing a role in group works, giving ideas and assessing my groupmates. However, on the other hand, I do not stand people telling me how to do my things as long as I do not ask for it, and therefore, I prefer to work autonomously”.

(b) Exam Result: 10 points (out of 10 points)

(c) Personal opinion concerning the Cybertask:

(Q7) FINAL ACTIVITY: Write a short report about the following questions in your own language (Spanish or Catalan).

(Q7.1): How long have you been working on this activity?

(Q7.2): Did you find it interesting? Why?

(Q7.3): How do you think this task is related to the objectives of the program?

(Q7.4): Do you think this task has helped you to face the final exam' Why?

"This Cybertasks work has taken me about a week, since the search for information and sees the proposed videos have led me some time. In my opinion, has been a different and less expensive to make work than the previous ones, because it is related to concepts that we have given in class. However, having the tests closely, I've had to reduce my time in this to devote it to the study of the subjects, and the truth is that I would like to further develop the questions.

On the other hand, I think that it has been a different and more interactive; work since we have removed sources provided information to then apply it in the exercises. And of course, we had to use our minds to develop certain responses with our words.

In addition, it has allowed me to take a look at the books and articles of the links, and honestly, I think that I will be very useful in my studies; as well as suggested videos, which I have seemed concise and easy to follow, even some with funny and animated touches. As for the relationship with the objectives of the programme, I think that prepare works (in general, in all subjects) is something that is necessary for our academic performance, and this in particular provides the ability to relate the concepts given in class, as well as to reason critically the information that has been suggested to us. In addition, it also helps us to work relatively independently, learning at the same time.

From my point of view, the work brings together the terms and major theories of all issues, and most importantly, resumes them, something that is very helpful for the exam of Linguistics. However, this means leaving aside the specifics of each item, because you have to adhere to the general. Even so, it has been a good way to "Refresh" the information we had stored for months in our head."

‘STUDENT B’:

(a) Learning Style:

- Active (50%) / Thoughtful (100%)
- Visual (25%) / Verbal (25%)
- Synthetic (33.33%) / Analytic (40%)
- Emotional (75%) / Rational (0%)
- Inductive (0%) / Deductive (25%)
- Cooperative (33.33%) / Individualistic (33.33%)
- Dependent (33%) / Autonomous (66.67%)
- (+) ICT's (66.67%) / (-) ICT's (0%)

Regarding the Learning Styles Questionnaire, this student describes herself as follows:

“There exist eight opposed pairs within the student’s language learning styles, i.e., the “general ways” which they have to retain the information that they are reading or studying. These are: active vs. thoughtful, visual vs. verbal, synthetic vs. analytic, inductive vs. deductive, cooperative vs. individualistic, dependent vs. autonomous, emotional vs. rational, (+) positive ICT’s vs. (-) negative ICT’s.

According to the “Learning Styles Questionnaire”, which is a survey that students had answered last Tuesday, my own language learning profile related to learning styles is the following: I happened to be 50% active vs. 100% thoughtful, which means that although I strongly believe that practise is a “paramount need” to develop the language knowledge, I also think that is quite important to acquire a global language knowledge and think what I am going to say before express it out loud. Moreover, I am 25 % visual vs. 25% verbal, since although it is easy to me retain the information which is showed to me as a picture or scheme, I often need the help of the complete text in order to comprehend some complex ideas in a good way. The survey stated that I am also 33.33% synthetic vs. 40% analytic. The explanation for this fact is that I prefer to learn concepts step by step, without leaving any of them. Another result was that I am 75% emotional vs. 0% rational, because I consider that language devices like metaphors enrich languages – for example -, unlike “rational minds” who prefer that language is showed in a strict clear way, in order to avoid misunderstandings.

I am also 33.3% cooperative vs. 33.3% individualistic, since although I am aware of the benefits of work in groups, I like making things – essays, classroom practises – on my own. About the need of being assessed by others, I am 33% dependent vs. 66.67% autonomous, that is, I like that other people say to me their opinions about my work, and I am thankful to hear their advices. Nevertheless, I do not like being controlled by others when I am working, since if I feel overwhelmed under the “leadership2 of someone, I can not develop my skills in a proper way.

Then, I am 0% inductive vs. 25% deductive, because I prefer to learn the rules and, then, apply them to the particular cases.

Finally, I found that I have 66.6% (+) positive ICT’s attitude vs. 0% (-) negative ICT’s attitude, since in my opinion, sources like internet are really helpful tools to search – and find – information and learn new things.

As a conclusion, in the development of this activity, I have been able to discover that my language learning profile is not definitively clung to any of these eight pairs. It is just a “chaotic” combination of them, which constitutes my own “successful” way to retain information”.

(b) Exam Result: 6.5 points (out of 10 points)

(c) Personal opinion concerning the Cybertask:

(Q7) FINAL ACTIVITY: Write a short report about the following questions in your own language (Spanish or Catalan).

(Q7.1): How long have you been working on this activity?

(Q7.2): Did you find it interesting? Why?

(Q7.3): How do you think this task is related to the objectives of the program?

(Q7.4): Do you think this task has helped you to face the final exam? Why?

"The objective of this report is to answer the following questions, related to the virtual task that I have recently developed: you found interesting during how long have you been working on this activity?? why do you think that it is related to this task with the objectives of the programme? do you think that this task you has been helpful to deal with the final exam? why? To do this, I have prepared this task and I thought about an appropriate response to the questions posed.

First of all, I can say have employed around two and a half days to complete this activity, because despite all the materials needed to make the task, these were a considerable extension and required to be read with some care. However, I do not think that it has been too long nor that that time has been lost, because I think that it has helped me to review concepts that time ago I studied, and that in fact, now I know that I needed to review. And this is the reason why this task found me interesting, since it has given me the opportunity to dig a little deeper into concepts that had previously studied, and not only that, but also to understand them in a clearer way.

In second place, after having used the materials of the subject, along with the sources provided in the virtual task, can assure with relative certainty that, indeed, this task is directly related to the objectives of the programme, since it gets students to develop skills such as writing, and the critical sense, while it is "forced" to review the contents of the subject and to put them into practice, skill that seems to be fairly important within the field that concerns us, applied linguistics.

Finally, I think that this task I can be helpful to deal with the final examination of the subject, because, while it does not include each and every one of the concepts seen in class, - as expected, given the length of the task, in this case, yes addresses some of the most notorious and even encouraged to read those that do not appear explicitly, but which nonetheless are related to those that do appear.

In conclusion, from my point of view, this is a very interesting and desirable task for students. It involves some of the terms and concepts of increasing importance of the

subject and encourages the development of these concepts by students, two very important things to deal with the final exam”.

In the light of the results shown in relation to the Cybertask ‘English Applied Linguistics: An Introduction’ (EA0914), further discussion is presented concerning the main aim of our study: *To what extent do WebQuests and online materials favor the learning process outside the classroom?*

The analysis of the data may lead us to suggest the following ideas:

- (a) Students’ ability to deal with learning processes by means of managing different sources of information and selecting information,
- (b) Students’ ability to synthesize and take decisions about the use of that information and their ability to build new knowledge in the process of answering the different activities,
- (c) Students’ ability to reflect through a coherent discourse, which implies bearing in mind the process and not only the result of the task,
- (d) Students’ ability to employ language correctly with regards to grammar and lexicon, and
- (e) Students’ ability to understand texts and answer the activities proposed

Let us recall that the Learning Styles Questionnaire enables us to define a student’s profile as a compendium of combinations of traits and gradual criteria, depending on the options that s/he selects in each of the columns that, in theory, correspond to different learning styles. Moreover, the students’ choices are the result of an introspection process.

6. CONCLUSIONS

The aim of the present work has been to examine to what extent WebQuests and online materials favour the learning process outside the classroom. Our results agree with previous research in the sense that students did:

- (a) Put into practise their reading skills on the Web, as well as their ability to understand what they read,
- (b) Interact with texts resulting from an Internet search (considering the Web pages proposed),
- (c) Perceive Web text reading as different from print text reading,
- (d) Navigate creating their own paths through the information in a non-linear way.

According to our study, complex technological skills have the following implications (Girón-García, 2013: 433-434):

(a) We have seen that students have identified different types of screens and different ways of searching information in Web pages (i.e. the way in which they handle information),

(b) Students show personal interpretation and decision-making about information selection, and

(c) Students learn how to use interactive tools: Selection of links, webs, forums, videos, and so forth, bearing in mind the need to answer the questions proposed in the Cybertask.

The combination of all these implications leads to students' development of autonomous strategies for effective Cybertask completion. From the above technological skills, skills related to autonomy development are derived. Thus, we conclude that it is necessary that:

(a) Students know how to identify search objectives and modify them according to the information they have found on the Web.

(b) They know how to apply the search on the Web to task objectives.

(c) To select information on the Web pages bearing in mind the activities proposed.

(d) Re-use information. It is of paramount importance to re-use the information found on the Web, in order to adapt that information to personal needs in relation to the tasks and in relation to the students' background knowledge. In this sense it is important to propose tasks and exercises that imply strategies of induction, synthesis and generalization to construct meaningful knowledge.

In addition, after our study, we are aware that we could establish a distinction between **learning trait** and **learning style**, which may apparently refer to the same idea but are in fact different. We should take into account that the design of our Learning Styles Questionnaire is introspective; this means that a series of statements related to each one of the learning styles are offered to the student. After completing this, the student was able to select those statements that s/he considers best fits in with his/her learning needs, but the fact that students were able to select options from, for example, active and thoughtful traits does not mean that they belong to a specific learning style in absolute terms. The questionnaire offers a gradual perspective of students' profiles. Therefore, in this case we are referring to a learning trait because the student has traits in the active or thoughtful learning style. For this reason, we cannot talk about learning style in absolute terms, but we should instead talk in terms of learning style traits, which in combination with other traits may constitute complex learning profiles or *style-blending*. In other words, this combination of strategies is what we call *blended learning profile*, which has an influence on how students solve a given task. Style-blending can be defined as a

combination, mixture or synthesis of strategies that characterise a particular student learning profile.

Accordingly, the following suggestions are derived from this study:

With the aim of improving students' learning processes through Cybertasks, we need to bear in mind that it could be useful to design future exercises focusing on specific skills:

(a) Exercises that focus the task on the selection of information, in order to answer a learning need: gathering different contents on the Web with the purpose of answering the questions proposed in the Cybertask.

(b) Exercises that involve interaction on the Web: blogs, forums, e-mail. It would be interesting to give some training to students for selecting blogs and forums, in order to stimulate their personal expression, their interaction capacity and their practise in collaborative learning.

In the light of the result of the present study, we view that Cybertasks complement the face-to-face teaching activities and materials that encourage continuous and autonomous learning on the part of the students of the subject 'English Applied Linguistics: An Introduction' (EA0914).

Finally, we believe that these kind of online activities favour the students' learning processes outside the classroom.

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(*) The research conducted in this article is part of the Education and Innovation research project: Proyecto de Innovación Educativa (PIE) Universitat Jaume I. Diseño y Desarrollo de una WebQuest para la asignatura “Introducción a la Lingüística Aplicada en Lengua Inglesa” (EA0914). Evaluación de su papel pedagógico en el aula.

Accounting and The Built Environment Student: The Introduction of Simulated Case Studies to Augment Student Learning

¹H. ANTONIADES

Abstract

Suitable accounting knowledge is generally required for the day to day management of a business. For this reason it is common for undergraduate degrees to include a stand-alone subject for the development of the students' accounting and business management skills. This research paper explores the effectiveness of introducing case studies into the class room environment as part of the students learning experience. The research methodology in this paper analyses results from six groups of students over consecutive years. The students were enrolled in a property or construction undergraduate degree. Three groups of students (groups 1, 2 and 5) were taught without any case study simulations; two groups (groups 3 and 4) were taught with integrated case studies relating to the built environment, and one group (group 6) was taught with part of their subject providing simulated case studies and partly no case studies. The results indicated a superior learning outcome, with outstanding results, and a higher pass rate for groups 3 and 4; group 6 results showed a trend for students being better motivated towards their learning experience, once case studies were introduced into the class room environment; and groups 1, 2 and 5 grappled with the difficulty of understanding accounting concepts.

Keywords: accounting, built environment, case studies, education, knowledge, learning,

Introduction

A thorough understanding of good management and business skills are considered crucial for the successful operation of any business or profession. Therefore, accounting concepts which underpin the critical aspects of these knowledge fields are sometimes embedded within non-accounting degrees. For this reason it is easier for undergraduate degrees to include a stand-alone subject for the development of the students' accounting and business management skills. There are various methods adopted to assess students undertaking the stand-alone subject. These assessment

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approaches range from quizzes and class tests and extend to formal exams. The use of assignments is not very common, and this is primarily because elementary accounting subjects consist of more numeric calculations rather than geared towards a theory based approach. Therefore, this lack of flexibility with assessments does not provide the student with an opportunity to develop “problem solving skills”.

Traditionally, the accounting subjects are taught through a lecture style approach, followed by a tutorial session, with emphasis on the application of the mathematical calculations. There is also the additional problem, where the traditional accounting language relevant to an accounting degree, focuses on examples within the retail and manufacturing industries. However, this is a challenge for students in the built environment, where their needs are primarily associated with understanding the accounting concepts for property and construction. There is also the consideration that accounting resources and educational material, favour examples within retail and manufacturing; with little thought geared towards the requirements of the service industry for property professionals, or the management of a construction business.

Therefore, the thought arises if there are any benefits for students in the built environment, to engage in simulated case studies predominantly relevant to their discipline. It could be argued that accounting language is relevant, for understanding core themes, however a practical and meaningful application for the students would be to demonstrate these core concepts within their own discipline. This would enhance the students understanding of good business management skills, and provide a meaningful learning experience. For instance, managing a staff of 30 construction individuals would require different tactics and business skills, as opposed to managing 30 sales assistants in a supermarket/retail environment.

There is also the consideration from the lecturer’s perspective, where they are required to teach accounting to non accounting students. This can be a daunting task, where traditionally there is usually only one subject allocated for business management skills within a non-accounting degree. It is quite challenging to expect the students to grasp all the key elements of accounting concepts and decisions, within a relatively short space of time.

Therefore, this research paper explores the effectiveness of introducing case studies into the class room environment as part of the students learning experience. The first section of the paper commences with a discussion on the literature for teaching accounting concepts, which are augmented with case studies. The discussion is complemented with data and an analysis of the assessment results from six groups of students. These students were enrolled in undergraduate degrees in either the property or construction discipline. It is argued that case studies are an effective learning tool for students.

Literature Review

The introduction of digital technology has encouraged new approaches to teaching many subjects and accounting is no exception. Literature within accounting education journals acknowledges that student interaction is an important criterion for good learning outcomes. For instance (1) acknowledged the challenges in teaching accounting subjects and was of the opinion “central recurring theme in business education is the optimal strategy for improving introductory accounting” (pp23) and this is also followed by a desire to engage in active learning processes to maintain the students’ interest.

Concern with the methods of teaching accounting concepts has been discussed and researched extensively, with an ongoing debate over the best teaching approach for accounting subjects. This led to faculty members in 1990 to undertake a survey of the most favoured style of teaching by lecturers. The results showed that lectures followed by the seminar/tutorial format (2) were dominant. However, this method of teaching led to criticism, as students “are not being encouraged to exercise and express independent thought”. This notion was also earlier reiterated by (3, 4, 5). In addition, the importance of communication skills was highlighted by (6), where it was observed that accounting graduates were lacking in the written report style required to disseminate information to their clients.

Other issues raised, whilst undertaking this literature research includes problems with the specific accounting language and the understanding of the accounting vocabulary; lack of timely feedback on assessments; and the building of knowledge from previous lectures/seminars. These problems were addressed by (7) who suggested that lecturers should be implementing goals and objectives for the students to master; the lecturer should provide feedback in a timely manner; and to review the accounting vocabulary regularly in class; the aim of these suggestions being to help the students better grasp the key accounting concepts. Furthermore, the introduction of role play simulation to engage students interest and learning was suggested by (8) and the development of “analytical thinking, decision making, and communication” skills (9). These conclusions were similar with other research comparing various teaching styles (10), identified a lack of technical and procedural information; inadequate conceptual processes of accounting and the lack of clearly defined learning objectives. Ironically (11) identified students learning and interest could increase if the lecturers were more familiar with the course material.

As mentioned earlier, digital technology has encouraged different approaches to teaching accounting. For instance are power points more effective than a white board? This could of course depend if the power points were used as a slide show, or integrated within the class room context. For instance, (12) evaluated the effectiveness of conducting accounting lectures with the use of power point presentations. Their research concluded that students who were taught via the blackboard

gained a deeper understanding of the subject if this was integrated with the use of the application of the subject.

However not all research concludes with a negative outcome on the application of digital technology in the educational arena. For instance, (13) favoured the use of digital technology for accounting students to increase student motivation and fully engage student learning. Particularly in the last decade with many students in high school able to use computers, there is a natural expectation that this trend will continue through to university studies. Another consideration is the use of interactive on-line learning systems (14), where research noted a positive association with exam performance from students who had access to this additional resource. It can be very challenging to teach a stand-alone accounting subject to students of the built environment and for this reason, a variety of teaching styles and resources appear to benefit the students learning experience.

Historically, educational research has focused on teaching accounting to the business accounting discipline. Whilst there is some research documenting the best approaches in teaching accounting to non-accountants, there is scant literature in particular within the Built Environment. So the question arises on how we can improve the teaching delivery to maintain adequate interest and engagement within the built environment discipline, and simultaneously achieve the desired learning outcomes and adequately prepare students for class tests and exams.

In the wider context, it is generally accepted that accounting has numerous capabilities and end results. For instance there is the consideration of mathematical calculations, the application of theoretical concepts, and best practice management decisions. However criticism against the accounting discipline pivots on the perceptions of the “rules-based procedural approach” (15), with little emphasis on the macro issues which underpin the conceptual understanding of the accounting principles. In other words there is an imbalance of micro and macro applications of accounting principles. For instance, similarly to the economics discipline of micro and macro economics and the understanding of how to apply these concepts in a business making environment, it would be justifiable to include a related approach for accounting concepts.

As mentioned earlier in the paper, there are various methods for assessing students and also researched teaching approaches; such as the link between class room interaction, digital technology and relevant resources. Therefore, a further consideration on this notion is the assumption that students from the Built Environment, would benefit from selective examples inclusive of property and construction themes, instead of retail and manufacturing. Other suggestions include formative assessment (16); multiple choice-questions and problem based questions (17), where it was suggested that multiple choice assessments can provide the student with a higher opportunity of selecting/guessing the correct response to the question.

Therefore research does indicate the benefits when incorporating a variety of teaching styles, such as innovative problem solving (18, 19) and integrated case studies (20). Whilst accounting can be considered a very dry and regimented subject, the lecturer is faced with the challenge of engaging and stimulating the students' interest in a class room environment. The case studies have been acknowledged as improving a student's ability to identify problems and develop a rational constructive approach to aid the research of the relevant issues. Furthermore, (21) noted that it was important to consider "what" we teach and "how" we teach, and (22), concluded that students were provided with a "richer contextual environment" by the introduction of case studies relevant to the students' field of study. Furthermore, the suggestion to align accounting topics within the relevant field of discipline, can provide the student with a better learning experience (1).

Additionally, there are other considerations which are noteworthy to mention. For instance supplementary class handouts (23); and problem solving, lecture/discussion format for classes (24) the latter which is relatively unchanged during the preceding 25 years.

In conclusion, the literature reviewed in this research paper has identified the need to modify accounting subjects taught to accounting and non-accounting students. The introduction of case studies to augment student learning is endorsed and encouraged. It is also of paramount importance that the lecturer has a complete understanding of the material relevant to the subject and to keep introducing new methods of teaching to make the subject interesting. Therefore, there is an important link between the lecturer's depth of knowledge and the ability to prepare a challenging case study for the students to research.

Research Method and Limitations

The research methodology in this paper analyses results from six groups of students, over consecutive years, who were enrolled in property and or construction undergraduate degrees. The undergraduate degree comprised of one shared accounting subject which was taught over one semester. Three groups of students, identified as Groups 1, 2 and 5 were taught without any case study simulations. Furthermore, their subject matter incorporated the traditional accounting language found in an accounting degree. Their class work incorporated examples of accounting concepts which were extracted from a variety of industries within retail and manufacturing, and with very little content from the Built Environment discipline.

Students identified as Groups 3 and 4, were taught with integrated case studies relating primarily to the built environment. There was a modified approach to the accounting "language". For example, the accounting term "*inventory*" was substituted with the equivalent term commonly known in construction as "*materials*".

The case studies were also a feature of the class test/formal exam, with tutorial classes modeled to assist the development of the students' problem solving skills.

The final group of students, identified as Group 6, were taught with part of their subject providing simulated case studies and partly no case studies. The traditional accounting language was modified for the case studies. This mixed method approach was applied equally to the subject for Groups 6. Therefore, this group was provided with traditional accounting examples without case studies in the first half of their subject, and the remaining half of the subject was augmented with case studies featuring built environment examples.

The purpose of the research paper was to ascertain if case studies are an effective learning tool for students. The case studies included problem solving skills, modified accounting language, and integrated examples which relate to the built environment. All six groups of students were assessed using an identical mix method of quizzes, class tests and a formal exam. All assessments had similar weighting for each topic in the accounting subject. A matrix which identifies the assessment criteria, plus data relating to class sizes and exam results is also provided to support the conclusions in this research. All groups participated in workshop/tutorial classes; additionally, all six groups were provided with on-line tutorial questions and answers.

Discussion and Analysis

As discussed earlier in the paper, teaching accounting principles to non-accounting students can be very challenging. The six groups of students discussed in this research, were from either the Property or Construction Project Management undergraduate degrees within the discipline of the Built Environment. The accounting subject was a compulsory shared subject for both undergraduate degrees with a couple of students from either Architecture or Design selecting the subject as an elective.

Table 1 below, identifies the group of students analysed. Each cohort is listed with the relevant method of assessment and teaching delivery. In particular Groups 1, 2 and 5 were primarily taught with power point presentations, Groups 3 and 4 were with the use of a white board, and Group 6 was initially taught with power point presentations, and the second half of the subject was with the use of the white board.

TABLE 1: COHORT GROUPS – IDENTIFIED - SIX GROUPS

GROUP 1 – Application as an accounting discipline	GROUP 2 – Application as an accounting discipline	GROUP 3 – Application to the Built Environment	GROUP 4 – Application to the Built Environment	GROUP 5 – Application Mixed	GROUP 5 – Application Mixed
Quizzes	Quizzes	Quizzes	Quizzes	Quizzes	Quizzes
Class Test	Class Test	Class Test	Class Test	Class Test	Class Test
Formal Exam	Formal Exam	Formal Exam	Formal Exam	Formal Exam	Formal Exam
Weekly Lecture/Tutorial	Weekly Lecture/Tutorial	Weekly Lecture/Tutorial	Weekly Lecture/Tutorial	Weekly Lecture/Tutorial	Weekly Lecture/Tutorial
On Line Tutorials	On Line Tutorials	On Line Tutorials	On Line Tutorials	On Line Tutorials	On Line Tutorials
No Built Environment examples	No Built Environment examples	Built Environment examples	Built Environment examples	No Built Environment examples	Partly Built Environment examples
Accounting	Accounting	Modified language	Modified language	Accounting	Partly Modified language
Power Point	Power Point	White Board	White Board	Power Point	Power Pt & White B

The analysis above in Table 1, provides a snap shot of the assessment and teaching delivery for the six groups of students. Furthermore, all groups of students were assessed using the identical assessment matrix which appears below in table 2:

TABLE 2: MARKING CRITERIA FOR THE ACCOUNTING SUBJECT

CRITERIA FOR ASSESSMENT	WEIGHTING
Application of accounting theory	25%
Application of business decisions skills	25%
Mathematical calculations - process	40%
Creative thinking - alternative solutions	10%
	100%

The purpose of the marking criteria was aimed to remove focus from the mathematical aspect of accounting, with an emphasis to draw out the students’ ability to use theoretical concepts to solve problems and to develop high-quality business making decision skills. Of course mathematical accuracy is very important, however there is an abundance of computer accounting software available, and excel spreadsheet modeling, to assist employers with support in this area. Therefore, with the allocation of marks above in Table 2, the nominated 40% category was primarily driven towards the accuracy of the “correct technical process” for the calculation.

The examples and problems selected for groups 3 and 4, were specifically relevant to the Built Environment industry and inter-related with their other core subjects in

their discipline. Additionally the students were introduced to the accounting language systematically with weekly review and examples of the application of the terminology applicable to the Built Environment. During class time, Groups 3 and 4 practiced their accounting and decision making skills with small case studies, and were taught to break down the various key components and to consider the application of various possible solutions to solve the case studies presented in the class exercises. This required the students to use both analytical and critical thinking skills. The students were given the option to work individually or with another student, and were able to practice small style case studies as a follow-up with the online tutorial questions made available throughout the semester.

After the first half of the semester, the students were encouraged to develop their research skills in combination with their accounting and decision making skills. This approach allowed the student to individually develop answers to intricate case studies and check their answers progressively against the on-line tutorial sessions, which provided a suggested solution. However, as mentioned earlier in the paper, only Groups 3 and 4 were using specific examples relating to the Built Environment, and furthermore were provided with a modified approach to accounting language; and during each lecture/workshop, these two groups, were given the opportunity to assimilate the accounting language in context with the Built Environment. In contrast Groups 1, 2 and 5, used primarily non Built Environment examples, and were taught in the mode of teaching accounting within the accounting discipline. All assessments for the six groups, contained a similar weighting for each topic in the accounting subject. Group 6 was taught with a combination of non Built Environment examples for the first half of the subject, and in the second half followed the same approach as for groups 3 and 4.

This diversity of case studies, lectures and workshops, and online tutorials, gave students the opportunity to develop and learn at their own pace and seek assistance as required. This forced the students to participate in active learning and take responsibility for their progress with their studies for this subject. By providing the solution to each of the exercises and case studies progressively, the students were able to evaluate their own answers, critically reflect and finally compare their written answers with the final solution. This also improved the students' critical thinking skills and written communication which was measured by using the same matrix for all groups of students. For example, in some cases there were different possible solutions to the complex problems and the students were assessed on their ability to think outside the "square box". It was important to integrate their skills though out this subject so there could be a meaningful outcome.

Below, in Table 3, are the final results achieved within the different groups. These groups were assessed using the same assessment matrix as identified in Table 2, earlier in this paper. Students who did not attempt any assessments for this subject,

and discontinued attendance were removed from the analysis. There could be varying reasons for not continuing with the subject, ranging from work commitments which caused the student to have no time to attend class, or perhaps a heavy study load and not being able to keep up with the class work.

Table 3: RESULTS FOR ALL GROUPS

GROUPS	DETAILS	Number of students	Students not continuing	Mark under 50	Mark over 50	Percentage Failed	Percentage Passed
GROUP 1	Undergraduate Autumn 2011	69	5	16	53	17.19%	82.81%
GROUP 2	Undergraduate Spring 2011	63	1	21	42	32.26%	67.74%
GROUP 3	Undergraduate Autumn 2010	83	7	14	69	9.21%	90.79%
GROUP 4	Undergraduate Autumn 2012	44	0	2	42	4.55%	95.45%
GROUP 5	Undergraduate Spring 2012	60	1	13	47	21.67%	78.33%
GROUP 6	Undergraduate Autumn 2013	66	2	0	66	0%	100%

The identical assessment matrix listed in Table 2 was used to assess the results for all 6 groups. Therefore, Table 3 analysis indicates that Groups 3, 4 and 6 had a higher pass rate in comparison to Groups 1,2 and 5. For instance, the pass rate for Groups 3 and 4 was 90.79% and 95.45% respectively, with Group 6 achieving 100% pass rate, whilst Groups 1, 2 and 5 recorded 82.81%, 67.74% and 78.33% respectively. Further analysis of the results indicated that Groups 3 and 4 achieved a better learning outcome experience with 39.47% and 47.73% of the class achieving a score of 75 and above, whilst with Groups 1, 2 and 5, 21.88%, 9.68% and 8.33% respectively, of the class achieved a score of 75 and above. From the Group 6 students which were taught with a mixed method approach, 53.03% achieved a score of 75% and above.

In conclusion, the results from the analysis indicates that teaching accounting concepts with Built Environment examples, and a modification of the accounting language, provides the student with an opportunity to improve their performance and enhance their learning outcome.

Conclusion

The suggestion of applying accounting skills to related topics in their undergraduate degree, through simulated case studies, would greatly enhance the students' practical application of accounting. Therefore, the detail and contents of the case study, is an important contribution towards the student's involvement and enthusiasm for

the subject. This is evidenced with the analysis discussed earlier in the paper, where Table 3 indicated a superior learning outcome and a higher pass rate for Groups 3 and 4 who were taught within these prescribed methods. In conclusion, if the accounting examples and the accounting terminology were adapted to the Built Environment, this would have a more meaningful learning outcome for the students, as opposed to learning how to manage a pharmaceutical retail business.

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RISK ANALYSIS RELATED TO THE TEACHING PLAN OF A BACHELOR'S DEGREE COURSE

M. FERNÁNDEZ-DIEGO, E. GUIJARRO and E. BABILONI

Abstract

Successful courses require careful planning and continual revision. Although lecturers increasingly plan their courses, they do not often think about the dangers that may affect such planning. This paper discusses the nature of these threats and how they can affect the teaching plan of a Bachelor's Degree course. For this, a risk analysis is performed to quantify the cumulative impact of the events. While most of threats entail temporary delays, one of the main characteristic of a teaching plan is that some dates are usually delimited by regulations and cannot be delayed. As a consequence, this implies a loss of teaching quality which reinforces the importance of identifying these threats previously to minimize their effects.

1. INTRODUCTION

The teaching plan is the development of a comprehensive training project that organizes the teaching performance. However, it is important to consider this plan not as a set of disconnected actions, but as the implementation of a well thought out and articulated plan (Zabalza, 2004). Therefore, the teaching plan is one of the most important commitments to be assumed by academics.

The European Higher Education Area (EHEA) has supposed a change inside universities, producing a new role and competences required to lecturers. Nowadays, the planning is considered one of the most important good practice in education (Fernández, 2003), (Zabalza, 2003) and (Zabalza, 2012). However, although the planning is part of academics' professional work, it is often relegated to a purely bureaucratic exercise and reduced to a mere listing of topics with some notes on the assessment.

Successful courses require careful planning and continual revision. Although lecturers increasingly plan their courses, they do not often think about the dangers that may affect such planning, having to fix almost immediately incidents that happen during the course of the project. At most, these incidents are taken into consideration for next year, but there is no previous reflection enabling to anticipate potential threats and the possible consequences to minimize its effects.

This paper discusses the nature of these dangers or threats and how they can affect the teaching plan of a Bachelor's Degree course. We analyze how these threats can affect the planning of Human Resource Management course, a compulsory subject

of Public Administration and Management Bachelor's degree at Universitat Politècnica de València (UPV).

To achieve the aim of this work, we firstly detail the various tasks that make up the teaching program of a course (Section 2) and the potential threats that can affect these tasks (Section 3). Then, we associate the identified threats with each task, assessing the severity of the harm (expressed as time delays) and the probability of the harm occurring (Section 4). Finally, we perform a risk analysis to identify the most sensitive tasks to potential threats before the launch of the project, which can lead to an improvement of the teaching plan.

2. TEACHING PLAN TASKS

A lecturer in European universities distributes his time between teaching, researching and administrative functions. This paper focuses on the first one, (Fernández, 2006) summarizes the work of lecturers concerning the teaching function into two main groups:

1. Planning and designing learning activities and experiences according to expected results and taking into account the available resources.
2. To facilitate, guide, motivate and help students in their learning process.

Other authors, such as (Altet, 1994) or (Cid, Zabalza, and Doval, 2012) among others, identify five main functions of lecturers:

1. To present and communicate information.
2. To organize and structure the teaching-learning process.
3. To stimulate and motivate students.
4. To assess and correct.
5. To regulate and create a good climate in class.

These main activities are specified in a number of tasks carried out by lecturers in the day by day. This section presents a list of those tasks, which should be planned to ensure a significant learning of students. Note that these tasks do not only involve the preparation of the lessons, but also include much more activities that even start before the academic year does. Therefore, the list of the main lecturers' tasks concerning the teaching plan of a Bachelor's Degree course is:

- *Groups organization.* It is common that a group of lecturers collaborates in a same course. Then, they should coordinate and organize themselves to establish the topics, the assessment system, the responsibility, the groups distribution, the activities, etc.

- *Teaching lessons.* Obviously, this is one of the most important tasks of a lecturer. Its duration and place is previously defined and known since it is scheduled by the schools or faculties at the beginning of the course.
- *Preparing lessons.* Before a lecturer gives the lesson, a previous careful preparation is necessary as well as the review of the agenda and the schedule of the activities.
- *Preparing materials for the lessons.* Along with teaching classes, one of the most important tasks of lecturers is preparing the material for a course (notes, cases, exercises...). Although this task may be parallel to teaching, it is recommended to prepare the material in advance, revising and adapting it throughout the semester.
- *Management of ICT integration.* The EHEA represents a significant educational change that emphasizes the active role of the student and the development of his initiative and critical thinking. In this new paradigm, information and communication technologies (ICT's) play a key role, offering new contexts and opportunities to develop these skills. At UPV, PoliformaT is the platform used for this purpose and is used as a repository of documentation and to communicate with students. Therefore, its management should be considered as a task for lecturers since it is time consuming and requires a sort of planning.
- *Continuous assessment.* The assessment process of subjects should be continuous and combine two types of evaluation: formative and summative. That means that lectures do not only give an assessment at the final of the course, but also must correct different activities, essays, exams and tests realized throughout the semester. Besides, to achieve a formative assessment, the correction should be quick to enable an appropriate and useful feedback for the students.
- *Attending tutorials.* Other typical task of a lecturer is tutoring his students. Tutoring can take several forms, but the most common is individual tutorial times where students and lecturers address specific issues of the teaching program. This task should be performed along the entire teaching plan. However, tutorials are handled on demand, when students require them, and cannot be scheduled in advance.
- *Preparing exams and test.* To ensure that students acquire a significant learning, teachers should design exams and tests to assess whether students have acquired the competences of the subject. Therefore, the selection of which type of assessment and exam is an important decision.

- *Exam revision.* According to assessment rules at the UPV, students have the right to review their exams once grades are published. Then, the exams revision is part of the educational functions of lecturers.

All these tasks can be scheduled following the typical structure of any project with 3 main phases: planning, development and controlling. The first phase (planning) includes tasks related to groups organization and the preparation of materials. In this work we analyze the planning of Human Resource Management course which starts the first week of September. We establish that this first phase begins in mid-July and ends at the beginning of lectures (first week of September). The second phase (development) includes those tasks corresponding to prepare and give lessons, manage ICT integration into teaching and learning process, and assess activities carried out during the lessons. In this paper, this stage corresponds to the development of the first contents block of Human Resource Management course, i.e. from the first day of lessons (September 9, 2013) until the first assessment day, established by the Faculty (October 21, 2013). Finally, the controlling phase (last stage) includes tasks related to the preparation of the exam, the assessment and the revision, taking into account that the official examination date is on October 28 2013. Note that we have included a specific task for the Exam.

Figure 1 shows the Gantt chart of the teaching plan of Human Resources Management course, where the three main phases are depicted.

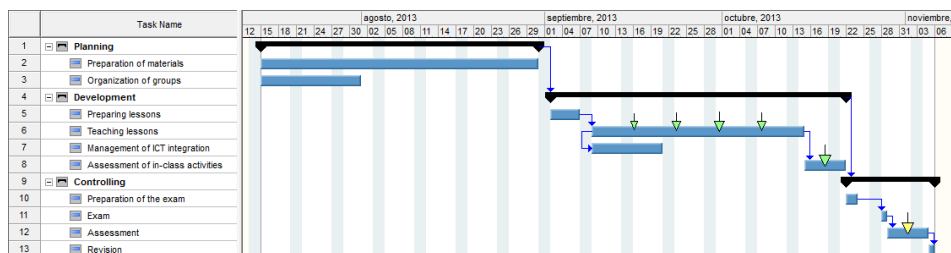


Figure 1. Gantt chart of the teaching plan (from RiskyProject Professional®)

3. THREATS TO THE SUCCESS OF THE TEACHING PLAN

When planning any project, a plan is developed, and this entails risk. In fact, the latest consequence of risk is the deviation from the scheduled plan, in terms of scope, time and cost.

It is very important to identify threats before they become problems. This threat identification process requires an open mind to foresee all possible scenarios since not all the threats in a project are obvious. The identification of threats is the first step in project risk management, since only the identified threats can be managed later (International Organization for Standardization [ISO], 2009).

In this section, we present a list of threats that can affect the teaching plan of a course. At this point of our research and in order to simplify further analysis, we understand all possible consequences as temporary delays in the teaching plan and ignore other possible consequences such as monetary cost overrun or even non-scheduled impacts such as quality or safety. The identified threats are:

- *Strike*. Increasingly, due to the economic situation and social discomfort, both students and lecturers may go on strikes throughout the academic year. That may have a direct influence on the teaching plan for two main reasons: on one hand, lecturers can take part of the strike which means that they do not give the lesson, and on the other hand, students can support the strike and then they do not attend the lesson. Both situations suppose a delay in the teaching plan.
- *Professor disease*. Obviously, the disease is a risk linked to any project involving people. The consequences of it depend on the type of disease and physical and psychological features of each person. However, the more common situation in the university environment is that professors suffer minor diseases which may suppose at most the cancellation of one class. Moreover, it is possible to estimate the number of lost-classes along a semester by using historical information.
- *Technical failures in the classroom*. Sometimes technical errors related to computers and technological resources available in the classrooms may occur. Even if it is not necessary to cancel the session, this threat may produce a time delay in the planning of the lesson. Therefore, the lecturer should at this moment plan again the lesson to finish all activities and explanations programmed for that day. Fortunately, the probability of a technical failure is normally low.
- *High priority non-teaching task*. A university lecturer carries out many different tasks. Generally, these tasks are characterized by having a deadline. Sometimes throughout the semester, lecturers receive an external task, i.e. a non-teaching task (this task can be administrative, related to their research, etc.) which should be finished before a deadline. At that moment, this external task becomes a high priority task, which supposes a change in the teaching plan. The probability of receiving an external task depends mainly on the position of the lecturer.
- *Massive tutorials*. Days prior to exams, students usually attend massively tutorials. This is a great investment of lecturer's time, who has less time than expected to perform other tasks such as preparing the exams or tests, correcting, etc.

- *Learning disabilities.* As previously mentioned, university professors should combine summative assessment with formative one. As a result of formative assessment, it is possible that, after an exam or activity, lecturers detect that a concept or unit has not been understood as they expect by the students. This requires spending time explaining again this misunderstanding concept, which means a modification of the initial planning.

4. RISK ANALYSIS RESULTS AND DISCUSSION

Once the main tasks performed by teachers to develop their teaching program have been listed and the main threats that may affect them identified, they can be analyzed as pairs characterized by the probability of occurrence and the outcome. Both are features of the pair and define the relation between them (Fernández-Diego, 2013). In a project, a threat can affect specific tasks or resources, but it can also influence the project as a whole.

In Table 1, all previously identified threats are associated to their respective tasks specifying the probability of occurrence and the expected outcome understood as time delay. As can be seen, most threats focus on the task Teaching lessons and Assessment, both of the exam and in-class activities. On the other hand, note how on the Gantt chart shown in Figure 1, the existence of threats associated to tasks is identified by arrows.

Threat	Task	Probability (%)	Outcome (delay)
<i>Strike</i>	Teaching lessons	10	1 day
<i>Professor disease</i>	Teaching lessons	5	1 day
<i>Technical failures in the classroom</i>	Teaching lessons	15	1% relative
<i>High priority non-teaching task</i>	Assessment	20	3 days
<i>Massive tutorials</i>	Assessment of in-class activities	50	5 days
<i>Learning disabilities</i>	Teaching lessons	25	5 days

Table 1. Pairs of threats and tasks

The probability of occurrence may be estimated by observing how often similar events have occurred in the past. However, one should take special care in considering historical data from similar teaching plans, since no two projects are the same and most probably different circumstances apply. Moreover, it is very common to overestimate the success rate of a project with multiple risks, which have a dependence upon each other (Virine & Trumper, 2013). On the other hand, an outcome is the immediate consequence of a threat on the task. It focuses on what happens to the task.

At this point, a risk analysis is performed to determine how these threats can affect the proposed teaching planning. The impact is a broader concept than outcome and describes the effect of a threat on the overall project. For this purpose, a leading tool for quantitative project risk analysis is used: RiskyProject Professional®.

After introducing a project schedule and once the identified threats are associated to their respective tasks, RiskyProject is able to compute the score of the different risks by multiplying probability and impact. Indeed, quantitative analysis using Monte Carlo simulation is performed to quantify the cumulative impact of the events. Probabilities and outcomes of risks are used as input data for Monte Carlo simulation of the project schedule.

The sensitivity chart (Figure 2) shows, by using the Spearman’s rank correlation coefficient, which risks have the most damaging potential to affect the project duration. Since the threat assigned to task Assessment is shown at the top of the sensitivity chart, this indicates that the project duration is very sensitive to the uncertainties caused by this threat High priority non-teaching task. In a second position, the threat Learning disabilities during the task Teaching lessons should also be taken into account. In sum, data obtained with Monte Carlo simulation allows prioritizing risks that affect the project duration.

Risks affected project: Duration				
	Name	Risk Assigned To	Sensitivity Chart	Ranking
1	Risk: High priority non-teaching task	Task 12: Assessment		0,889
2	Risk: Learning disabilities	Task 6: Teaching lessons		0,164
3	Risk: Technical failures in the classroom	Task 6: Teaching lessons		0,000
4	Risk: Massive tutorials	Task 8: Assessment of in-class activities		0,000
5	Risk: Strike	Task 6: Teaching lessons		0,000
6	Risk: Professor disease	Task 6: Teaching lessons		0,000

Figure 2. Sensitivity chart (from RiskyProject Professional®)

Moreover, the risk matrix is shown in Figure 3, where it is possible to visualize the two dimensions chart, probabilities in ordinates and impacts in abscissa. Risk matrix uses a color code (red, green, and yellow) to represent severity of the risk. In it, it can be seen graphically that: (i) most of the threats considered have a low probability and a minor impact, and (ii) the most dangerous threat to the project is that the teacher receives a higher priority external task that may affect the assessment, generating a delay in the whole project.

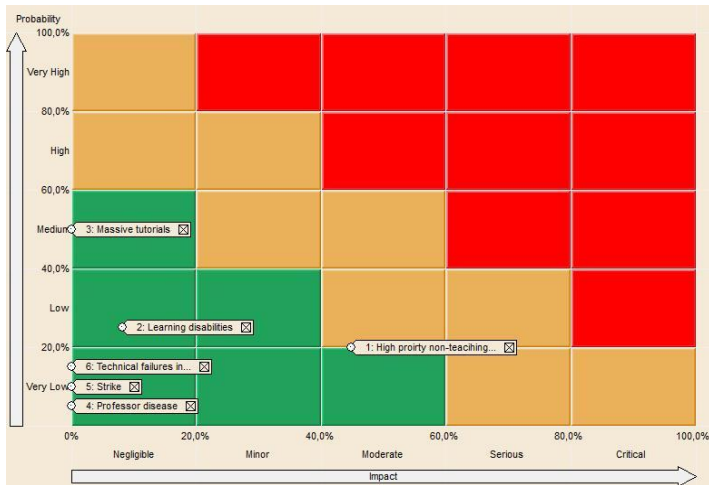


Figure 3. Risk matrix (from RiskyProject Professional®)

Figure 4 displays the start and finish ranges of each task in the Gantt chart. In this view the task bars for deterministic current schedule (Figure 1) can be compared to the probabilistic schedule. For the probabilistic schedule, both low (optimistic) and high (pessimistic) results have been displayed.

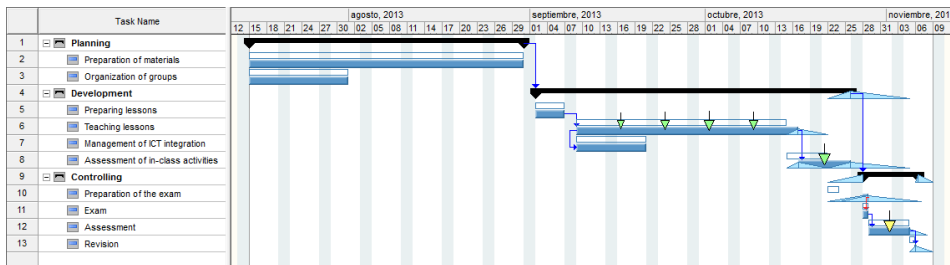


Figure 4. Gantt chart result (from RiskyProject Professional®)

Considering all tasks, perhaps the most critical one is the preparation of the exam because, as shown in the schedule of Figure 4, this task could be delayed so that the exam would not be ready for the formal date. After you have completed a probabilistic calculation, it is possible to determine the probability that a particular task will start and finish on certain date, and will have a duration less than a certain value. For the task Prepare the exam, Figure 5 shows that the probability that this task will be completed before October 28 is 43%. Therefore, the risk of delay it is not negligible.

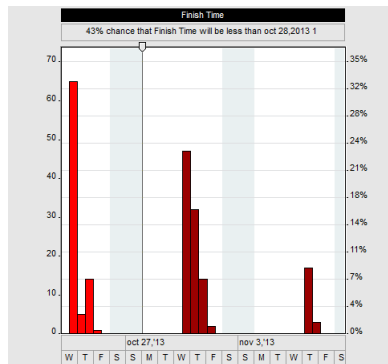


Figure 5. Task Preparation the exam (from RiskyProject Professional®)

However, in practice this never happens and the teacher would plan again the entire project or would manage his time differently to have the exam ready on time. This is one of the main characteristics of a teaching plan. While most of threats entail temporary delays, the dates established and usually delimited by regulations cannot be delayed. Indeed the task Exam must start on an exact date, which should be always respected. This is what is called a constraint that defines the degree of flexibility available when scheduling or rescheduling a task by imposing restrictions on its start or end date. A specific start or finish date for a task does not allow other dates to be determined by the planning process. In this case, the constraint for the start date of the task Exam is indicated by the red link between predecessor and successor on the Gantt chart of Figure 4.

5. CONCLUSIONS

This case study emphasizes the importance of considering risks in teaching plans. Despite the fact that planning is one of the most important assignments of lecturers, normally they do not think about the risks associated with its implementation, having to rectify the possible incidents during the course.

This paper analyses the risk involved in a teaching plan of Human Resources Management course using RiskyProject. A tool such as RiskyProject allows a more complete understanding of managing risks in teaching plans. To carry out the risk analysis, we firstly establish a list of tasks related to teaching and identify potential threats that can affect them. Then, we associate explicitly all these tasks and threats, considering the probability of occurrence and the expected outcome. With this data, we carry out the risk analysis which shows how these threats can affect the whole teaching planning. As a result, the task Prepare the exam has been identified as the most critical one since it has a high probability of delay.

However, in real situations this delay would never happen, since the exam date is officially established by the faculty. This fact forces lecturers to reorganize their

time (even their personal time) to ensure that the task Exam will start on date. At this point, the question is which are the real implications of these threats on teaching plans. As it is said, one special characteristic of teaching plans is that some important dates are established beforehand and academics should respect them at all costs. As a consequence, they are not able to spend all the necessary time to some other important tasks such as correcting or assessing. From an educational point of view, this involves a loss of teaching quality which reflects the importance of identifying these threats previously to minimize their effects.

In the future, we intend to incorporate safeguards to devise a mitigation strategy and deal with risks affecting not only project duration but also non-scheduled risks such as quality.

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ENGLISH CORPUS LINGUISTICS: ABSTRACT ANALYSIS

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Abstract

This essay aims to describe how corpus linguistics can be used by trainee translators to investigate the main features of a corpus of abstracts. To this purpose, a DIY (Do-It-Yourself) specialized corpus of English abstracts on ecological economics was first compiled; afterwards, keywords, n-grams, and concordance lines were retrieved and analyzed. Biber *et al.*'s structural classification of lexical bundles in academic prose (1999: 1014-1024) and Hyland's functional classification of lexical bundles in academic writing (2008: 13-14) were used to investigate further the data collected.

Keywords: corpus linguistics, keywords, lexical bundles, collocational frameworks, academic writing, translation.

1. ENGLISH CORPUS LINGUISTICS AT UNIVERSITY LEVEL

A post-graduate course focusing on corpus linguistics applied to translation is taught at the University of Urbino. The course aims to train students to use corpora to translate from Italian into English and vice versa. To this purpose, students are first introduced to key corpus linguistics methodology and then asked to investigate corpora to carry out the assigned translations. A direct use of corpora is enhanced in keeping with Leech's classification of pedagogical applications of corpora: "the direct use of corpora [entails] [...] teaching to exploit [...], which means providing students with 'hands-on' know-how [...] so that they can exploit corpora for their own purposes" (in McEnery *et al.* 2006: 97). As a result, a learner-centered approach promoting autonomy is implemented in the course targeted in the present study: "Instead of having to rely on the researcher as mediator and provider of corpus-based materials, [...] learners [...] get their hands on corpora and concordancers themselves and find out about language patterning and the behaviour of words and phrases in an 'autonomous' way" (Römer 2008: 118).

2. THE STUDY

In order for translations to be carried out effectively, source texts need to be carefully examined. This study aims to exemplify how a DIY (Do-It-Yourself) specialized corpus of English abstracts on ecological economics can be investigated by trainee translators to determine the collocational and phraseological profile of the text type

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represented in the corpus prior to translating into English an abstract on the same topic. To this purpose, keywords, n-grams, and concordance lines were retrieved and investigated in terms of lexico-grammar, lexical bundles, subject-specific lexical sets, and genre-specific features. Two taxonomies were used to examine further the data collected, namely Biber *et al.*'s structural classification of lexical bundles in academic prose (1999: 1014-1024) and Hyland's functional classification of lexical bundles in academic writing (2008: 13-14).

Methodology

To carry out the study, a DIY specialized corpus, the 'eco-economics' corpus, was compiled by the trainee translators with 600 English conference abstracts on ecological economics. The corpus was created with *Sketch Engine*, software which allows users both to compile corpora and to investigate existing corpora. To retrieve content-specific lexical items, keyword lists – keywords are “words in a corpus whose frequency is unusually high [...] in comparison with a reference corpus” (McEnergy *et al.* 2006: 347) – were first generated from the DIY corpus. Keywords were then selected to retrieve n-grams, also called clusters or lexical bundles, which are multiword units featuring contiguous items: “Bundles are defined as recurrent strings of words, delimited by establishing frequency cut-off points, for example, that a string must occur at least [x] times per million words of text [...], and must be distributed over a number of different texts, to qualify as a bundle” (O’Keeffe *et al.* 2007: 61). Collocational frameworks, which Sinclair and Renouf define as “a discontinuous sequence of two words, positioned at one word removed from each other” (1991: 128-130), were also investigated. The aboutness of the corpus was thus mapped out through the analysis of intercollocational patterns (Phillips 1989).

Keywords

As mentioned above, keywords were first retrieved to identify the main content-specific lexical sets represented in the corpus. The top-ranking keywords generated from the specialized corpus are provided below (Fig. 1):

Word	Freq	Freq/mill	Word	Freq	Freq/mill	Word	Freq	Freq/mill
biodiversity	341	1293.0	biofuels	39	147.9	economics	101	383.0
ecosystem	438	1660.8	trade-offs	45	170.6	biorefinery	15	56.9
sustainability	247	936.5	agri-environmental	28	106.2	deforestation	35	132.7
stakeholders	156	591.5	biophysical	28	106.2	environmental	809	3067.5
ecological	91	345.0	eco-efficiency	22	83.4	green-economic	14	53.1
bioenergy	55	208.5	biomass	53	201.0			
socio-ecological	42	159.3	low-carbon	18	68.3			

Fig. 1: Top-ranking keywords

Fifteen of the keywords selected belonged to the ecology lexical set; on the other hand, three lexical items belonged to the economics lexical set while only one item belonged to the ecological economics lexical set (Fig. 2). On the basis of the keyword list retrieved, ecology seemed to emerge as the mostly represented topoi in the corpus.

Ecology	biodiversity, ecosystem, sustainability, ecological, bioenergy, socio-ecological, agri-environmental, biophysical, biofuel, eco-efficiency, biomass, low-carbon, biorefinery, environmental, deforestation
Ecological economics	green-economic
Economics	stakeholders, trade-offs, economics

Fig. 2: Topoi

The analysis of the left-sorted concordance lines of the top ranking keyword ‘biodiversity’ produced scarce results even though they revealed the tendency of biodiversity to appear in noun phrases (n + of + biodiversity) such as (frequency is provided in brackets) value of biodiversity (10), loss of biodiversity (8), role of biodiversity (8), context of biodiversity (6), contribution of biodiversity (4), creation of biodiversity (4), and halt of biodiversity (4). On the other hand, right-sorted concordance lines of the query item ‘biodiversity’ highlighted interesting data. In particular, the analysis of the 367 concordance lines generated showed collocations (frequency is provided in brackets) such as biodiversity conservation (41), biodiversity loss (24), biodiversity off-sets (12), biodiversity policy (8), biodiversity banking (7), biodiversity indicators (7), biodiversity management (7), biodiversity off-setting (7), biodiversity compensation (5), and biodiversity values (4).

N-grams

The analysis of the fifty top-ranking 2-grams showed that the ecology-related lexical set was extensively represented featuring eighteen lexical bundles (frequency is provided in brackets) (Fig. 3); the ecological economics lexical set ranked second with nine 2-grams; the economics lexical set featured the least amount of 2-grams, namely six. It is also noteworthy that two ecology-related 2-grams ranked high in the list as suggested by their frequency (283 and 98 occurrences respectively) while the majority featured a frequency ranging between 47 and 12. The two top-ranking ecological economics-related 2-grams revealed a high frequency of use (76 and 71 occurrences respectively) while the majority ranged between 34 and 14. The top-ranking economics-related 2-gram featured 95 occurrences while the majority ranged between 33 and 14 in terms of frequency.

Ecology	ecosystem services (283), climate change (98), environmental effects (47), biodiversity conservation (39), natural resource (32), biodiversity loss (23), Ecosystem Assessment (21), energy system (21), energy consumption (38), energy use (23), environmental practices (15), agricultural intensification (15), forest conservation (16), renewable energy (27), environmental conflicts (13), greenhouse gas (23), gas emissions (17), environmental innovation (12)
Ecological economics	sustainable development (76), ecological economics (71), green economy (34), environmental policy (22), sustainable consumption (16), environmental governance (34), environmental management (19), environmental sustainability (14), ecological economists (14)
Economics	economic growth (95), economic valuation (33), economic activities (19), monetary valuation (16), economic incentives (15), economic production (14)

Fig. 3: 2-grams

In the fifty top-ranking 3-grams, four ecology-related 3-grams appeared at the top of the list while overall the ecological economics- (except for ‘water resources management’ featuring nineteen occurrences) and the economics-related 3-grams ranked lower ranging between eight and five in terms of frequency (frequency is provided in brackets) (Fig. 4). It is worth mentioning that 3-grams revealed for the first time the presence of social phenomena in the corpus (Fig. 4).

Ecology	the ecosystem services (20), greenhouse gas emissions (15), land use conflicts (12), natural resource management (11), environmental change process (8), climate change mitigation (7), low carbon energy (6), phenomenological environmental effects (5)
Ecological economics	water resources management (19), exergy replacement costs (8), neo-liberalisation of water (7), river basin management (6), the green-economic potential (5), the ecological economics (5), global environmental governance (5)
Economics	the wage-labour nexus (6), a steady-state economy (6)
Social phenomena	shared social values (7), civil society organizations (6)

Fig. 4: 3-grams

The fifty top-ranking 4-grams highlighted a change in the distribution of the data retrieved if compared to what emerged thus far. For the first time the ecology-related lexical set was less represented than the ecological economics lexical set; the former and the latter featured respectively five and seven 4-grams (Fig. 5). It is worthy of note that there were no top-ranking 4-grams related to the economics lexical set; likewise, the social phenomena lexical set was not represented. One can then argue that 4-grams allowed the trainee translators to retrieve the lexical bundles that conveyed the main topos of the corpus, that is ecological economics; the key content-specific concepts of the specialized corpus were thus mapped out. In this light, it is important to pinpoint that ecological economics-related processes, such as planning, valuating, and managing, were consistently represented in 4-grams.

Ecology	provision of ecosystem services (14), biodiversity and ecosystem services (10), material and energy use (5), material and energy flows (5), implementation of environmental practices (5)
Ecological economics	valuation of ecosystem services (12), payments for ecosystem services (12), neo-liberalisation of water resources (7), the exergy replacement costs (5), river basin management planning (5), monetary valuation of ecosystem (5), management of natural resources (5)

Fig. 5: 4-grams

The fifty top-ranking 5- and 6-grams, on the other hand, referred mainly to abstract-specific metadiscourse; genre-specific features thus emerged (Fig. 6). Overall, 5- and 6-grams were used to analyze the most frequent lexical bundles deployed to structure abstracts (purpose, methodology, results, and conclusion); the purpose of the abstracts ranked high in the lists. 5-grams (such as in the context of the, in the case of the, on the basis of the) were especially instrumental in framing the specific conditions informing the studies presented.

5-grams	Freq	6-grams	Freq
of this paper is	19	The purpose of this paper is	9
in the context of the	12	and so on and so forth	9
purpose of this paper is	10	purpose of this paper is to	8
The purpose of this paper	9	aim of this paper is to	6
so on and so forth	9	The aim of this paper is	5
in the case of the	8	is one of the most important	5
aim of this paper is	6		
The aim of this paper	6		
on the basis of the	6		

Fig. 6: 5- and 6-grams

Overall, through the analysis of n-grams, genre- and register-specific features of the corpus searched emerged, “bundles operate as important structuring devices in texts and are register- (or genre-) sensitive” (O’Keeffe *et al.* 2007: 61), along with key content-specific concepts.

Collocational frameworks

To analyze more in detail the phraseological component of the corpus, collocational frameworks were implemented. As Sinclair and Renouf claim: “the frameworks are highly selective of their collocates” (1991: 128-130). Using closed-class words, i.e. grammatical words, instead of lexical words to retrieve lexical bundles, the analysis of the conceptual level of the corpus was investigated further: “a set of concordance lines based on a single closed-class keyword can be divided into distinct and quantifiable series of phraseological groups, each of which might yield interesting insights into the preferred meanings and values of a specialized discourse community” (Groom 2010: 69).

In keeping with Sinclair and Renouf’s research, high frequency closed-class words, such as ‘a’ and ‘of’, were used (1991: 128-130). The collocational framework ‘n of

n’ was first searched using CQL (Complex Query Language). Out of the 4.163 ‘n of n’ sequences retrieved, those top ranking were the following (Fig. 7):

Ecology	concept of ecosystem (8), conception of sustainability (5), production of energy (5), production of waste (5), condition of ecosystems (4), role of biodiversity (4), loss of biodiversity (4), conservation of biodiversity (3), context of biodiversity (3), context of sustainability (3), contribution of biodiversity (3), criterion of sustainability (3), effects of climate (3), level of pollution (3), loss of species (3), number of species (3), use of pesticides (3), value of biodiversity (3), vulnerability of agriculture (3)
Economics	means of production (5), mode of production (4), combinations of instruments (4), combination of measures (3), distribution of benefits (3), distribution of costs (3), management of quotas (3), management of resources (3), modes of governance (3), norms of cooperation (3)
Justice	community of justice (6), elements of justice (6), instruments of justice (6), burden of proof (6), bundle of rights (4), analysis of justice (3), aspects of justice (3), challenges of justice (3), Court of justice (3)
Social grouping	groups of individuals (4), groups of people (4), level of participation (4)
Social values	quality of life (33), freedom of choice (4), level of trust (4), levels of well-being (3), plurality of values (3)

Fig. 7: Classification of ‘n of n’ sequences

The collocational frameworks led to the emergence of a different internal organization of the topoi featured in the corpus. The ecology-related field was the most widely represented with twenty clusters while a new category, namely justice, surfaced along with – in order of frequency – social values and social grouping. Overall, therefore, through collocational frameworks trainee translators managed to identify new topoi, such as the active role played by humans as citizens (social grouping), positively connotated social values (social values), and justice-related components (justice). However, quite surprisingly, the ecological economics lexical set, which had been previously identified as the main topos of the corpus, was not represented; a further study of the concordance lines generated by means of the collocational frameworks targeted revealed that most concepts related to the ecological economics lexical set were conveyed through adjectives (such as green, ecological, socio-ecological, environmental, and biophysical) working as premodifiers of ‘n of n’ sequences.

The collocational framework ‘a + noun + of’ was also analyzed through the CQL search. Out of the 544 ‘a noun of’ sequences retrieved, those top ranking (frequency is provided in brackets) were classified as follows (Fig. 8):

Classifications	a form of (8), a function of (6), a typology of (6)
Models	a conception of (5), a vision of (5), a model of (4), a system of (4)
Processes, consequences, results	a result of (15), a process of (12), a consequence of (8)
Quantity	a number of (46), a variety of (23), a series of (22), a combination of (21), a range of (20), a lack of (12), a group of (9), a multitude of (4)

Fig. 8: Classification of ‘a noun of’ sequences

The most frequent lexical bundles retrieved belonged to the category of quantity. The other multiword units indexed ways in which ideas could be conceptualized (models) and how their components could be classified (classification).

Lexical bundles in academic writing

Some of the main categories of Biber *et al.*'s classification of the most common lexical bundles in English academic texts (1999: 1014-1024) were used to analyze the most common academic 4-grams in the eco-economics corpus. The most significant data retrieved (frequency is provided in brackets) are provided below (Fig. 9):

Structures	Examples
noun phrase with <i>of</i> -phrase fragment	the case of the (13), the context of the (13), the application of the (11), the role of the (11), the implementation of the (11), the understanding of the (10), the use of the (9), the dynamics of the (8), the evolution of the (8), the impact of the (8), the success of the (8), the origin of the (8), the basis of the (7), the size of the (7), the end of the (7), the beginning of the (6), the complexity of the (6), the influence of the (6), the capacity of the (5), the characteristics of the (5), the question of the (5), the rest of the (5), the results of the (5), the study of the (5), the sustainability of the (5), the transformation of the (5), the core of the (4), the effectiveness of the (4), the framework of the (4), the analysis of the (4), the functioning of the (4), the importance of the (4), in the light of (4), the majority of the (4), the nature of the (4), the scope of the (4)
noun phrase with other post- modifier fragment	the ways in which (14), the extent to which (13), the fact that (8)
prepositional phrase with embedded <i>of</i> - phrase fragment	in the context of (49), in the case of (41), in the field of (20), on the basis of (18), to the development of (15), in the form of (13), for the development of (13), in the light (12), in the management of (12), of the concept of (12), from the perspective of (9), on the role of (9), with the aim of (9), in the use of (8), of the relationship between (7), at the end of (7), for the analysis of (7), against the backdrop of (6), for the implementation of (6), in the development of (6), in the evaluation of (6), in the framework of (6), at the expense of (6), in the process of (6), in the sense of (6), for the provision of (5), for the purpose of (5), at the level of (5), of the impact of (5), on the evolution of (5), to the concept of (5), to the creation of (5), within the field of (5), through the development of (4), to the definition of (4), to the detriment of (4), to the establishment of (4), to the implementation of (4), to the role of (4), to the understanding of (4), to the use of (4), as the basis of (4), at the scale of (4), for the production of (4), for the success of (4), in the face of (4), in the implementation of (4), in the production of (4), in the provision of (4)
anticipatory <i>it</i> + verb phrase/adjective phrase	it is necessary to (10), it is possible to (10), it is important to (9), it is difficult to (4), it is obvious that (3), it is unlikely that (2)
copula <i>be</i> + noun phrase/adjective phrase	is the case of (5), is a lack of (4), is the result of (3), is a need for (3), is consistent with the (3), is essential for the (3), is important for the (3)
(verb phrase +) <i>that</i> -clause fragment	has been assumed that (1), has been reported that (1), has been recognised that (1), may be hypothesised that (1), can be argued that (1), can be assumed that (1), can be concluded that (1), can be demonstrated that (1), can be identified that (1), can be implemented that (1), can be noted that (1)
(verb/adjective +) <i>to</i> -clause fragment	is likely to be (4), are likely to be (3)

Fig. 9: Academic 4-grams of the eco-economics corpus classified according to Biber *et al.*'s classification of the most common lexical bundles in English academic texts (Biber *et al.* 1999: 1014-1024)

The analysis of the academic 4-grams revealed a high degree of prepositional phrases working as postmodifiers, which was in keeping with Biber *et al.*'s research holding that "in academic prose, prepositional phrases allow a very dense packaging of information in a text. [...] Prepositional phrases commonly occur in sequences in academic prose, which also adds to the dense packing of information" (2002: 269). In particular, 4-grams featuring *of*-phrase fragments were the most frequent in the eco-economics corpus: thirty-six noun phrases with *of*-fragments (237 occurrences in total) and forty-nine prepositional phrases with embedded *of*-phrase fragments (413 occurrences in total) were retrieved. On the other hand, the anticipatory *it* + verb phrase/adjective phrases featuring six lexical bundles and the (verb/adjective +) *to*-clause fragments featuring two clusters were much less used (38 and 7 occurrences in total respectively); both categories mainly worked as stance features. Furthermore, it is worth noticing that 4-gram (verb phrase +) *that*-clause fragments, mostly used to index writers' hypotheses, assumptions, and claims, occurred only once and consistently featured passive structures.

A functional classification of lexical bundles in academic writing

Hyland's functional classification of lexical bundles in academic writing was implemented to analyze to what extent academic 4-grams were used to convey research-oriented, text-oriented, and participant-oriented functions (2008: 13-14). The degree of writers' and readers' involvement in the texts was thus also investigated on the grounds of the data retrieved (frequency is provided in brackets) (Fig. 10).

<p>Research-oriented – help writers to structure their activities and experiences of the real world includes:</p> <ul style="list-style-type: none"> -<i>Location</i> – indicating time/place [...] -<i>Procedure</i> [...] -<i>Quantification</i> [...] -<i>Description</i> [...] -<i>Topic</i> – related to the field of research [...] 	<p>Location: at the same time (22), in this paper we (17), the end of the (7), in this study we (7), as a starting point (7), the beginning of the (6), in this article we (4)</p> <p>Procedure: the role of the (11), the application of the (11), the implementation of the (11), the use of the (9)</p> <p>Quantification: one of the most (15), a wide range of (8), is a lack of (6), the majority of the (4), in a number of (4)</p> <p>Description: the size of the (7), the framework of the (4), the structure of the (3)</p>
<p>Text-oriented – concerned with the organisation of the text and its meaning as a message or argument includes:</p> <ul style="list-style-type: none"> -<i>Transition signals</i> – establishing additive or contrastive links between elements [...] -<i>Resultative signals</i> – mark inferential or causative relations between elements [...] -<i>Structuring signals</i> – text-reflexive markers which organise stretches of discourse or direct reader elsewhere in text [...] -<i>Framing signals</i> – situate arguments by specifying limiting conditions [...] 	<p>Transition signals: on the other hand (15), in addition to the (4), in contrast to the (2)</p> <p>Resultative signals: a result of the (15), our results suggest that (4), it was found that (2)</p> <p>Structuring signals: ---</p> <p>Framing signals: in the case of (27), on the basis of (18), with respect to the (10)</p>
<p>Participant-oriented – these are focused on the writer or reader of the text (Hyland, 2005) includes:</p> <ul style="list-style-type: none"> -<i>Stance features</i> – convey the writer's attitudes and evaluations [...] -<i>Engagement features</i> – address readers directly 	<p>Stance features: it is possible to (10), is likely to be (4), are likely to be (3), it is unlikely that (2)</p> <p>Engagement features: it is necessary to (10), it is important to (9), can be seen as (9), can be viewed as (6), can be addressed as (6), can be considered as (6), can be interpreted as (6), it</p>

[...]	should be noted (2), it is noted that (2)
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Fig. 10: Hyland's functional classification of lexical bundles in academic writing (Hyland 2008: 13-14) (left column); classification of 4-grams of the eco-economics corpus (right column)

In terms of 4-gram research-oriented bundles (Fig. 10), clusters indexing location were the most numerous (7 lexical bundles: 70 occurrences in total). In this respect, it is noteworthy that these lexical bundles referred almost exclusively to the beginning of abstracts (i.e. in this paper we, in this study we, as a starting point, the beginning of the, in this article we) where metadiscourse is consistently used. The lexical bundles indexing procedures (i.e. the use/role/application/implementation of the) followed in terms of frequency of use (4 clusters: 42 occurrences in total), which is probably due to the fact that describing methodology in detail is instrumental in foregrounding the scientific value of the studies showcased thereby increasing writers' chances to have their abstracts accepted by conference scientific committees. Quantification bundles, mainly used to report results, ranked third in terms of frequency (5 clusters: 37 occurrences in total); the gap with the procedure bundles was really small, which mirrored the almost equal value procedures and results were likely to have in abstract writing. Description bundles, which were used to frame the size, framework, and structure of the studies presented, followed in ranking (3 clusters: 14 occurrences in total). Topic-related clusters were not retrieved since they had been previously analyzed through n-grams.

Text-oriented lexical bundles working as framing signals ranked first (3 clusters: 55 occurrences in total) probably because they were instrumental in outlining the specific conditions informing the studies thereby supporting the scientific value of the research presented (Fig. 10). Transition and resultative signals came second (3 clusters and 21 occurrences each) (Fig. 10). Overall, in terms of transition signals, connections were more extensively implemented by means of contrastive signals (17 occurrences in total) than through additive signals (4 occurrences in total). Highlighting the contrastive conditions affecting the studies was likely to help writers to foreground further the scientific value of the results achieved. Causative relations were indexed mainly through the recurring cluster 'a result of the', which was mostly used in the results sections. On the other hand, no 4-gram text-oriented structuring signals were retrieved probably because abstracts, which are quite concise, did not need to guide readers through complex sections and figures (Fig. 10).

In terms of participant-oriented lexical bundles (Fig. 10), writers' attitudes were distributed along a continuum which went from possibility (it is possible to, is/are likely to be) to unlikelihood (it is unlikely that) with definitely more focus on the former pole (17 and 2 occurrences respectively). On the other hand, readers were addressed mainly through engagement features (9 clusters: 56 occurrences in total) containing predicative adjectives indexing necessity and importance (it is necessary

to, it is important to) and passive structures (can be seen as, can be viewed as, can be addressed as, can be considered as, can be interpreted as, it should be noted, it is noted that). Engagement features seemed to be used more extensively than stance features.

Writers' involvement

To examine further writers' involvement in the eco-economics corpus, the use of personal pronouns was investigated. The search revealed that 'we' occurred 1.268 times in the corpus, which highlighted a high degree of writers' involvement. Furthermore, 69 occurrences of 'I' were retrieved. On the other hand, the reader was rarely addressed directly: 'you' occurred only 8 times.

A more detailed investigation carried out using 2- and 3-grams showed how 'we' was consistently used by writers to state their paper objectives (i.e. we argue that, we analyze, we present, we aim to) and to describe the methodology adopted (i.e. we use, we develop, we estimate, we apply, we conduct, we identify, we perform) (frequency is provided in brackets) (Fig. 11). Writers' involvement was slightly less evident in the conclusions (i.e. we show that, we conclude) and definitely much less present when results were provided; in particular, in the latter case, only two 2-grams were recurrently employed. Noticeably, in the results and especially in the conclusion sections, passive verbs were mainly used instead of active verbs by writers probably to increase the degree of objectivity and the scientific value of the results achieved in the studies presented. These data were likely to account for the lower use of the pronouns 'we' or 'I' in the two sections targeted.

Purpose: we argue that (40), we analyze (35), we present (23), we aim to (17), we examine (16), we investigate (15), we consider (15), we focus on (14), we assume that (11), we want to (9), we explore (9), we will focus on (7), we are interested (6), we will present (6), we aim at (5), we demonstrate (5), we claim (4)
Methodology: we use (37), we propose (37), we develop (21), we estimate (20), we apply (14), we conduct (13), we identify (12), we perform (9), we combine (6), we compare (5), we assess (5), we build (4)
Results: we find that (21), we found (9)
Conclusion: we show that (27), we conclude (20), we hope (10), we believe (8), we think (7), we suggest that (6)

Fig. 11: Classification of 2- and 3-grams featuring the pronoun 'we'

3. CONCLUSIONS

The study shows how a direct use of corpora can be especially beneficial for trainee translators to outline, by means of a bottom-up phraseological approach, the collocational and phraseological profile of a specialized corpus along with its aboutness prior to translating similar text types into the target language.

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EDUCATIONAL INNOVATION THROUGH PARTICIPATORY ACTIVITIES

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Abstract

The paper describes a new challenge for university teachers. The theory of ‘attention deficit’ was first used by Simon (1971) to describe the emergence of new challenges in an information-rich world. We use this theory to describe the emerging challenge of ‘partial attention’ in the modern classroom. The present study describes participatory activities as a method to increase the students’ attention. A collection of 320 responses is used to discuss the relevance of participatory activities.

Keywords: New Challenge; Partial Attention; Participatory Activities.

1. INTRODUCTION

The management of the students’ attention in class is an emerging challenge for university teachers. The wide range of Internet search functions has gradually disrupted the way students learn, but the old idea of using paper participatory activities has not gone out of fashion in the classroom. Today’s students often prefer to use their computer for taking notes and finding information online, but using paper and pencil exercises in the classroom is still a valid method. The question is no longer *if* new learning technologies should be used, but rather finding new ways of combining new learning technologies – both digital and physical – to optimize the current teaching at university. In fact, the old idea of participatory classroom activities has become increasingly important during the past decade. The reason for this is not only due to the continuing introduction of new information and communication technologies, but also due to the new and emerging challenge that we refer to as ‘partial attention’ in class. Simon (1971) describes the management of attention as an emerging challenge in an information-rich world. We apply this theory to contribute to the dialogue about the value of new learning technologies at university by pointing out the importance of managing the students’ attention in the classroom. It is widely known that motivation and learning are key factors for higher education,

but it is less widely known that attention is another essential factor. Student attention has become an increasingly important challenge for university teachers especially during the past five years. We present the results of a survey to evaluate the effect of participatory classroom exercises in relation to five factors: (1) Motivation, (2) Attention, (3) Learning, (4) Innovation, and (5) Stimulation. We explore the connections with educational innovation through participatory exercises in relation to these five factors with the goal to identify the most important factors.

2. METHODOLOGY

We used the Google Web Survey to gather data in December 2013. We received 320 responses from 40 students, which corresponds to a response rate of 80%. The small sample size is a critical limitation, but the present study is nevertheless suggested to be a valuable starting point for future research on educational innovation through participatory activities. We used the business model canvas (Osterwalder et al., 2010) as a framework to evaluate the advantages of using participatory exercises in class. After the exercise, we asked three questions about the students' prior knowledge, motivation, and demand for interactive exercises to establish a general overview. Then, we designed a five-factor model to explore, which of these factors would be considered the most important for improving the students' ability to learn. The responses from two groups of students from 15 countries were compared to evaluate the potential of educational innovation through participatory exercises. The demographics of the sample are described in Table 1.1.

Table 1.1.
About the data
sample

Criteria	Count	Percent
Male	13	32.5%
Female	27	67.5%
National	19	47.5%
International	21	52.5%
Management	23	57.5%
Economics	9	22.5%
Engineering	5	12.5%
Other	3	7.5%
Total	40	100.0%

Note: Countries of origin: Spain (15), Germany (6), Belgium (3), USA (2), South Korea (2), Czech Republic (2), Romania (2), Lithuania (1), Finland (1), Sweden (1), Russia (1), Italy (1), Holland (1), Bulgaria (1) and Ecuador (1).

We compare the results of two classes: (i) a Spanish and (ii) an international class of students both within the field of management at the Polytechnic University of Valencia in Fall 2013. The same instructions were provided to both classes. We

divided the Spanish students into five groups with 3-4 persons in each group, while the international class consisted of seven groups with 3-4 persons in each group. Each group selected a secretary to fill in the information in the canvas and to present the results of the exercise, while a general secretary was appointed by the course instructors to register the names of the participants of each group. Finally, we appointed three observers to observe and take note of how the groups worked with the exercise, which in itself was an interesting experiment. This way the students were activated, assuming clearly defined roles. The responses were analyzed via Google Analytical Summaries, Excel Tabulations, and SPSS Procedures.

3. RESULTS

Key findings of three general questions

The experiment suggests that the students believe that the combination between theories, practical tools, and interactive exercises is an important factor for the learning of new concepts. In fact, 97.5% of the students would like interactive exercises in the future. Next, the survey confirms this result by asking explicitly if interactive exercises are motivating. Finally, the third question indicates that 37.5% of the students had prior knowledge about the canvas, which was used to facilitate the group exercise. The outcome of the first part of the survey is described in table 1.2.

Table 1.2.
Demand,
Motivation
and Prior
Knowledge

	Male, n=13 (32.5%)		Female, n=27 (67.5%)		Total, n=40
	Yes	No	Yes	No	
1. Would you like interactive exercises in the future?					
a. Economics	2 (5.0%)	0 (0.0%)	7 (17.5%)	0 (0.0%)	9 (22.5%)
b. Management	6 (15.0%)	0 (0.0%)	16 (40.0%)	1 (2.5%)	23 (57.5%)
c. Engineering	3 (7.5%)	0 (0.0%)	2 (5.0%)	0 (0.0%)	5 (12.5%)
d. Other	2 (5.0%)	0 (0.0%)	1 (2.5%)	0 (0.0%)	3 (7.5%)
Total	13 (32.5%)	0 (0.0%)	26 (65.0%)	1 (2.5%)	40 (100.0%)
2. Do interactive exercises motivate you?					
a. Economics	2 (5.0%)	0 (0.0%)	6 (15.0%)	1 (2.5%)	9 (22.5%)
b. Management	6 (15.0%)	0 (0.0%)	17 (42.5%)	0 (0.0%)	23 (57.5%)
c. Engineering	3 (7.5%)	0 (0.0%)	2 (5.0%)	0 (0.0%)	5 (12.5%)
d. Other	2 (5.0%)	0 (0.0%)	1 (2.5%)	0 (0.0%)	3 (7.5%)
Total	13 (32.5%)	0 (0.0%)	26 (65.0%)	1 (2.5%)	40 (100.0%)
3. Did you know the canvas before the course?					
a. Economics	0 (0.0%)	2 (5.0%)	3 (7.5%)	4 (10.0%)	9 (22.5%)
b. Management	4 (10.0%)	2 (5.0%)	4 (10.0%)	13 (32.5%)	23 (57.5%)
c. Engineering	2 (5.0%)	1 (2.5%)	1 (2.5%)	1 (2.5%)	5 (12.5%)
d. Other	0 (0.0%)	2 (5.0%)	1 (2.5%)	0 (0.0%)	3 (7.5%)
Total	6 (15.0%)	7 (17.5%)	9 (22.5%)	18 (45.0%)	40 (100.0%)

Note: A total of 62.5% of the students responded they did not have prior knowledge of the tool that was used for the experiment.

The first three questions confirm a strong demand for classroom participatory exercises. The results show that students across the different fields of study agree on the importance of interactive exercises in class. This result was confirmed by both students with or without prior knowledge of the tool. The only surprise of the first three questions was that the majority of the students within the field of management did not know the tool before attending the class, since the canvas is an important management tool for analyzing business models.

Key findings of the five-factor analysis

The key findings of the survey are described within the five factors. Each factor received 40 responses to identify the most important factors for facilitating educational innovation through participatory exercises. The national and international students independently reached the same conclusions about the importance of the five factors. Although, the national students rated the five factors slightly higher in general in comparison to the international student, the responses follow the exact same general pattern. The average values (Mean) and standard deviations (SD) of the 200 responses (n=200) are described in table 1.3.

Table 1.3.
Five-factor
analysis

Construct	National (n = 65)	Intern. (n = 135)	Overall (n = 200)
	Mean (SD)	Mean (SD)	Mean (SD)
(1) Motivation	6.2 (0.7)	6.0 (0.8)	6.1 (0.8)
(2) Attention	6.2 (0.6)	6.0 (0.9)	6.1 (0.8)
(3) Learning	6.3 (0.6)	5.9 (0.8)	6.1 (0.7)
(4) Innovation	5.7 (1.4)	5.0 (1.9)	5.4 (1.7)
(5) Stimulation	5.9 (0.8)	5.2 (1.1)	5.6 (1.0)
Overall	6.1 (0.9)	5.6 (1.2)	5.8 (1.1)

Note: Each factor received 40 responses.

The present study indicates that the first three factors play the most important role for educational innovation. Clearly, student *motivation* is a key factor (Mean=6.1, SD=0.8), while student *attention* is another key factor (Mean=6.1, SD=0.8) and student learning is a third key factor (Mean=6.1, SD=0.7). In this context, motivation may be considered as input, while learning may be regarded more as the output of the participatory activities. Attention may be considered as the binding factor that needs to be managed continuously throughout the course. Classroom *innovation* (i.e. novelty) is not considered a key factor (Mean=5.4), but this result is characterized by high uncertainty (SD=1.7). The majority of the students see a clear relationship between novelty and educational innovation, while a little minority group of students rejects this relationship (n=3). Student *stimulation* is considered only moderately important (Mean=5.6) for educational innovation, which means that the

stimulation of the students in the classroom is not considered as a decisive factor for educational innovation through participatory activities. This is not to say that stimulation is unimportant, but simply that it is not the most important factor. The students agree on this result (SD=1.0). In fact, the national and international students independently reach the same conclusion, which increases the reliability of this result. Figure 1.1 describes that motivation, attention and learning are the most important factors for educational innovation through participatory activities.

4. MOTIVATION, ATTENTION, AND LEARNING ARE THE MOST IMPORTANT FACTORS FOR EDUCATIONAL INNOVATION

Number of responses: 200

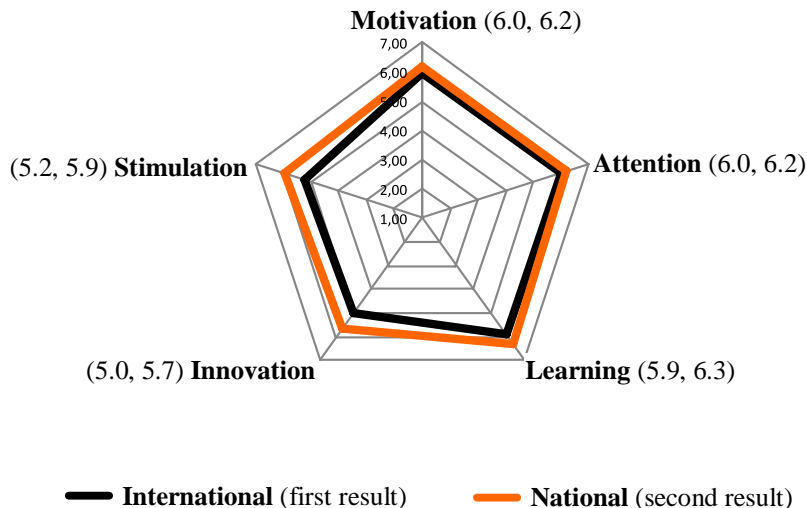


Figure 1.1. Five-factor analysis

Motivation

Motivation is a key concept in the education literature (Pintrich & De Groot, 1990; Newby, 1991; Vallerand et al. 1992; Pintrich, 1994). In this context, instructional strategies, for example the use of the interactive exercises, have been recognized as a key component for maximizing student motivation in business school classrooms (Debnath et al., 2007). The present study confirms that participatory activities are

vital for increasing students' motivation. Specifically, the international students evaluate the importance of this factor by an average of 6.0 out of 7.0, while the national students confirm the importance of using participatory activities to increase the students' motivation by an average of 6.2 out of 7.0.

Attention

Attention has not yet been considered a key component in the education literature, but the results of the survey suggest that its importance is essential. The two classes of students independently confirm that classroom attention is a vital challenge to avoid that the students lose the ability to concentrate. The students indicate that the importance of *student attention* is equally important as student motivation, which was the most surprising result in the survey because the education literature rarely seems to have recognized its importance. The international students recognize a clear relationship between participatory activities and student attention in the classroom by an average of 6.0 out of 7.0, while the national students confirm this result by an average of 6.2 out of 7.0.

Learning

It is widely acknowledged that active learning is a central topic in higher education teaching (Ausina et al., 2013) and that different classroom activities are important for maximizing the students' motivation (Debnath et al, 2007). It is widely recognized that *variety* in educational activities (Lengnick-Hall & Sanders, 1997; Pintrich & De Groot, 1990) and *meaningfulness* of the different assignments play a major role for making the classroom activities relevant (Blumenfel, 1992). Creating relevance of the classroom activities may include a reconsideration of the *students' roles* in the classroom activities (Blumenfel, 1992). These factors obviously play a role for learning, but beyond the course learning objectives remains a latent demand for *compelling*, *challenging* and *engaging* classroom activities. The present study confirms a clear relationship between participatory activities and student learning in the classroom. The international students rate the importance of participatory activities for accelerating learning by an average of 5.9 out of 7.0, while the national students confirm this result by an average of 6.3 out of 7.0.

Innovation

Innovation in classroom activities (i.e. novelty) is perhaps the most interesting factor, but simply doing something different from tradition teaching activities (i.e. lecturing and presenting cases) is considered the least important factor. Simply having participatory activities is insufficient, *if* the students do not find these activities relevant or meaningful. By innovation is meant non-traditional teaching activities that provide a new or different way of learning. The students were evaluating the degree of innovation of the interactive exercise compared to traditional lectures.

The content of the participatory activity is a key challenge for the course instructor, because if the students do not find the activity relevant then the implementation of new learning technologies may have an adverse effect. However, the relatively low degree of importance does not mean that facilitating innovative classroom activities are unimportant, but the implementation of non-traditional classroom activities only to do things *differently* represents a potentially incomplete idea. The international students evaluated the importance of classroom innovation ('only') by an average of 5.0 out of 7.0, while the national students confirm the relatively low importance of simply implementing non-traditional classroom activities to do things differently by an average of 5.7 out of 7.0.

Stimulation

Stimulation is another important, but not an essential, factor for maximizing the quality of classroom activities. Student stimulation can be achieved through participatory classroom activities with the explicit purpose of activating and *challenging* the students in the classroom activities. Many of today's students have great ideas, but may lack the ability to translate them into value, and that is what should be trained in the classroom. The students' indicate that participatory exercises are important for stimulation. For example, the students assumed different roles in the groups and the exercise challenged the students in new ways. Hence, the result suggests that there is a need for a higher amount of interactive exercises compared to what is the common practice in most business schools today. The international students evaluate the importance of this factor by an average of 5.2 out of 7.0, while the national students confirm the high, but not essential, importance of having participatory activities to stimulate the students by an average of 5.9 out of 7.0.

5. DISCUSSION

The students' attention in the classroom has become an important challenge for university instructors, especially during the past five years. A growing number of today's students are always connected to the internet in parallel to the classroom activities. This can be seen as a new challenge and at the same time a new opportunity. Participatory activities therefore represent an alternative to the massive open online courses (MOOC) that have received much attention recently.

New challenge and opportunity

The evolution of new technologies has led to new opportunities to improve the current teaching at university, but it has also led to an information overload and an attention deficit. Or, as Simon (1971) puts it, a wealth of information has the power to create a poverty of attention. For example, some students use time on facebook, responding messages, writing emails, reviewing online newspapers, and finding other non-related educational information in class. For these students, the classroom

activities are constantly interrupted, which means that a growing number of students are only partially present in the classroom activities. The challenge of ‘continuous partial attention’ is not a new idea (Stone, 1998), but it is new that students’ (full) attention is a key component in university education. James (1890) originally described the term attention as a selection of simultaneous objects, which implies withdrawing from some objects in order to effectively concentrate on other objects. The problem is that an increasing number of students seem to be only *partially attentive* rather than fully attentive in class. The challenge for many university teachers is no longer reduced to the question *if* new learning technologies should be used, but finding new ways of combining traditional teaching methods with participatory classroom exercises. To that end, the experimentation with new teaching methodologies is a double-edged sword: It may help the instructor to improve the current teaching, yet it may also have the adverse effect to decrease the students’ motivation if the students do not find the new teaching methodologies relevant or meaningful. A major challenge for the future is therefore to be aware of, and draw attention to, how new learning technologies can be applied in classroom activities to avoid that the students’ attention is disrupted by irrelevant parallel activities.

Participatory activities

Traditionally, computer-based activities have been designed as exercises in a computer lab by following a manual with a list of predefined steps, for example in statistics courses, while new and innovative methods have gradually emerged during the past ten years that allow for using web-based surveys that can be answered via the students’ mobile phones, tablets or laptops. However, participatory classroom activities are not limited to online tools. The old idea of using participatory activities in class fits well with the new challenge of managing the students’ attention in the classroom. In this context, both paper and computer-based participatory activities are important. Paper-based activities remain a valid method, while computer-based surveys in class represent another new opportunity in university teaching to engage the students in the classroom activities. Based on the study, we believe that there is a need to develop the current teaching activities, not by restricting the use of students’ information and technologies in the classroom, but rather by connecting them with the present university infrastructure.

4.3 Massive open online courses

The new idea of massive open online courses (MOOC) may be considered innovative, but irrelevant for improving the *quality* of the teaching at university. A MOOC with over 300 students is similar to the classic lectures in plenum with over 100 students, but it remains fundamentally different from the small classes with less than 30 students. The context of massive open online courses to more than 300 students is clearly different from the teaching of fewer than 30 students in a class-

room. The MOOC present a new opportunity for scaling up the number of students in order to lower the cost per student (i.e. cost challenge) and finding new routes to market (i.e. revenue streams). Thus, the MOOC represent an interesting step in terms of ‘cost innovation’ (Williamson, 2010), but not necessarily for improving the quality of the current academic courses. The MOOC may be considered efficient in gaining *breadth* in order to scale up the number of students to lower the cost per student; and it may work as an effective method to capture the revenues from otherwise inaccessible students, but the obvious limitation of the MOOC is the potential lack of *depth* in order to engage the students in the teaching activities. By depth we refer to improving the quality and relevance of the course material through paper or computer-based exercises in the classroom. The activation of students via interactive online surveys in real-time is possible through a MOOC, but the distance between the teacher and the students remains a critical limitation. A related limitation of a MOOC is that it may be considered only ‘partially connected’ to the real world. High quality paper-based group exercises are not an option. Neither is the rich dialogue with the students about different topics in the teaching activities an option. Thus, the MOOC are relevant in terms of cost innovation (Williamson, 2010), but they do not solve the new and emerging challenge of the students’ partial attention or attention deficit, which may be considered a critical limitation. As an alternative to scaling up the number of students to decrease the cost per student, we encourage our fellow colleagues to incorporate participatory exercises in the teaching activities in order to (i) increase the students’ motivation, (ii) manage students’ attention, and (iii) accelerate learning.

6. CONCLUSION

The present study presents an original contribution to the education literature by specifying the importance of classroom attention. The present study suggests that both paper and computer-based participatory activities are useful in relation to the new and emerging challenge of managing the students’ attention in class. Participatory activities are also important for increasing the students’ motivation and accelerating learning. Participatory activities are relevant in order to improve the traditional classroom activities. Not only by facilitating paper-based exercises, but also by integrating the students’ devices in the current classroom teaching to avoid that these devices could otherwise consume their attention. The present study indicates an unexploited potential in using real-time online surveys that can be answered via the students’ mobile phones, tablets or laptops in the classroom. The present study draws on a total of 320 responses from 40 students from 15 different countries. The small sample size is a critical limitation, but the present study is nevertheless suggested to be a valuable first step for the research on educational innovation through participatory activities. Finally, the five-factor framework is scalable (and perfectly repeatable), which provides a new avenue for conducting further research.

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Demotivating factors in English classroom: a case study of Iranian guidance school students

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Abstract

This study was set out to find out the main sources of demotivation in English learners learning environment. The study was designed as a qualitative case study, and involved face-to-face interview, and a diary maintained by the three thirteen year old female students for data collection. They were asked to write about their English learning experiences and the factors that made them demotivate. After data collection the researcher analyzed the content of diaries and the interviews. Based on the findings, five categories of demotivating factors were identified which are 1) the teacher, 2) text books, 3) school officials, 4) learner personality, and 5) school facility in order of importance.

Keywords: Iranian guidance school, qualitative case study, foreign language.

1. Introduction

There is a long history of the study of motivation in language learning. Many research results shows that motivation is one of the main determining factors in an individual's success in developing a second (L2) or foreign language (FL) (see, e.g., Dornyei, 1990, Dornyei, 2001a, Dornyei, 2001b; Gardner, Lalonde, Moorcroft, & Evers, 1985; Oxford & Shearin, 1994). Research has shown that motivation is crucial for L2 learning (Dornyei, 1994; Oxford & Shearin, 1996) because it directly influences how much effort students make. It could be described as a driving force that energizes human behavior and directs their behavior. Research on L2 motivation is concerned with what makes a person want to learn a second language and what keeps him or her interested in learning it, i.e. motivated.

Recently, L2 motivation is viewed as a discursive phenomenon which means that, it is produced in various situations and contexts by various people. In other words "motivation is something that is produced in people's talk and writing" (Kalaja & Leppänen 1998:174). Thus,

motivation can be constructed, e.g. in classroom interactions, educational settings or talk among classmates. This view of motivation emphasizes the importance of examining motivation as a variable. Also, viewing motivation as a discursive phenomenon allows researchers to study it as it occurs in real-life situations, instead of studying it as a constant construct that lies within a person.

There is also another side to motivation that probably every learner has faced at some point which is loss of motivation. What this means is that just as there are influences that have a positive effect on motivation, there are also some influences with a negative effect. These influences are called *demotivating* influences. Contrary to positive forces that keep learners motivating during learning, demotivating forces reduce motivation during learning. Dörnyei (2001) has attempted to provide a definition for it. Accordingly, demotivation “concerns specific external forces that reduce or diminish the motivational basis of a behavioral intention or an ongoing action” (Dörnyei 2001:143). Thus, demotivation could be regarded as the dark side of motivation. A demotivated learner is someone who has lost his or her interest for some reason. The loss of interest can derive from various external sources. Dörnyei (2001) points out that demotivation do not mean that a learner has lost his or her motivation completely. On the contrary, the positive influences that originally made up the motivational basis of behavior can still be there.

1.1. Statement of problem

This 'darker side' of motivation or demotivation has been somehow ignored in previous researches on L2 motivation. Demotivation is an area of research that must receive more attention, because that it has direct educational implications. In other words, in addition to knowing what motivates a learner, being aware of the demotivating factors is essential both for teachers and learners.

1.2. Objective of the study

This case study sets out to explore sources that cause demotivation in guidance school EFL learners. In other word, the objective of this study is to answer the following question:

What factors cause demotivation in guidance school EFL learners?

2. Literature review

While motivation is really important to learning, so does demotivation is a problem with all students at all levels. Oxford (1998) conducted a qualitative study on demotivation, which focused on a teacher's influence on (de)motivation. The data were collected by essays. Approximately 250 students, both in high schools and universities, were asked to write about their experiences over a period of five years. Four broad themes emerged from the data. The teacher's personal relationship with the students was the first theme. The teacher's attitude towards the course or material was the second theme. Style conflicts between teachers and students were the third theme. The nature of classroom activities was the fourth theme.

Dornyei (1998), as cited in Dornyei & Ushioda, (2011) interviewed 50 secondary school students who had been identified as demotivated learners by their teachers or peers and identified the following demotivating factors: 1) The teacher, 2) Inadequate school facilities, 3) Reduced self-confidence, 4) Negative attitude towards the L2, 5) Compulsory nature of L2 study, 6) Interference of another foreign language being studied, 7) Negative attitude towards L2 community, 8) Attitude of group members, and 9) Course book. They reported that demotivating factors of the teacher and reduced self-confidence account for more than half of all demotivating factors.

Falout and Maruyama (2004) examined the relationship between demotivation and students' level of language proficiency. The 49-item questionnaire developed based on Dornyei's nine demotivating factors was administrated to 164 freshmen university students from two science departments. Six categories of demotivating factors were identified: 1) Teachers, 2) Courses, 3) Attitude towards English speaking community, 4) Attitude toward English itself, 5) Self-confidence, and 6) Attitude of group members. It was found that for the low-proficiency learners, self-confidence, attitudes toward the L2, courses, teachers, and attitudes of group members were the most demotivating factors. For the high- proficiency learners, self-confidence was the most important demotivating factor. In fact, low proficient students tented to correlate demotivation to their affective states, while the high proficient students were more suitable to attribute their demotivation to external factors and indicate more control over their affective states and learning situation.

Sakai and Kikuchi (2009) concluded that teachers, characteristics of classes, experiences of failure, class environment, class materials, and lack of interest were identified as the major demotivating factors in previous studies of students' demotivation. They administrated a 35-item questionnaire to 656 Japanese high school students and identified the following sources of demotivation: 1) Learning contents and materials, 2) Teachers' competence and teaching styles, 3) Inadequate school facilities, 4) Lack of intrinsic motivation, and 5) Test scores. Findings indicated that learning contents and materials and test

scores were the salient demotivating factors for many students. Contrary to the previous studies, teacher-related factors were not the most demotivating factor.

Kikuchi (2009) asked 5 university students from public and private universities to share their experiences in high school English classrooms. Forty-two university students from public universities completed an open-response questionnaire. Through the qualitative analysis, the following demotivating factors were identified: 1) The teacher behavior, 2) The grammar–translation method, 3) Tests and entrance examinations, 4) Vocabulary memorization, and 5) Textbooks and reference books. It was concluded that many demotivating factors were related to “the old-style teacher-fronted approach and teachers’ behavior were the salient demotivating factors in Japanese context.

Muhonen (2004) examined the main demotivating factors in relation to students’ gender and level of achievement. Through the analysis of 91 ninth-grade students’ writings, the following demotivating factors were identified: 1) The teacher, 2) Learning material, 3) Learner characteristics, 4) School environment, and 5) Student’s attitude towards English. The findings revealed that the most demotivating factor was the teacher and the least demotivating factor was attitude towards second language. The quantitative analysis of the data showed that there were not significant differences between male and female students in terms of demotives. However, the comparison of the frequencies of demotives indicated that male students more frequently attributed demotivation to the teacher whereas learning material was considered more demotivating by female students. The teacher was regarded the main demotivating factor in all grades.

Christophel and Gorham’s 1992 study tried to determine what factors were perceived as demotives by college students taking introductory communication classes. Demotives were collected from students’ responses to the open-ended question: “What things decrease your motivation to try hard to do your best in that class?” The research findings revealed three main categories of demotives, i.e., context demotives (factors likely to be regarded as antecedent to the teacher’s influence), structure/format demotives (factors over which the teacher is likely to have some degree of influence, if not complete control), and teacher behaviors (factors likely to be perceived as under the teacher’s direct control). Teacher-related factors, which consist of class structure or format-related demotives and the demotivating factors resulting from teacher behaviors, accounted for 79% of all the responses. In a follow-up study to ascertain whether the perceived sources of demotivation could be replicated, Christophel and Gorham (1995), using the same question to detect demotives with another group of college students studying

communication, obtained findings that were consistent with those from the first study. However, in both studies, no attempt was made to examine the cases of the students who might have already been demotivated before entering the college class nor was it clear whether the responses were to real or hypothetical sources of demotivation, i.e., did those who indicated the so called demotives really suffer from them?

3. Method

This study sets out to be a qualitative case study, “an approach to research that facilitates exploration of a phenomenon within its context, using a variety of data sources” (Baxter & Jack, 2008, p. 544), is based on the constructivist paradigm that requires a close collaboration between the researcher and the subject (Crabtree & Miller, 1999), and depends on participant perception. The purpose is to find out the factors that cause demotivation in guidance school EFL learners. To avoid answering the issue generally, and to reasonably define the scope of the topic, the cases were restricted by age, educational level and context. As the study was aimed at examining the demotivation factors in the EFL learning, the study was conducted holistically to explore the various factors influencing the learning process.

The study conducted at two-step procedure: data collection and data analysis. Data were gathered from two sources, interview, and a diary maintained by the cases. Then, the data from two sources were analyzed according to the research topic to link the data to the issue. Therefore, the irrelevant ones were deleted. Next, the data collected from two sources were coded and organized in relation to the demotivating factors in the learning process. Finally, the data were presented in the order of importance, from the most repeated factor to the least repeated one.

It was emphasized that cases’ privacy would be respected, and that participation was voluntary. Further, the study was stated to be conducted within the bounds of respect for the subjects, that there was no risk at all in participating in the study (Mack, Woodsong, MacQueen, Guest, & Namey, 2005), and that the outcomes of the study would be useful to EFL teachers in service, teacher trainers, education politicians, and curriculum developers.

3.1. Participants

There are three female students who are about 13 years old. They have already finished the second grade of guidance school. All of them have joined English institutes since 2 years age;

therefore, they are familiar with English to some degree. They have positive attitude toward English, but there were some external factors that had affected their motivation.

3.2. Tools

The tools for data collection included interview, and a diary maintained by the subjects. The case study was limited to interview and a diary maintained by the cases over one month to determine the factors causing demotivation in EFL learning context. The research was carried out qualitatively as the tools mentioned helped to provide data from the participants' perspective.

3.3. Procedure

This study is a qualitative case study, in order to explain the demotivating factors in guidance school EFL learners. This implied that it was necessary to carry out a qualitative case study to reach a deeper understanding of the research issue (Law et al., 2007). The study conducted at two-step procedure: Data collection and Data analysis.

3.3.1. Data collection

After the participants were informed about the aims, contributions, and output, including the data collecting tools and the procedure of the study at the beginning of the study, the subjects announced that they would participate in the study voluntarily and consciously.

Two instruments were used to obtain the data: interview and a diary maintained by the cases. First, the data were limited to the factors that demotivate EFL learners. Therefore, during the interview, the researcher and cases discussed the learning environment and problems related to EFL teaching and learning. The researcher took notes during the interview. During the earlier interview, the questions mainly focused on general issues that relate to demotivation during the learning process whereas later ones focused on more specific issues in learning environments. For instance, while one of the cases criticized the teaching methodology in a general sense in her earlier talks, she later mentioned the difficulties in learning new grammatical point due to the problems related to the teaching methodology. Interviews were held face-to-face. Also, the researcher and all three cases were talked in a group about their learning experiences during

learning in English classes. Participants wrote their diaries holistically and gave them to the researcher. Diaries mentioned by cases resembled an unstructured interview, in which cases can externalize their thinking with very little interference. There were no preconceived questions or claims during these interview or diary entries. The process lasted nearly one month. As the data was collected from two different sources, over one month, it was assumed that the saturation of the data was achieved to meet the purpose of the research (Law et al., 2007). The entire process, data collection, saving and analysis, was carried out by the researcher.

3.3.2 Data analysis

The data from the sources were contextualized separately in lines. Then the data was analysis based on Selinger and Shohamy (1989) detailed content analysis. Selinger and Shohamy (1989) have discerned a technique to analyze qualitative data which is descriptive and exploratory in nature and aims at establishing categories from the data. In addition, there were no possible influences of the researcher during collection, interpretation and evaluation of the data (Seliger & Shohamy, 1989).

4. Findings

This study sought to find out the factors which cause demotivation in EFL learners. The factors are reported in themes. The demotivating factors that emerged from the diaries and interviews which were collected from the cases were grouped into five themes: the teacher, the text book, school officials, learners' personality, and facilities.

Teacher:

Teacher was the main factor in demotivation. The negative aspects related to teacher were described as: teaching methods, teacher personality, and teacher appearance. These three subthemes will be discussed starting with the teacher's more general aspects, her teaching methods and then moving on to more personal aspects, and finally to her appearance.

Teaching method:

The first theme, teaching methods, refers to all kinds of classroom activities and to the teacher's way of teaching. What seemed to be causing demotivation in students were the temporal aspects of teaching, meaning that the progress teaching had been too fast. To teach too fast make students demotivate. It was complained that the teacher taught too fast. The teacher

should have adjusted the teaching to such a rate that everyone could have been able to keep up and that the teacher should have made sure that he or she had not lost anyone before moving on as:

- حجم دروسها خیلی زیاد هست و معلم تمام درس را در یک جلسه تمام میکند که باعث میشه درس را یاد نگیرم.

[Lessons are too long but teacher tries to finish all of them in a section, so I don't learn.]

- نکات تنها یکبار گفته میشه و من نمیتوانم همه مطالب را یاد بگیرم.

[The important points are being told just once, so I don't learn those parts.]

- معلم فقط به تمام شدن درس فکر میکنه، به همین دلیل خیلی سریع درس میده. تا میخوایم یه نکته را بفهمیم معلم رفته سراغ نکته بعدی و ما عقب میفتیم.

[Our teacher is just concern about finishing the lesson and because of that she teaches very fast. Once we want to learn one point she moves on to the next point.]

Another demotivating factor was lack of practice. It was reported that leaving the lesson without any practice make the class meaningless to students. There was almost no speaking practice in the most English classes which had decreased students' motivation. Students wish to see more of the class activities and practices in English, as:

- من ترجیح میدهم بعد از تدریس هر نکته، معلم بهمون تمرین بدهد تا حل کنیم.

[I prefer to have exercise after each part of the lesson.]

- معلم ما بعد از تدریس گرامر هیچ تمرینی حل نمیکند، که این باعث میشه من گرامر را یاد نگیرم و ملکه ی ذهنم نشه.

[Our teacher does not solve many exercises on grammar, so I don't learn very well.]

- معلم من اصلاً به زبان انگلیسی صحبت نمیکنند، زنگ زبان من اصلاً احساس نمیکنم که توی کلاس زبان نشستم، چون نه معلم انگلیسی صحبت میکنه و نه هیچ تمرینی میشه.

[Our teacher does not speak in English. In English class, I don't feel that I'm sitting in English class because she doesn't even work on the speaking part.]

Homework was the other demotivating aspect of teaching. What seemed to be a problem was that the teacher had given too much homework. Also, the homework had included tasks about grammar points and new vocabulary that had not been practiced very well in the class, as:

- ما بجز زبان هم درسهای دیگری داریم، اما معلم زبان خیلی تکلیف میدهد و من وقت کافی برای انجام دادن اون همه تکلیف را ندارم.

[Our teacher asks us to do so many home works but we have another home works which are related to other books, too.]

- معلم من درس را برای ما ترجمه نمیکنند اما در تکالیفمان از مون میخواند که جملات را ترجمه کنیم در صورتی که من بلد نیستم و معلم بهم منفی میدهد و این واقعاً باعث میشه انگیزه من از دست بدم.

[My teacher does not translate the lesson but gives us the exercises which are related to translation, I don't know how to translate them. This make me demotivate.]

Teaching method itself is the other factor in demotivation. Students prefer to learn grammar by rules. They want teacher to teach every rules and exceptions of grammar, in another word, they want teacher to teach deductively rather than inductively, as:

- معلم باید گرامر را موشکافی کند و تمام نکاتی که مربوط به اون درس هست را درس بدهد با تمام جزئیات که این کار را نمیکنند.

[The Teacher must teach all of the details of the grammar part but our teacher doesn't do so.]

- معلم باید فرمولهای گرامری را روی برد بنویسد و کامل توضیح بدهد. اما معلم ما این کار را نمیکند.

[The Teacher has to write the grammar points and formula on the board and explain all of the completely. But our teacher does not do so.]

Finally, another aspect of teaching methods that cause demotivation was that the teacher had penalized all students rather than the guilty one, as:

- آنگه یکی از دانش آموزها خطایی کند یا بی نظمی میکند، معلم ما تمام کلاس را جریمه میکند، این خیلی بی انصافیست.

[Our teacher penalizes all of the class instead of those students who has irregularities. This is not fair.]

- یکروز یکی از هم کلاسیهای من نظم کلاس را بهم زد و معلم تمام کلاس را مجبور کرد پنج دفعه از روی کل درس بنویسند.

[One day one of my classmates made a lot of noises but our teacher made all of us to write the whole lesson five times.]

Personality

There were many features in the teacher's personality that had caused demotivation. One of these features was that the teacher had been too formal and so that the class atmosphere had been too unpleasant. It was also reported that she had yells at pupils. For example:

- جو کلاس ما پر از استرس هست، اگر یک سوال را بیشتر از یک بار بپرسیم معلم عصبانی میشه، با ملایمت جواب نمیدهد.

[Our class environment is full of stress, if we ask a question more than one time our teacher become mad.]

- جو کلاس خیلی خشکه، احساس راحتی نمیکنیم.

[I don't have good feeling in the class because our class environment is so unpleasant.]

- معلم ما خیلی سختگیر هست، یه روز امتحان ریاضی داشتیم و از معلم خواستیم که اون روز درس نپرسه، اما راضی نشد و پرسید و به اکثر بچه ها منفی داد.

[Our teacher is so fastidious. One day we had a math test so we demanded our teacher not to ask the lesson but she didn't satisfy.]

It was also reported that the teacher had humiliated and had called the students down. This characteristic of teacher personality had been decreased motivation to a large degree, as:

- یکبار امتحانم را خراب کرده بودم و نمره ام کم شد و معلم جلوی تمام کلاس من را تحقیر کرد.

[Once I blew up my test and my teacher humiliated me in front of my classmates.]

- یکبار من و چندتا از دوستانم درس بلد نبودیم و معلم ماها را فرستاد دفتر مدیر، من خیلی خجالت کشیدم و از درس زبان بدم امد.

[Once my friends and I didn't study and our teacher sent us to the principal's office. I embarrassed.]

Finally, it was reported that teachers had compared students and classes with each other which made students to lose their motivation. In addition, some teachers are "biased", meaning that they discriminate others, less-talented students, as:

- معلم من دایم کلاس ما را با کلاسهای دیگر مقایسه میکند و از کلاسهای دیگر تعریف میکند، اصلاً کلاس ما را قبول ندارد.

[Our teacher always compares our class with other classes. She praises other classes.]

- معلم ما بین دانش آموزها فرق میگذارد و به دانش آموزهای زرنگ بیشتر توجه میکند، مثلاً وقتی به دانش آموز زرنگ جواب سوالی را نداند خود معلم بهش کمک میکند تا جواب بدهد اما وقتی به دانش آموز تنبل جواب سوالی را نداند معلم سریع بهش منفی میدهد.

[Our teacher differentiated between us, she helps the smart students to answer the questions but gives mines to those lazy students when they can't answer the questions.]

Teacher appearance

The teacher's way of clothing, make up had been influenced students' motivation, especially in girls. Students paid a lot of attention to teachers' appearance, as:

- معلم من خیلی شلخته هست، مانتوهای شیک نمیپوشه، گاهی اوقات کفشهاشو در میارده و بوی پاش ما را اذیت میکند و کلا حواسمون پرت میشه.

[Our teacher is so slovenly. She is not stylish. Sometimes she takes off her shoes; her food odor bothers us and distracts us completely.]

Text books:

The second theme which had been affected students' motivation was text books. The most demotivating aspect about text books were the contents. It was complained that the book was uninteresting and the exercises in it had been very easy and boring, as:

- موضوعهای درسهای کتاب اصلاً جذاب نیست، خیلی خسته کننده هستند. مکالمه ها اسان و بی ربط هستند به همین دلیل برای من کسل کننده هست.

[The text book's topics are not interesting at all. The conversations are too easy and irrelevant and because of this it is so boring for me.]

- تمرینهای کتاب خیلی اسان هست و من هیچ انگیزه ای برای حل کردنشون ندارم واسم جذاب نیست.

[The text book's practices are too easy so I don't have any motive to solve them.]

The lack of variation was stated as a demotivating factor. It was complained that the same topics had been repeated in the books, as:

- بعضی از موضوعهایی که در کتاب اول راهنمایی خوانده بودیم را باز در کتاب دوم راهنمایی خواندیم ، به همین دلیل هیچ انگیزه ایی برای یادگیریشو نداشتیم.

[There are some topics which are repeated in both first grade and second grade books, so it is not interesting for me.]

Finally, appearance of the text books had been affected students' motivation. Colored books along with interesting pictures made students motivated. But the schools' books in Iran with their childish pictures and white and black colors had been one of the sources of demotivation for students, as:

- کتابهامون که سیاه و سفید هستن، عکسها و نقاشیها هم انگار واسه بچه های دو سه ساله هست، اینها هم یکی از دلایل خسته کننده و کسل کننده بودن کتابها هستن.

[Books with their white and black color and childish pictures are very boring.]

School officials

The forth theme according to the factors of demotivation was school. The first demotivating aspect of school officials was those who scheduling English classes. The problem was that the classes had taken place too late. The reason why this was considered a problem was that, this time had not been that suitable for studying languages. Consider:

- زنگ کلاس انگلیسی اکثراً در ساعات اخر هست، درست زمانی که خیلی خسته هستیم، بخاطر همین چیزی یاد نمیگیرم.

[Classes are take place too late so I don't learn too much because I'm really tired at that time.]

- مدیر برنامه ریز مدرسه نباید کلاس زبان را بعد از کلاس ریاضی یا فیزیک بگذارد اخه ما دیگه کشش یادگیری نداریم، ذهنمان به اندازه کافی فعالیت داشته.

[Class programmers should not take the English classes after mathematics or physics because we can't learn any more.]

And the second aspect was that the principal and schoolmaster were unexceptionable. Students had become disappointed when there is no one to listen to their professional about the teacher and school and so on, as:

- مدیر و ناظم اصلا انتقادپذیر نیستند، ما جرات اعتراض نداریم.

[The school principle and schoolmaster are unexceptionable. We don't dare to talk to them.]

- حتی اگر حق با ما هم باشد کسی نیست که به حرفهای ما گوش بدهد و ترتیب اثر بدهد. همچنین جوی توی مدرسه انگیزه من را از بین میبرد.

[Even if it was our right but there is no one to listen to our professional. Also, school environment make us demotivate.]

Learner personality:

The third source of demotivation lied within the students themselves, i.e. learner personality and preferences, which refers to everything that comes from inside the learner and their preferences. Lack of confidence in students' was reported as one of the aspects of learner personality that had been affected motivation. It was reported that studying English had been difficult for a student if found it difficult to keep up with the others, as:

- اکثر همکلاسیهای من کلاس زبان میروند، و چون درسشون خوبه من خجالت میکشم سوالهامو بپرسم اخه فکر میکنم اگه سوال بپرسم اونها مسخره ام میکنند.

[Most of my classmates are going to English institutes so they are good in English and I'm ashamed to ask my questions because I think they would make fun of me.]

- احساس میکنم تنها کسی که تو کلاس درس یاد نگرفته منم به همین خاطر اگر سوالی داشته باشم نمیپرسم و باعث شده انگیزه ام را از دست بدهم.

[I lose my motivation because I thought that the only person who does not learn is me, so I don't ask my questions.]

Another aspect of learner personality was that they had preferred teacher correction, means that in the case of making error they had preferred their teacher to correct their errors. They had become nervous when their classmates corrected their errors, as:

- وقتی اشتباهی میکنم و هم کلاسیهام اشتباهمو تصحیح میکنند عصبی میشم و دیگه دلم نمیخواد ادامه بدم.

[Whenever I make a mistake and my classmates correct me, I become angry and I prefer not to continue any more.]

- ترجیح میدهم معلم اشتباهاتم تصحیح کند، اخه بهتر یاد میگیرم.

[I prefer my teacher to correct me because I will learn much better.]

Facility

The last theme in order of importance was the facility by which the researcher means school properties. Lack of facility had effected demotivation, as:

- در مدرسه من هیچ وسیله کمک آموزشی موجود نیست، توی کتاب قسمت listening دارد اما ما ضبط صوت نداریم و بنابراین این قسمت توی کلاس کار نمیشه.

[In our school there are not many facilities. There is a listening part in the book but it does not work because we don't have tape recorder.]

- من وقتی مدرسه خودم را با بقیه مدرسه های بالا شهر که کلی امکانات دارند مقایسه میکنم بی انگیزه میشم، انها فیلم تماشا میکنند اما ما نه، تخته های هوشمند دارند اما مدرسه ما ندارد.

[When I compare my school with those high class schools I lose my motivation because they watch movie and use smart board.]

5. Discussion

Five demotivating factors were identified in this study: 1) the teacher 2) text book, 3) school officials, 4) learner personality, and 5) facility. The 'teacher' was the most prominent demotivate

factor in L2 learning. This finding is in line with findings of the previous studies which have related students' demotivation to the teacher (e.g. Dornyei, 1998, as cited in Dörnyei & Ushioda, 2011; Falout & Maruyama, 2004; Muhonen, 2004; Oxford 1998). The results of the study by Dörnyei & Ushioda, Kikuchi and Muhonen indicated that teacher was the prominent source of students' demotivation. They reported that demotivating factors of the teacher account for more than half of all demotivating factors. But this is in contrast to the study conducted by Sakai & Kikuchi, 2009, in which the learning content was the salient sources of students' demotivation.

Text book was the second source of students' demotivation. These findings are in line with results of the previous studies which have related students' demotivation to the learning material and contents such as: Dornyei, 1998, as cited in Dörnyei & Ushioda, 2011; Falout & Maruyama, 2004; Muhonen, 2004; Sakai & Kikuchi, 2009. The results of the study by Sakai and Kikuchi indicated that learning contents and materials were the important sources of students' demotivation.

In addition, a school official was the other source of demotivation. Factors related to school officials have not been reported in the previous studies.

Learner personality was the fourth source of demotivation among these three cases. Similar results have been reported by Dörnyei (1998b), Falout and Maruyama (2004), and Muhonen (2004), who included reduced self-confidence as a demotivating factor.

Finally, school facility was the fifth source of demotivation. Factors related to facilities have also reported in the previous studies such as Dornyei, as cited in Dörnyei & Ushioda; Sakai & Kikuchi, who reported facility as one of the sources of demotivation. But in contrast to the previous studies (e.g. Falout & Maruyama, 2004; Gorham & Christophel's, 1992; Kikuchi, 2009) in this study it was found that 'facility' was among the factors of demotivation.

6. Conclusion

The overall objective of this study was to answer the question of: "What factors cause demotivation in guidance school EFL learners?". After analyzing the diaries and interviews these results were obtained: 1) the teacher 2) text book, 3) school officials, 4) learner personality, and

5) facility. As the findings indicate the teacher's teaching method along with her personality and appearance have strong influence on students' demotivation. In other word, her way of teaching grammar, lack of working on exercises, speaking in Persian, her personality that differentiated between students and classes, and her way of clothing and make up have influence on learners' motivation.

The other source of demotivation is an English text books that influence motivation and to a great degree cause demotivation. Text books contents, easy exercises, simple and irrelevant conversations, and childish pictures reduce students' motivation. Material developers are advised to modify learning contents and materials to meet students' interest. Students' negative idea about the second language might be changed by improving the content of the text books. English text books fail to attract the students' attention and reduce their motivation by emphasizing grammar and vocabulary.

Considering students' personality, teachers must be pay more attention to their feelings and try to increase their motivation, help them to increase their self-confidence, talk to those who are shy and try to involve them in class activities.

School officials and facility that cause demotivation must be taking into consideration. Education has to increase schools facilities. In addition, school officials should be more exceptionable, listen to students complain and giving effect to them in order to increase students motivation.

Since this study was exploratory in its nature, more studies on L2 demotivation are needed to confirm these findings. In addition, demotivation is still a relatively new area of L2 research; therefor there are lots of issues that need further investigation. In fact, demotivation itself requires more investigations because the demotivating factors discovered so far can hardly be generalize to other contexts. Another aspect of demotivation that has not been studied to date is how reduce demotivating factors to the extent that nearly all the EFL learners become strongly motivate to learn.

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COGNITIVE THEORY AND THE DESIGN OF EDUCATION TO WORK CONNECTION

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Abstract

The current and future health of 21st Century economy depends on how broadly and deeply work and education are interconnected. Education to work connection should enable cognitive development of individuals and teams so that the outcome of education can be directly translated to work environment. Cognitive developmental theories attempt to explain cognitive activities that contribute to students' intellectual development, their long life learning, and solving problems. These are the attributes that one needs to acquire before entering work environments. The author will first briefly present Piaget's cognitive theory and derive a problem solving pedagogy model from it that will support learning that will translate to education to work connection. Second, an example developed by the author and his graduate students will be presented that uses the Web as an appropriate instructional delivery medium to apply Piaget's cognitive theory to create environments that promote the education to work connection.

Keywords

Cognitive theories, education to work connection, e-learning, inquiry training, Web.

1. INTRODUCTION

The explosive growth of the Web and mobile devices and the dramatic advances in the design and development of online technological tools in recent years have revolutionized the way students and teachers view technology in education. These technological advances have made it possible to produce educational materials and transmit them over the Web or the mobile devices. In parallel to these

technological advances, the field of instructional design has not made phenomenal contributions to real world technology curriculum planning that would prepare students entering the workforce with adequate training.

One of the most effective approaches to developing appropriate pedagogical models for the design of e-learning in schools is to understand how cognitive development occurs naturally in students in school. Cognitive development theories attempt to explain cognitive activities that contribute to the learners' intellectual development and their capacity to solve problems. Once we understand how cognition develops, we can derive a pedagogical model from it and then design effective e-learning environments that are responsive to the demands of 21st Century economy.

2. COGNITIVE DEVELOPMENTAL THEORY

Piaget

Piaget [1] argued that children and adolescents must continually reconstruct their own knowledge through a process of active reflection upon objects and events until they eventually achieve an adult perspective. Piaget explanation is similar to recent finding of human brain plasticity. In order to understand brain plasticity and to have a better appreciation of this process, it is essential to understand four other concepts that Piaget proposed. These concepts are schema, assimilation, accommodation, and equilibrium.

Schema

Piaget [2] used the word schema to represent a mental structure that adapts to environmental patterns. In other words, schemata are intellectual structures, in terms of "neuron assemblies," that organize perceived events and group them according to common patterns. A number of researchers [3][4] have posited that schemata are the building blocks of intellectual development. During cognitive development, because of brain plasticity, children's schemata are constantly restructured as they encounter new patterns in their learning experiences.

Schema is not limited to concepts, objects, data, and their relationships. There are also procedural schemata [5] which are the ways of processing information. For example, students who have acquired the basics of mathematics, such as adding, multiplying, dividing, and subtracting, have internalized the concept schemata about these mathematical operations. However, as the students grow, they gain new abilities to solve problems that are related to mathematical concepts. The ability to solve problems is a procedural schema. Both concept and procedural

schemata are constantly restructured as new learning environments are introduced to the learner.

Assimilation, Accommodation, and Equilibrium

One of the most fundamental questions about schemata is how are they restructured when new data or patterns are discovered in the environment? Piaget was a biologist by academic training. He was very comfortable with the concept of biological adaptation to environmental stimuli. For example, from a biological point of view the human body is structured to be constantly in a state of equilibrium in regard to its temperature. When the body temperature is raised by a few degrees during exercise, the entire system goes into a state of disequilibrium. The feedback mechanism senses such a state of disequilibrium and internally responds by producing sweat and sending more blood near the skin to cool the body down; thus, restoring a state of equilibrium for the body.

Piaget used the same concept of biological equilibrium-disequilibrium states to explain the causes of cognitive restructuring in response to new learning experiences. For example, when students encounter a new learning environment, a state of disequilibrium is created within their brains that must be internally managed. In other words, the new learning environment has placed the brain in a state of disequilibrium. In order for the brain to get back to the state of equilibrium, the learner has to add, modify, or restructure his or her schemata, synaptic connections, to account for the new situation. This is possible because plasticity of human brain. The internal mental mechanism or processes that is responsible for the restructuring of schemata so that the brain can restructure itself to get back to an equilibrium state is called assimilation and accommodation. [6][7]

Assimilation is the cognitive process by means of which people integrate new patterns, data, or processes into their existing schemata. Piaget argued that, as learners assimilate input from the environment, the new information is not simply stored in the mind. Rather new information is integrated and interrelated with the knowledge structure that already exists in the mind of the person. "Every schema is coordinated with other schemata and itself constitutes a totality with differentiation parts." [8]

The change that occurs in the mental structure of schemata is referred to as accommodation by Piaget [9] Upon facing new learning environments, sometimes the learner's schemata cannot assimilate the new information because the patterns of the new stimuli do not approximate the structure of the existing schemata. In such cases one of two things can happen: The learner can create either new schemata or modify the existing schemata. In either case the structure of schemata is being changed, due to brain plasticity, so that it can accommodate new information. Therefore, accommodation is the creation of new schemata or

modification of old schemata. In both of these cases the result is a change in the cognitive structure, the overall structure of schemata because of brain plasticity.

The process of cognitive development is the result of a series of related assimilations and accommodations. Conceptually, cognitive development and growth proceeds in this fashion at all levels of development from birth to adulthood [10]. However, because of biological maturation, major and distinctive cognitive development occurs over a lifetime. Piaget [11] posited four major stages of cognitive development that occur over a lifetime. These stages are sequential and successive. According to Piaget, these stages are Sensorimotor (birth to 2 years old), Pre-Operational (2 to 7 years old), Concrete Operation (7 years to adolescence), and Formal Operation (adolescence to adult). The first three stages are not relevant to the purpose of this paper. Therefore, I shall only describe the Formal Operation development as it applies to students in grades 6th and higher who are getting trained to enter the workforce that should be connected to education.

The Formal Operational stage of development generally begins in early adolescence and continues through adulthood. Formal reasoning is characterized by the ability to carry out mental activity using imagined and conditional actions and symbols that are divorced from their physical representation. Individuals at this stage are able to control variables systematically, test hypotheses, and generalize results to future occurrences. This stage, which continues to develop well into adulthood, is characterized by the ability to reason and solve problems.

Adolescent, just like scientists, follow an inquiry process when they are faced with a new problematic situation. That is to say, when they are faced with a problem, they use their ability to hypothesize, gather information, and classify relevant information to solve the problem. When this natural process of learning happens, the structure of the brain, or synaptic connection are restructured because of brain plasticity. The ability to hypothesize can provide a foundation for a pedagogical approach to education and the design of e-learning environments.

3. COGNITIVE THEORY AS THE BASIS OF PEDAGOGY

Based on Piaget's theory of cognitive development, during the 1980's and 1990's, influential educational technology theorists such as Papert [12] became interested in constructivism and inquiry-training models. This new breed of instructional designer believed that construction of knowledge through inquiry, rather than direct instruction, should be the focal issue of teaching and learning. They viewed learning as a process in which children interact with the world to construct, test, and refine their own cognitive representation of the world. Technology is viewed as a tool that allows the development of environments or educational programs in

which adolescents go through interacting with its elements to construct their own knowledge.

The general goal of inquiry-training is to help students develop a sense of the independent inquiry method but in a disciplined way. The inquiry-training model of teaching has the following five phases of instruction [13]:

- Phase One: Puzzlement or intellectual confrontation by presenting students with the *problem* to create a state of disequilibrium in their mind.
- Phase Two: Students will *hypothesize* a reason for the problem.
- Phase Three: Students will *review* and look at models for the new information in regard to the hypothesis and the original problem. Then they isolate relevant information, eliminate irrelevant information, and organize the information.
- Phase Four: Students *explore* approaches then *test* their hypothesis to postulate a possible answer to the original puzzlement.
- Phase Five: Students are *evaluated* to ensure their understanding of the concept(s) in the intellectual puzzlement.

Research conducted by Voss [14] concluded that the inquiry-training strategy is effective both for elementary and secondary students. The inquiry-training results in increased understanding of science, productivity in creative thinking, and skills for obtaining and analyzing information.

4. INQUIRY-TRAINING AND E-LEARNING

The author of this paper has developed several successful and effective e-learning sites using the inquiry-training model. One such program is Math, Science, and Technology for students in grades 5-8 where they are confronted with an intellectual problem and try to solve the problem based on the inquiry-training model. This site was developed under the direction of the author of this paper and his graduate students in the Educational Technology program at the California State University, East Bay. The Math, Science, and Technology site uses online multimedia activities and off-line inquiry explorations to engage students in guided inquiry aligned with the inquiry-training model. As seen in Figure 1, the first tab “Problem” presents the problem students need to solve. The second tab “Review” presents background information that students need to understand the new concept. The third tab “Model” presents situations in real life that relate to the mathematical concept to be learned. The fourth tab “Explore” presents the mathematical concept to be learned. The fifth tab “Practice” is where students are

assessed about the content. Finally, the sixth tab “Discuss” is where students need to go to discuss their findings and their problems with the teacher and other students.

As one of the requirements for the course, each graduate student was responsible to develop an inquiry-training model Web site to teach mathematics aligned with the California Mathematics framework. The result is a collection of simple, uniform, and effective math sites for elementary and middle school students. All sites share the same navigational menu as it was originally developed by the author of this paper.

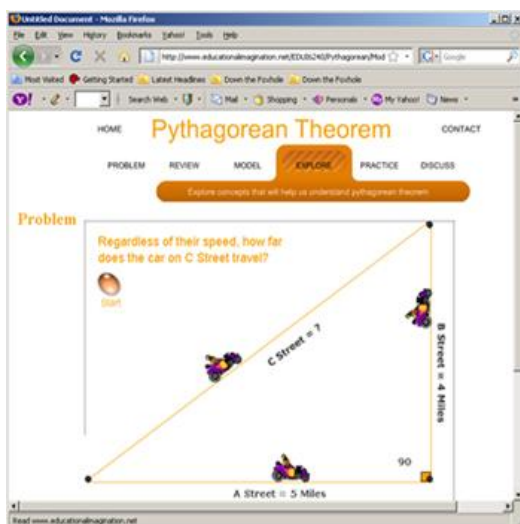


Figure 1 Math, Science, and Technology for the Pythagorean site
<http://www.educationalimagination.net/EDUI6240/home.html>

In all the Web sites in Math, Science, and Technology, the audiences (students in grades 5-8) are first presented with a problem or the intellectual confrontation in the form of a realistic life situation that has a mathematical solution. The problems are aligned with the California Mathematical Framework. Students hypothesize about the aspects of a solution to the problem and discuss solutions in the chat area included in the site with the teacher as the moderator. The navigational menu reflects the inquiry-teaching process to better understand how they can provide the answer to the problem. As new members of the Math, Science, and Technology group, the students get more information through the navigational menu that will help them to review the mathematical concepts that relate to the original problem.

The next navigational button presents modeling from real life that relates to the mathematical concept under investigation. For example, if the mathematical concept is Pythagorean Theorem, then video and animation is provided that explains the diamond of a baseball field and asks how far it is from first base to third base. Or a video can show a building with a specific height and ask what size ladder is needed to climb to the top of the building if the ladder is placed four feet from the base of the building. These types of videos or animations will help students create a conceptual map in their brain about the Pythagorean Theorem.

Next, Students conduct this research by engaging in multimedia training modules that allow them to explore different aspects of the original problem. By focusing on interactive animation about the mathematical concepts, students begin to understand and internalize the mathematical concept and connect that to their prior knowledge. This process helps them to connect their new knowledge to their existing schema and, therefore, restructure their schema (Accommodation). From these observations, students are encouraged to discuss their findings in the private chat room that is provide on the web site and to draw conclusions and find a solution to the original problem.

Once students have generalized needed conditions of "what" we need to solve the problem, they conduct further research in off-line classroom activities that also follow the inquiry-training model and help students to understand "why" we need these mathematical concepts to solve the problem. These off-line activities engage students in explorations that guide them in discovery learning of concepts. For example, after gaining an understanding of the Pythagorean formula ($a^2 + b^2 = c^2$), students relate the formula to the original problem and the models. Then they can realize whether their original hypothesis about the problem was correct or not. From this inquiry-training process the students "discover" and conclude that the Pythagorean formula has application in real life. This type of learning through discovering on their own research and exploration will stay with the students for the rest of their lives.

The inquiry-training model, based on Piaget's concept of learning, allows students to simulate the methods scientists might use to collect data on various scientific explorations. The model that has been presented here is not restricted to mathematics. It can be applied to any academic discipline.

The Math, Science, and Technology Web site is not restricted to the Pythagorean formula, which was originally designed and developed by the author of this paper. There are more than twenty other sites included in the main site. These sites were designed by the graduate students. The most significant aspect of all these sites is that the Web is used as an appropriate instructional delivery medium to apply Piaget's cognitive theory to create e-learning environments. The result is a collection of simple, uniform, and effective inquiry-training mathematical web sites for the elementary and middle school students.

5. CONCLUSION

In this paper, I have presented a different approach to the design of e-learning environments. While traditional instructional design promotes a structured approach to the development of educational technology programs, the cognitive approach supports a guided learning that allows the learner to construct knowledge while in the process of learning. Just like any other theoretical foundation for instructional development, there are those who support a cognitive approach to technology [15][16], and there are also those who claim that the cognitive approach of unstructured learning is not the best use of technology [17].

The cognitive approach that impacted the development of constructivist e-learning has a stronger basis in learning how to learn than the traditional structured approach. It also provides a new approach to the new attributes, such as hypertext and hypermedia that are found in modern technology. Many of the concepts that I presented in this chapter such as the inquiry-training model and the discovery-learning approach have influenced the development of successful and effective e-learning environments. In general cognitive approach is more difficult and more expensive to be used to design and develop e-learning environments. However, high cost and difficulties in design should not be the basis of what kind of effective e-learning site one should develop. If your research shows that a cognitive approach is the best suited for your project, then it must be implemented.

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IMPLEMENTATION AND EFFICIENCY OF EDUCATION IN LAW AND ADMINISTRATION ARRANGED BY OULU UNIVERSITY OF APPLIED SCIENCES CO. LTD., FINLAND

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Abstract

In co-operation with the Ministry of Justice, Finland, we – the authors of this paper - have started a research project on the regional and national efficiency of the professional education in law and administration arranged by the universities of applied sciences in Finland. This paper is a first phase report on an extremely empirical study conducted in the geographical and political region of Oulu. The nationwide educational program in law and administration started in the country - triggered by the ministry - in 2004. As this educational program is, now, reaching its tenth anniversary, it is time to examine the national efficiency of the program. The preliminary aim of this paper is to communicate analysis on research data collected in our own region. Our research project, finally, aims at analyzing and reporting on research data collected in the entire country. We assume these kind of educational programs - triggered by appropriate ministries - could be very efficient within various fields of administration in all the Europe; maybe, around the world. From 71 surveyees 38 gave free word feedback commenting on the education. From them 17 commented positively on the usefulness of the studies and the hands-on approach on them. The education has given the graduates a good basis for further studies, too. We found another 16 answers neutral ones. Some criticism was aimed at the fact that the educational study option is not widely recognized by the private sector. On the other hand, salaries in the public sector are found low. However, also these answerers were satisfied with the quality level of the education.

1. INTRODUCTION

We are two senior lecturers at Oulu University of Applied Sciences Co. Ltd., Finland. Higher education, in Finland, is offered by universities and polytechnics. Both sectors have their own profiles. Universities emphasize scientific research and instruction. Polytechnics, also known as universities of applied sciences, adopt a more practical approach. The educational task of the polytechnics is to offer higher education for future professionals and experts. This we do aiming at contributing to the development of regional industries and a variety of fields of culture. In our country,

there are in total 24 universities of applied sciences. For a couple of years now, higher education has been, and still is, in a process of big changes. All polytechnics either have been privatized, or shall be privatized, in the nearest future; hence Oulu UAS Co. Ltd. Because of a long ongoing economical depression in the country, all administrative fields within the public sector including educational units that are financed by the public sector, have had to and still have to cut their operational costs. The funding of educational units has already been limited. Reforms contributing to improving the quality and the efficiency of education have also been realized. All in all, these reforms aim at developing an educational system that will be internationally recognized and is independent and responsible as an educator of future experts. It shall also be a contributor to the regional competitiveness, as well as both a developer of the working life and a network of innovators.

The very aim of this paper is to study the regional efficiency of one specific educational option at Oulu University of Applied Sciences Co. Ltd. The corresponding author of the paper is responsible for the Option of Law and Administration (BBA) at the polytechnic's School of Business and Information Management. Any BBA degree programme consists of studies covering 210 ECTS points. Half of the studies in this named option are law courses. Various needs of the working life originally called for this specific educational option. The country's Ministry of Justice employed a committee to survey these needs. The committee came to the conclusion that the ministry's administrative field, which is in turbulence of many changes, will be lacking experts, in the future. They also foresaw that when the large age classes will retire we will be facing a great need for assistant labor. The ministry's authorities suggested, in year 2003, that education of BBA:s in the Option of Law and Administration should be made nation wide. This educational option reaches its tenth anniversary, in 2014. In a collaborative network offering this education, there are 10 universities of applied sciences. These educational units have agreed upon a certain mutual construction of studies, and are committed to networking and to a holistic approach to development, too. By the end of year 2013, some 1000 law and administration students have graduated with the study option in question.

The ministry's investment in this network of polytechnics and in the realization of the education has been remarkable. In offices, subordinate to the ministry, there have been from 80 to 100 salaried internships for law and administration students, every year. The ministry has also given specific courses to more than a hundred permanent employees who are supervising apprentices in the offices.

Now that this education in focus reaches its tenth anniversary, it is time to survey the education's efficiency in general, and from the ministry's point of view, in particular. Research objectives include the education's efficiency from the following viewing points: 1) the graduates', 2) their working environments' and 3) the rest of the society. This efficiency scanning is, in this first phase, focused on the Law and

Administration graduates of Oulu University of Applied Sciences. This article communicates mere facts and the results of the empirical study. We will, later this year, broaden our approach applying it on all the schools that provide their students with the mentioned educational option. Later, it will also be necessary to interview heads of appropriate offices and people who have acted as supervisors to the apprentices who have done their internships in these offices.

2. LAW AND ADMINISTRATION EDUCATION AT OULU UAS CO. LTD, SCHOOL OF BUSINESS AND INFORMATION MANAGEMENT.

The Law and Administration Study Option has for the first time been offered to our students who had started their BBA studies, in the autumn 2006. Students who had chosen the option, were given their first law courses, the following autumn (2007), and the first ever law and administration student from our school graduated, in the spring term 2009. Year by year, the annual intake of law and administration students has varied from 23 to 40 individuals. By the end of calendar year 2013, 115 students of ours have graduated from the study option with a BBA degree. According to the nation's Ministry of Education and Culture, this education has met all success measurements very well. Drop-outs are only a few, and more than 90% of the students seem to graduate within five years. The ministry's national goal for all bachelor's degree programmes has been 65%.

The demand for the education in focus is based on the needs of one specific administrative field within the public sector, namely the field of judicial administration. However, from the very beginning, it has been clear that especially in the northern parts of the country offices subordinate to the Ministry of Justice (district courts, administrative courts, courts of appeal, the offices of the prosecutors, the offices of enforcement, public legal aid) would not be capable of offering many enough internships and permanent job positions. The educational option has been designed with the aim of serving the rest of the public sector, too. In addition to this, the educational option should not prevent anyone from working in the private sector.

To make all targets possible, close co-operation with employing organizations is crucially important. Academic staff and students within the study option are in frequent contact with organizations in both the public and private sector. Co-operators are e.g. the Police, the Tax Administration, the Municipality of Oulu, banks, insurance companies, law firms, associations, real estate agencies, rental agencies and companies in housing management.

3. OUR EMPIRICAL STUDY, SO FAR

In this chapter, we go through the questions placed in the survey, question by question, with some generalizations that derive from the answers. The survey was distributed through the Webropol surveying system to all the 115 graduates of the study option of Oulu UAS, in February, 2014. It has to be pointed out, that the Webropol system has been provided with those E-Mail addresses students have given our school organization as their private E-Mail addresses, while they were students. Because some of these addresses probably are outdated, by now, our data must be somewhat biased: we have relatively more answers from recently graduated students than from students that have graduated earlier. The response rate varies from 40% (graduation year 2009) to 72% (graduation year 2013). All cross tabulations, below, were made in early March, 2014, when respondents were 52. Some concluding remarks have been made, later in March, when the number of respondents was 71. We still receive response to the survey, and are looking forward to a 70% total response rate. We understand that this fairly high response rate indicates our graduates' satisfaction in the study option they have taken with us.

Demographics. Because we tend to use the very same questionnaire nationwide, we have this question as the first one: "From which university of applied sciences did you graduate with a BBA degree including the Law and Administration study option?". All 71 respondents, of-course, answered: Oulu UAS. The question of the respondents' gender (question n:r 2) is a 'technically' interesting question. Surveying the respondents' gender makes it possible to analyze the data, later, split into two subgroups, males and females. As former teachers of all the respondents in the Oulu region, it did not come to us as a surprise that from the 71 respondents less than 10 are men and more than 60 are women. In the future, in later phases of our research project, we also tend to divide all the answerers into at least two age groups, namely 1) Generation X (max 30 years of age) and seniors (plus 30 years). An example of such a grouping is illustrated in the Table below.

Table 1. Cross Tab.: Age Group -> Nature of Present Employment, N = 52

Demographics, Age group	Temporary Employment	Permanent Employment	Row sums
Gen. X, up to 30 years	4 = 33.33 %	8 = 66.66 %	12 = 100 %
Seniors, 30 years and plus	17 = 42.50 %	23 = 57.50 %	40 = 100 %
	21	31	52 = N

The data communicated in the above table was partly based on question n:r 3: “In what year were you born” ? This resulted in two medians: birth years 1986 and 1987. “What was your home location before your BBA studies ?”, was the fourth question. The Oulu region and the rest of the Northern Finland scores 63 out of a total of 71. “What studies had you completed before your BBA studies ?” (question n:r 5). Options (and scores) are: Matriculation Examination (65) / Vocational Institute (20) / Polytechnic (2) / University (2). Answerers were 71 in total. It was possible to choose more than one option.

Question n:r 6: “How many months of work experience did you have before your Law and Administration studies ?”. The 70 answerers scored a median of 16 months. “How many months of work experience, in an office subordinate to the Ministry of Justice, did you have before your Law and Administration studies ?” (question n:r 7). The same 70 answerers scored a median of 0 months, even though some of them had been working in the field in question.

Table 2. Cross Tab.: Level of Pre Education Work Experience -> Present Employment Situation, N = 69

Work experience	In Public Sector	In Private Sector	Seeking for a job	On parental leave	Studying, full time	
Max 1 year Exp.	14 = 46.67 %	10 = 33.33 %	2 = 06.67 %	1 = 03.33 %	3 = 10.00 %	30 = 100 %
1 - 2 years Exp.	6 = 46.15 %	4 = 30.76 %	0 = 00.00 %	1 = 07.64 %	2 = 15.38 %	13 = 100 %
Min 2 years Exp.	12 = 46.15 %	7 = 26.92 %	5 = 19.32 %	0 = 00.00 %	2 = 07.69 %	26 = 100 %
	32	21	7	2	7	69 = N

All in all, the study option and working in their very sectors seem to attract fairly young females who originate from the Oulu region. They also seem to have had some work experience, in advance to their studies at the polytechnic.

Questions concerning studies in the Law and Administration option. “In what year did you start your BBA studies ?” (question n:r 8), and “In what year did you complete your BBA studies with the Law and Administration option ?” (question n:r 9). A BBA student should complete his or her studies in approximately 3.5 years. In total, 138 students started their studies between years 2006 and 2010. From these, 112 have graduated, in time (81.16%). Our survey’s population of 115 graduates includes 3 individu-

als who have graduated prematurely, in 2.5 years. “Did you apply for the BBA studies with the intention to choose the Law and Administration option ?” (question n:r 10). All 71 answerers answered the question: >53% ‘yes’ and <46% ‘no’.

It has to be noted that those students who started in year 2006 did not know about the coming study option, in advance. All of them had come in for a general BBA degree. In that year 2006, 43 applied for the option, and in year 2007 25 of them were selected. “How important was it for you that you were selected for the Law and Administration study option ?” (question n:r 11). In total, more than 90% of the 71 respondents answered either 4 or 5, on a scale from 0 to 5. “Did you complete an internship in the public sector, during your studies ?” (question 12). From the 71 answerers 57 replied ‘yes’ and 14 ‘no’. From these 57 answerers, 32 answered ‘yes’ also to the question (n:r 13): “Was your internship in an office subordinate to the Ministry of Justice ?”. Another question (n:r 14) was placed to scan the importance of the answerers’ sector of internship. From 71 answerers, 55 replied 3, 4 or 5, on a scale from 0 to 5, indicating that it was important for them to do their work practice in the particular sector.

Questions concerning post graduate career. For educators of future professionals, it is – of-course - interesting to know if their former students are working or not. As a background fact, it has to be mentioned that the general unemployment rate in the Oulu region was 16.3%, in December, last year. The youth unemployment in the region is higher than in the country, on average.

Question n:r 15, in our survey was: “At the moment, are you employed either in the public or in the private sector / are you seeking for employment / are you on parental leave / are you a full time student ?”. From 71 answerers, 60 indicated having a job, while there were 18 scores for the other three options. It was possible to choose more than one option. According to the answers, 11.26% of the respondents were job seekers. Employed were 84.5%, and individuals in other situations of life, e.g. as full time students at universities were only a few.

“If you work, at the moment, in an office subordinate to the Ministry of Justice, are you working for a) a district court, b) ... j) other options ? From 21 answerers, 9 have chosen option a) a district court (as an answer to question n:r 16). There are five district courts in Northern Finland, 27 in all the country. “If you work, at the moment, in the private sector, what is your employer’s field of industry ?” (question n:r 17). From the 26 given answers, the most common ones are: advocacy (5 out of 26), finance and insurance (5/26) and the trading sector (5/26). One of the answerers has started his or her own business being an entrepreneur, now. Question n:r 18: “How important is it for you that your job is in the sector where it is ?”. From 61 answers, 51 are positive ones, 3, 4 or 5, on a scale from 0 to 5.

The table below (n:r 3) illustrates the correlation between the importance of the study option to the students and their present work tasks’ correspondence with the education. It was, all in all, very important for the students to be in the study option. Those graduates, who had found the study option very important, had succeeded in finding job posi-

tions where their work tasks well corresponded with the education in focus. Some individuals seem to have shown a tendency towards long term thinking and planning.

Table 3. Cross Tab.: Importance of Law and Administration Study Option while studying - > Present Work Tasks Corresponding with Education

Importance of Study Option	Not (0) Corresponding	1	2	3	4	Well (5) Corresponding	Row Sums
More important, 4 – 5	2	1	7	9	6	14	39
Less important, 0 – 3	1	1	1	1	3	03	10
	3	2	9	10	9	17	49

Answers to question n:r 19 are particularly interesting ones: “Are you employed for a fixed period or is your work contract of permanent nature?”. From 60 answerers, 25 have a contract for a fixed period and 35 have a permanent contract. “How well do you think the Law and Administration studies correspond with the demands of the working life?” (question n:r 20). 65 answerers, out of 68, think they correspond well (3, 4 or 5, on a scale from 0 to 5). “How well do you think your work tasks correspond with your BBA degree including the Law and Administration study option?” (question n:r 21). 53 answerers, out of 61, think they correspond well (3, 4 or 5, on a scale from 0 to 5).

Question n:r 22: “What is your home location, at the moment?”. Answers are 70, in total: in Northern Finland, 57; in others parts of the country, 11; in another country, 2. Question n:r 23: “How important is it for you that you live in the region where you live?”. Answers: 71. 56 answerers scored this question 3, 4 or 5, on a scale from 0 to 5. Unemployed individuals should seek for employment in areas with a lower unemployment rate.

Questions concerning possible future degree studies. Question n:r 24: “Have you taken / are you in the process of taking / are you planning of taking a higher degree with a university of applied sciences or with a university?” Readers need to take into consideration that any single individual may represent several groups of educational back-

ground. It does not come to a surprise to anyone that those few who had a university degree before the studies in the study option in question, are not planning of taking another degree.

Table 4. Cross Tab.: Educational Background ->Plans on Future Studies

Educational background	Now, doing an MBA	Planning an MBA	Now, doing a Master's	Planning a Master's	Row Sums
Matriculation Examination	1	11	8	23	43
Vocational Institute	1	3	2	2	8
Polytechnic	1			1	2
University					0

“What field of education would best meet your needs for further education ?” (question n:r 25). The 58 respondents scored this question as follows: law (35), economics (4), business (10), others (9).

Finally, question n:r 26 gave the respondents a chance to give feedback – to the Ministry of Justice and to their own university of applied sciences - on the efficiency of their BBA studies including the Law and Administration study option. Feedback on this survey was also welcomed. From a total of 38 answers, 5 were found negative, 16 neutral and 17 positive. From the five individuals, whose feedback was negative, three are unemployed, at the moment. Neutral feedback include statements concerning the good level of education, in general, but the labor market's low awareness of the BBA degree including the study option in focus; in the private sector, in particular. The relatively low salary level, in the public sector, was seen as a negative point by those answerers who, on the other hand, were satisfied with the study option, in general. The positive feedback is pointing out concepts like ‘good level of teaching’, ‘practical studies’, ‘usefulness for work’ and ‘a good basis for further studies’.

4. THE OUTCOMES OF THIS STUDY

This is a first phase report on a research project on the regional and national efficiency of the professional education in law and administration arranged by the universities of applied sciences in Finland.

When Efficiency of Education has been scanned, such concepts as efficiency, effectiveness, quality, productivity and profitability have been given different definitions and contents depending on the discipline of science and field of administration. In this study, we discuss efficiency from different viewing points, namely: 1) from the individual's, 2) from all the society's, in general, and 3) from the Ministry of Justice, Finland's, in particular. The mentioned ministry was the organization who triggered the educational option that is in focus here.

In our country, students apply for Polytechnics with very different expectations. Many students at the School of Business, originally, would have wanted to study at a university. Many who have taken the study option of Law and Administration have admitted that they had dreamed of studying at the law school. For the polytechnic, it has been very important to admit these facts when planning and realizing educational programmes. A big question is: "How to motivate students to complete a BBA degree programme at a polytechnic if they are facing other possibilities" ? The data of this study, especially answers given in free words, clearly indicates that the contents of the study option have been relevant and the realizations of the courses has been appreciated. From the 38 answerers, 17 commented positively on the usefulness of the studies and the hands-on approach on them. The education has given the graduates a good basis for further studies, too. From them, 10 are studying at a law school, at the moment, and a total of 25 have plans of doing so, in the future (please, see Table 4). We found another 16 answers neutral ones. Some criticism was aimed at the fact that the educational study option is not widely recognized by the private sector. On the other hand, salaries in the public sector are found low. However, also these answerers were satisfied with the quality level of the education.

The study option of Law and Administration has been a real option for our BBA students since 2007. From the answerers to our survey, more than 90% found it very important that they had chosen the study option. In a degree programme of a total of 210 ECTS points, Professional Work Practice is the biggest single study module being 21 ECTS points. From the points of learning and future employment, the work practice experience is of crucial importance. From 71 answerers 57 had done their work practice in the public sector and – from these – 32 had done it in an office subordinate to the Ministry of Justice. From all the 71 answerers, 55 (77.5%) indicate that it was important for them that they had done their internship in the actual sector.

Our study also indicates that those graduates, who had found the study option very important, during the education, had also succeeded in finding jobs where their work tasks well correspond with their education. In general, from a total of 68 an-

swerers, 65 (95.6%) indicate that the study option corresponds well or very well with the requirements of the working life.

Employment after education is important for any individual, and for the society, in general. Out of 71 answerers 60 (84.5%) report being employed. From these 58.3% have permanent employment and 41.7% have time-limited jobs. Individuals seeking for employment are 11.3% out of the answerers, while another 5% are e.g. studying full time. From the employed ones, 14 (23.3%) are in offices subordinate to the Ministry of Justice; most of them in the northern parts of the country. From the regional efficiency's point of view, it has to be mentioned, that 88.7% of the answerers indicated having been living in Northern Finland prior to their studies, the equivalent number 'after their studies' was 81.4%.

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Physics teacher's creative approach to digital technology – exploring the projectile motion

P. DEMKANIN and L. BARTOŠOVIČ

Abstract

Digital technology has had its footing in school practice for some time. This also applies for Slovak education system (and for other countries with less investment in education). However, it's true that teachers' attitudes are rather cautious and the same goes for schools and state institutions. There are several national projects of digitization of education that are gradually being launched. Physics education is not a few steps behind – use of applets (or physlets) appears here as the most promising and perspective solution. They allow us to show, in illustrative and attractive way, that even at the school level the physics is quite practical science and it makes possible to analyze real-world situation without that we have to say "in this problem, we don't consider drag or friction". In this paper, therefore, we look at several options for creative use of applets in exploration of projectile motion – on the part of a teacher and also a student. Use of these options in school practice we will illustrate by solution of complex physics problem with an experimental tone. We will also present our own experiences with in-service teachers who participated at the workshops focused on modernization of education – they learned there, among other things, how to creatively and actively use physics applet. We will also convey some of their views on the issue of creative physics teacher in the role of "active consumer" of digital technology.

Introduction

It is probably not the most optimistic opening, but it's a known fact (for school system in Slovakia and other less prosperous education systems), that the most prevalent element of students' activities (many times also teacher's) is constituted of theoretical analysis of idealized real-world phenomena. In order for physics knowledge to become the permanent and solid part of our image of the world, we need to understand the principles of physical phenomena in the first place. Not just to absorb the quantum of theory, but also to be the active part in as many laboratory experiments as we can. Current state of physics education makes possible to large extent only computational exercises, theoretical analyses, idealized reality and from time to time 1-2 demonstrations. Some selected schools go the third way – they put into practice some kind of compromise solution between above mentioned "extremes" made possible by using the MBL tools and approaches (microcomputer

based laboratory). According to collective of authors from Faculty of mathematics, physics and informatics [1], such activity should be intersection of three sets:

1. Methods of teaching and learning based on scaffolded guided inquiry and students' exploration of physical phenomena,
2. Accuracy and credibility of results, speed of acquisition and interpretation of data,
3. Context of problems being solved and tools used, both of which are designed as attractive – computer is not just a word processor.

The above mentioned applies very well to computer models, interactive animations, applets, physlets... in other words, real-world physical phenomena transformed into virtual environment (of the computer). School laboratory experiments are simulation of processes, which we observe in everyday life or in engineering practice – and the transformation of phenomena taking place in nature into digital environment composed of zeros and ones leads again to simulation. Same processes take place there; the only difference is that it's not live [2]. The benefit of this is the physical availability, possibility of exploring the phenomena that are progressing too fast or too slow, chance to compare results that are originating from almost any initial conditions – and we have the opportunity to solve challenging physics problems really easily.

In order for an experiment in any form to be meaningful, it should meet several specifications – operate under the well thought scheme. Firstly, we must clearly define the problem – that is, we have to know, to which question do we seek an answer. Then we formulate a hypothesis – we suggest a possible answer to our question and also outline how we can prove or reject this answer. We continue in the design, we will describe, how to get the necessary information or data – we suggest the procedure of an experiment or measurement. In the next step we get and record all necessary informations – recording the data. We analyze the collected data – this is the processing of acquired information. Ending procedure is again the analysis, this time we analyze the results of an experiment/measurement and we decide on the answer to our question, eventually we suggest the procedure of finding a more accurate answer – conclusion and interpretation of results of our experiment (loosely based on [1]).

Creative teacher, physics experiment, digital technology... and what's next?

We are starting with definition of creativity. Is the physics teacher creative, if he comes in the "market" with some new teaching method? Or when he creates a set of educational materials which are something really unheard of (or something that was missing)? Can we consider usage of fruit jar instead of glass beaker to be creative? I'm gonna teach the theme "transformation of potential and kinetic

energy” by bouncing on a trampoline – am I creative? According to collective of authors of publication dealing with creativity in physics teaching [3], the most important indicator of creativity is the external one and it is the product of creative activity itself. And thus simple and concise definition of creativity can be regarded as following statement – creativity consists in making of new and also suitable products. It is also true, that a prerequisite for creative activities are the skills, motivation and personality traits. To the product itself it is good to remark that its main feature is a novelty (that can be also a surprising solution of some problem).

In the area of modeling the physical phenomena, the unconventionally formulated physics problem was considered a creative solution some few years ago. But it's still a conventional computational exercise. In case of using the system „pencil – paper – calculator" we will have to proceed to certain idealization. This is a common case especially in the field of mechanics – we describe uniform and uniformly accelerated motion, but we neglect forces, representing and expressing resistance of environment. Three-dimensional bodies are exchanged for point masses; the real-world motion is transformed to the line (or the axis) and the like. This can be viewed positively – by simplifying the real situation we get rid of complex mathematical apparatus. On the other hand, it acts as a deterrent. It is good to show to our students that the physics is connected with reality, with the world around them and deals with specific situations, mainly those that are well known to us from the practice. And not only THAT it deals with them, but also HOW does it solve them. For these purposes is very well suited specific type of physics model running in the virtual environment of the computer [4].

An intermediate step between the real experiments and virtual computerized model is the digitization of a real phenomenon and subsequent processing of that phenomenon by computer. One form of virtualization of reality lives successfully to this day and we know it under the name video measurement. Cameras went the long road since its inception and they bring a wide range of practices applicable in physics teaching. Common computational exercise about the ball falling from a height h , that will surely not meet with a big response today. However, if we let the ball fall in front of the blackboard or canvas with cleverly arranged system of lines and marks (e.g. the square grid with known length of a side of that square) and we capture it on video, after transferring images or video to a computer we can proceed to a much more detailed analysis of the phenomenon. In addition to this, we can eliminate the element of idealization to a great extent. Doing so, recorded video becomes a virtual model of a real-world physical phenomenon. The modern and simple one at the same time – there is no need to program anything. More about this creative teaching method can be found in following article dealing with the analysis of mechanical motion by means of video measurement [5].

Conditions for teaching physics, which is "spiced up" with experiments may not always be the most ideal. Teachers in countries with less investments in education would like to implement physics experiments, but often do not have sufficient material background, properly equipped classroom, time for the preparation of the experiment, the time allocated to the subject of physics is also quite limited, it is not always possible to divide the class into groups... there are simply a lot of obstacles. Some experiments can be transferred to a virtual form, and not just by digitization of the real phenomenon, it is also possible to go such path, where we move entirely in a computer environment from the start to the finish. This characteristic applies to known and well tested applets, simulations, animations, physlets – collectively referred to as (physics) computer models. And right there, in the area of motions in Earth's homogeneous gravitational field, it's quite rich offer of professionally designed applets. To give just few examples: applet examining the projectile motion programmed by german teacher W. Fendt [6], graphically pleasing and effective applet with academical background elaborated by team of educational researchers based at university in Colorado (US), this applet can be found in set of interactive animations under the name „PhET“ [7] and simple applet of flying projectile (or ball) created using the Mathematica software within the project „Wolfram Demonstration Project“ [8]. In the following text we look at how to make use of those applets to refresh students' exploration of projectile motion and also outline how to interconnect the virtual (applet) and the real (experiment).

How to make the unsolvable solvable even at high school physics level

Physics at school is often more of a mathematical description of nature than the exploration of reality. Physics problems and exercises prevail over experiment, which doesn't need to mean anything negative if we formulate the problem properly. Good example of this is the problem describing some interesting experiment and text doesn't encourage the idealization, we take a "firm grip" of that problem – and mathematical part of solution is left to the computer. Described method of solving problems with physical context is called „dynamical modelling“ (further information can be found here [9]). Nice case of this are situations that we can classify in the area of mechanics – students are making observation of movement of vehicles, they are doing sports, they watch falling or flying objects, try to set something in motion or, on the contrary, to stop it, etc. Mentioned phenomena can be easily modelled using simple tools, examined in the imagination through a thought experiment and also be described qualitatively and quantitatively qualitatively and quantitatively through physics problem – but also be modelled with the use of a computer.

Just for its connections to sports, an excellent candidate for all-round physics analysis is the projectile motion. Every one of our students have thrown a stone or a cricket ball at some time, tried to toss (and hit) a ball of crumpled paper into trash

can, kicked a football – or tried to catch a flying ball. Based on above mentioned theoretical grounds and principles, let us compare two physics problems that model the same phenomenon:

1. A football player kicks a football with a speed of 27 m/s at an angle of 43 degrees. To what maximal height does the ball rise and what is the horizontal distance between launch point and point of impact? What is the time of its flight? Determine the kinetic energy of the football at the moment of the kick! Consider the ball to be the point mass and neglect air resistance.

2a. Tennis ball machine has its ejection hole at the height of 1.2 m above the ground of the court. It throws the tennis balls with diameter of 6.7 cm and mass of 60 g with a speed of 80 km/h at an angle of 25 degrees. Drag coefficient C for a sphere is roughly 0.5 and the rounded off value of air density is about 1.29 kg/m^3 . Find the horizontal range the ball will cover from the point of the shot after 1 second of its flight! What is the vertical height difference between centre of the ball and its perpendicular projection onto Earth's surface right at this moment? What is the impact velocity of this ball? Determine the value of potential, kinetic and total mechanical energy at the start and at the end of the motion! How would the ball fly, if it was made of lead and how, if we made it out of styrofoam? What if we leave the mass of the ball unchanged, but we decrease (or increase) its diameter? How much total mechanical energy was converted to other forms during the flight due to effect of the environment (i.e. due to drag)? How would the results change, if we neglect the air drag, dimensions of the ball and also its mass?

2b. We have plenty of time and the conditions (mainly weather) are good. Let's go to the school sports ground! Pick any suitable ball and ask the athletically able student, to project it upwards at an angle (any value between 40 and 60 degrees). We record this real-world experiment on digital camera or the smartphone and with the use of video measurement determine the value of initial velocity and elevation angle. Just for the comparison, we also record the result of our experiment (that means, we take the note of the maximum horizontal range attained by a ball, how high did the ball rise and so on). At the physics lesson we will then pose same questions as we did in the option 2a (and with the use of information acquired we also get the answer). But that's not all. Our stay on the sports ground can be used to a good effect to determine the value of gravitational acceleration. Whilst it is true, that the values we'll get will be more or less different from the tabulated 9.81 m/s^2 , however, we are not aiming for a textbook accuracy, we are interested in creative approach to exploration of physical phenomena. A couple of creative and original ideas for such measurement can be found for example in the following article [10]. Or we can construct an electronic free-fall apparatus [11] and bring the electronics and digitization also in this part of projectile motion analysis (or the gravitational acceleration).

The first problem is a traditional exercise, highly simplified and full of idealization. It can happen, that if someone tries and solves this problem, calculates the values and compares it with real-world situation (he finds his way to the sports ground and kicks the ball), he'll be dissatisfied, that the calculated values are not reflecting the reality. On the other hand, analytic solution by using common equations for projectile motion would't allow us (or with considerable difficulty) to include the air drag to our calculations. The second problem, whether it is theoretically (2a) or practically (2b) formulated, is beyond the computational capabilities of typical high school student. But what is problematic for "manual" calculation becomes trivial with the right use of MBL tools. In the following lines we will give a brief description of some possibilities for solution of above mentioned physics problem about the tennis ball, while our main analytical tool will be the multimedia-equipped personal computer.

Simple physics simulation in mathematics software

If there is only computer without specialized software available for digitized physics, still nothing is lost. We can use the technique, which is almost totally independent of the level of technical advancement in our laboratory or classroom. It is sufficient if the computer is connected to the Internet and has a Web browser that supports CDF format. After installing the free plugin, we will easily fulfill that requirement. If we use the Mathematica software, it's not necessary to install anything else.

Start the browser and open the website of Wolfram Demonstrations Project (<http://goo.gl/ODUtKO>). Type the „projectile motion“ in the search-box (it is located in the upper left corner and labeled with SEARCH) and hit Enter on your keyboard. The list of search results will appear, from there we consider the „Motion of Projectile with or without Air Resistance“ [8] to be the most elaborated one. Now simply click on that applet's name and you'll be forwarded right to the page with the given applet. The way the applet is designed may not be the most attractive for students; graphical layout is simplistic, but also really practical and neatly done. Many will be pleased that the applet can be saved to the computer and used off-line. Despite the simple layout we have available wide range of control elements – buttons, sliders, etc. (Fig. 1).

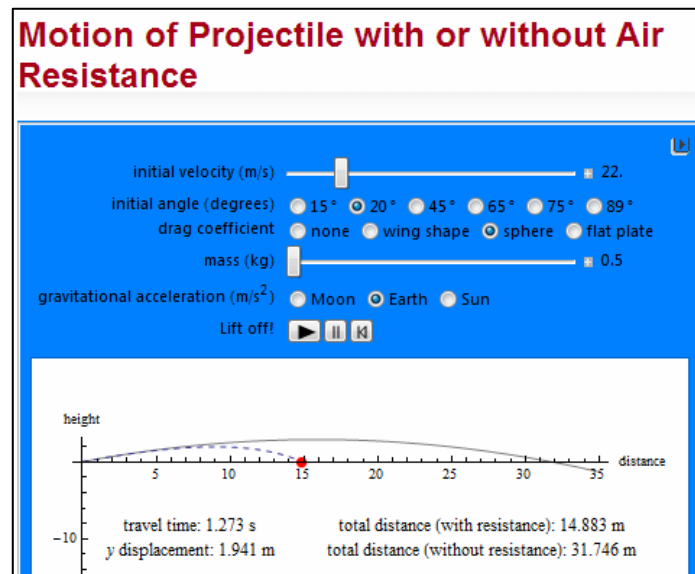


Fig. 1 Flying ball in applet from Wolfram Demonstrations project

In addition to initial velocity and initial angle (so called elevation angle, we can adjust this only incrementally) we have also available settings of the drag coefficient, where we can choose the wing shape, sphere or a flat plate. We can turn the (air) drag off too, if we want to. It is possible to set up the mass of the projectile (after some modification in any range of values) and the value of gravitational acceleration on the Moon, Earth and Sun. After carrying out the settings procedure we run the applet by clicking on the black triangle next to the writing „Lift off!“. The result is a quite good approximation to reality. We’ll learn, for example, that in the real world the tennis ball will reach not even the halfway of the ideal distance (or even less, but our model computed with the mass of 0.5 kg and not the 60 grams). As we can see, this simple method brings us remarkably usable results, but trade off is the predefined form of data display, more or less static visualization, numerical values, which could be obtained easily also with traditional calculation and preset (thus not that much interactive) options for including the air drag.

Interactive animation of projectile motion in Coach 6

In this part of our paper, we will briefly present an interactive animation, which is the result of creative activity done by the authors. The goal, which we have set, was to try to fill a gap in the field of applets that are modeling projectile motion and show, what can be “mined“ from the part of Coach software environment called „Modelling“. In our analysis of content available on the web, it intrigued us that at

the very most, 1 out of 10 applets offers, in addition to traditional animated flight of the projectile, the output in the form of graph.

Yet, the understanding of graphical expression of relationship between two physical quantities should be among the key goals, which every author of physics applet modelling phenomena from the field of mechanics should set. Students should be able to sketch or interpret given motion graph (that means displacement, velocity, acceleration, etc. – all with respect to time) – in other words, to graphically illustrate some physically interesting situation, and also use such graph while solving a physics problem [12]. This can be substantially helped by specialized interactive animation. Let's focus on investigation of capabilities of an applet mentioned in the title of this section in the search for answers and solutions related to the problem established in the text above. The user is offered an option to fully configure the model or its graphical interface, because there are many options to customize an applet – this is, in contrast to the former mentioned examples, designed as a fully open system (in other words, it is possible to set up and modify almost anything). Typical layout of input, output, text-based and graphical components is shown on figure (Fig. 2).

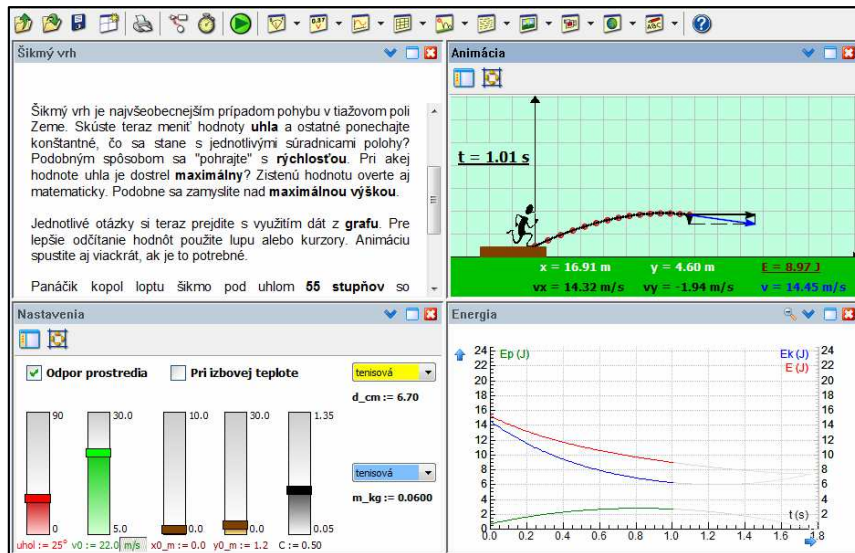


Fig. 2 Physics applet in Coach 6 software environment – projectile motion without compromises

Physics problem about the tennis ball? The settings window doesn't have the slightest problem with accepting any parameter from the set of the initial conditions describing this special case of projectile motion. Everything is accessible on one click and the controls are as simple as possible and highly intuitive. In the graphical output on the bottom right we can observe the trajectory of the flying ball, find out,

what happened in time $t = 1$ s, measure all the necessary distances with the help of the square grid; same thing, although more accurately, is made possible by the numerical output in the bottom part of the graphical window. In the bottom right window can be displayed graph or chart with any time-varying function: height vs. horizontal range, displacement vs. time, inter-conversion of kinetic and potential energy, velocity vs. time and the like. We can stop the motion in any point of the virtual world, or operate it step-by-step in millisecond increments. Here, it clearly shows the advantage of of programmers approach. However, the downsides of this are the demands that it imposes on physics teacher – time-related, technically oriented and also financial. Some compromise could be the abandonment of graphical aspect of the project and rather model by means of alphanumeric items – equations, graphs and charts (e.g. through the concept called dynamical modelling – see the introductory part of this article). Therefore, it is logical that most of us are reaching for a ready-made solution, or we customize our assignments for some specific program. Or not?

How to create an applet and learn by one's own creative activity

It seems like the utopia, yet you can find a couple of applet users, who can't seem to be satisfied with ready-made and pre-set virtual environment. If they use Coach software, they are able to “program” the desired applet. Quotation marks around the word programming are not accidental – an interactive physics applet that can be created for example in a Coach programming language, is not a program in the traditional sense of the word. If we were to create an applet in a programming language, the basis would be a sophisticated system of commands and rules with graphical interface. From the perspective of a programmer it's the advantageous situation, it's sufficient that the he devises commands and graphics so that the applet acts exactly according to the laws relating to the modeled physical phenomena. For example, applet displays the ball kicked out at a certain angle that will fly following the parabolic trajectory and after pressing the button the next flight is characterized by the ballistic curve. The programmer does not have to understand physics, but physics teacher usually does not understand programming. The way out is to construct a simple physics model by means of mathematical formulation of physical laws, we can also count on some few logical operations.

To illustrate that the process described is not only possible, but also useful, we have created several interactive physics applets, one of which we presented in the text above. In order to be more exact, in precise terminology we might call it „interactive simulated experiment with output in the form of animation" [13].

Applet in Coach environment consists generally of two components – physics model and graphical interface. In respect to physics model, previously mentioned phrase “dynamical modelling” is frequently used. As you can clearly observe at

following figure (Fig. 3), model in Coach environment is composed of a set of several objects, each of which has its specific function. Of course, projectile motion is a relatively complex physical phenomenon, therefore we have chosen something simpler to illustrate the concept – free fall (fall of the body in general – and without idealization).

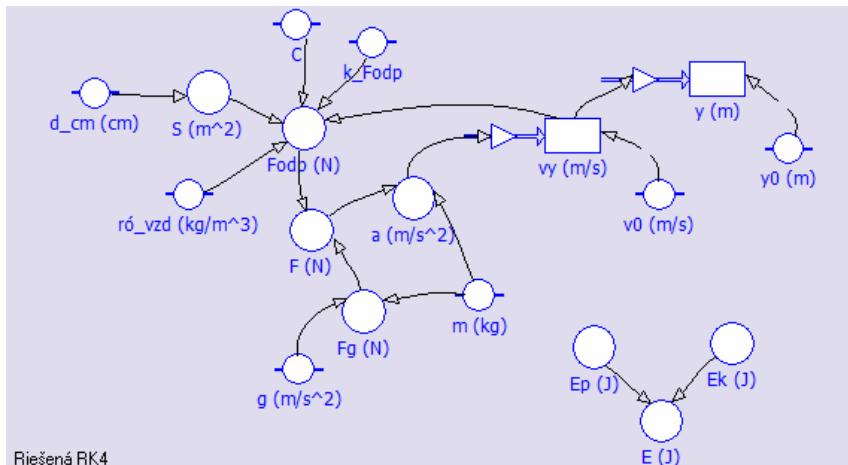


Fig. 3: Virtual physical system – model of falling ball with air drag

Writing of differential equations and meticulous monitoring of correct syntax is a thing of past – in the Coach environment the principle of „stock and flow" was added to the concept of dynamical modelling. This principle is built upon the theory developed and elaborated by professor Jay Wright Forrester from American MIT (Massachusetts Institute of Technology) in the early 1960s. One can find out more about this approach to system modelling in specialized publication [14]. Let's look at the specific application of „stock and flow" to our model of falling ball.

As the first, we will certainly notice, that all objects in the model/program are physical in their nature – force F with the unit Newton, mass m with the unit kilogram, or energy E with the unit Joule. If we "clicked off" any of the objects, we will not see a mixed-up mass of complex commands and formulas, as we would observe in the model written in a programming language. Models implemented in software as a Coach consist of mathematical equations and physics relations. Thus we create our model in the "language" that we are familiar with and we do not need to learn to program – the principle of simplicity and usefulness.

Skeleton of the model consists of the triplet „acceleration a – velocity v_y – displacement y ", while the Coach computes on our behalf the instantaneous velocity from the current value of the acceleration, value of the initial velocity and with the respect to considered time interval. Going back to the principle of „stock and flow",

stock, that is the initial value of the velocity, flow is represented in the model by increment/decrement of velocity, which is caused by acceleration. Analogically, we come to the displacement through the velocity. Other interesting component is group of icons just bellow the icon of acceleration. Why do we calculate the acceleration in such a complicated way, would be enough to write $g = 9.81 \text{ m*s}^2$? No, if we want to include the air drag to our physics model, acceleration becomes the time variable and will be dependent upon the net force acting on the ball (the vector sum of gravitational force and force of air drag) and upon the mass of this ball. Drag force is calculated from standard Newton's formula $F_{drag} = 1/2 C_D A \rho v^2$. Last component of the model is the trio of icons E , E_p a E_K , of which it can be imagined that they will be used for calculations related to the conversion of mechanical energy during the motion of the body in Earth's homogeneous gravitational field. There is no need to do anything to our model for it to be both functional and useful, only one thing is left, equip it with the graphic interface – convenient controls, output in the form of graphs and charts and with the animation of falling ball.

"Firing" the spring-powered airsoft gun – real-world experiment with computer support

On the previous lines we dealt with the virtual "shooting", but we ourselves know that what you can try in real-life that you believe the most likely. And also we will show that it makes sense to the practical life. Does it make sense to explore the projectile motion? We can argue that student who will understand this physical phenomenon is clearly to be the one who will achieve excellent sporting performance in the the corresponding disciplines – but that is nothing in comparison to the area of ballistic. Surely we can find in the classroom (or science club) some students who are experienced with sports shooting, Airsoft or maybe the Paintball. Let's pose a provocative question related to the problem about the shooting the tennis "cannon" – why are some of the airgun BBs the 6 millimeter in diameter and others have a diameter of only 4.5 mm? What effect on trajectory of a flying ball has its mass – and is important to manufacture BBs with masses so slightly different from each other as is 0.20 g, 0.25 g or 0.30 g?

Cool and witty experiment in this area is suggested in currently used Slovak physics textbook for first year of high school [15]. We will use commonly available tools from the school physics laboratory and by following the instructions we can easily make a functional spring loaded cannon. Using it, we are able to accurately model the projectile motion in real conditions. But why do we make something that is already available and made in the professional form? We think about the spring-powered airsoft gun, commercially available in almost any toy store or specialized shop. It's inexpensive, surprisingly accurate, relatively safe (it shoots light plastic balls and initial kinetic energy of shot is about 0.2 to 0.5 Joules, which decreases

quickly with the growing distance from the muzzle) and the velocity of „throw“ is consistent. It's also easier to calculate the results when we consider the relatively stable value of the drag coefficient for the sphere, than the variable value of C for the ring or washer (thin circular plate with a hole in the middle).

The procedure is identical to that suggested by the textbook, it remains only to supplement it – apply the procedures from MBL. As the first we digitize the real phenomenon, for example by using video measurement. We may also use the optical gate or a specialized device called a chronograph. Measurement is performed with various projectiles – 4.5 mm steel BB (zinc coated steel ball), 4.5 mm lead pellet (classic airgun pellet) and 6 mm plastic BB (small plastic ball) in various weights. For each measurement we determine the velocity the projectile is travelling when it leaves the barrel of the gun (or airgun). It is good if the "gun" is fixed to a tripod and we align the axis of the barrel parallel to the horizontal plane (for example, using a bubble-level). Then we enter the initial conditions of each shot for the analysis into the interactive animation. By observing the trajectory and reading the values for the displacement, velocity and energy we can answer without much effort the question, how will the mass or the diameter of a tennis ball affect its flight (should a student had opposed that air-soft BB and tennis ball are not the same, explain to him, that we used the model or the analogy). This experiment will tell us why the airguns and spring-powered guns use lead pellets (compromise between the velocity, ability to resist the air drag and effect on the target) small steel balls (they fly faster than the lead pellet with the same diameter – although they also loose faster their kinetic energy) and why the bigger plastic balls (they fly reasonably fast even with the small and safe kinetic energy of the shot and with the relation to their mass they loose their kinetic energy faster or slower – in reciprocal proportion). The same conclusions can be stated also for the tennis ball and its derivatives with altered mass or diameter (see the physics problem 2a).

If we, for some strange reason, would see the problem in the concept of "airgun / spring-powered gun at physics lesson" and yet we are interested in connecting the real and virtual, let's make that "shot" only at the level of applet and the link with the reality let be the less frequently used application of projectile motion in practice – water flowing from some container (bucket, bottle or such). As with the tennis ball and the connection with the airsoft ball, also there are found opponents of analogy. Try to direct them, to have noticed that the velocity of outflow of ideal liquid from a container with a small hole is the same as it was the speed of the falling body from the same height. The path from the free fall (or the fall of the body) to the projectile motion should be now more straightforward. Detailed description and methodical material to such pupil's experiment with elements of scientific work and focused on water flowing from the bottle can be found in research article [16].

Selected experiences and opinions of in-service teachers

Now let's put all the theory into practice and look at the issue of the creation and, generally, use of physics applets through the insight of the in-service teachers. The basis for this would be the survey that we conducted at several meetings within workshops called MVP (Modernizácia vzdelávacieho procesu – Modernization of educational process). Slovak physics teachers could be classified into two groups. The first consists of enthusiasts and supporters of innovations and digital technology. In early 2012, we attended MVP workshop in the role of active observer and we watched the teachers' work with the software Coach, with use of which they learned how to design interactive animation. Under the supervision of a qualified lector, teachers carried out an instructional activity with duration of approximately 2 hours. Practical demonstration was followed with an individual activity, the main goal of participants was to create simple animation of an apple falling from a tree, those, who dared to adjust the model, tried to construct animated model of the ball which was thrown horizontally out of the window of the building. The participants successfully solved the assigned task and prepared functional interactive animations – most of them developed applet modelling the falling ball, some participants mastered the projectile motion (although simplified and limited to the elevation angle of 45 degrees). Of course, their creative activity was based on a pre-existing model; this was with respect to the time allocated and nature of workshop. Creative approach, however, was also expressed here, one or two teachers embarked on a substantial expansion of the model and also the graphical output. They successfully managed to prepare an animation of package falling from a flying aircraft (on a desert island in the sea). Despite the fact that most of them came into contact with coach-applets only and firstly at MVP workshop, they were really enthusiastic about the creative process and have worked on assigned animation with great dedication. They have also come up with several suggestions for improvements to our own applets.

The second group could be labeled as “the less enthusiastic”. We have met them again at MVP workshop (fall 2012). Part of the workshop was devoted to the work with software named Coach and together with the lector, teachers dealt with the creation of a simple applet. Following this activity, we presented them some examples of our applets and also some freely available ones which are of foreign origin. Then we mentioned some basic ideas of creation and use of applets that form the pillars of our professional and research work. This was followed by semi-structured interview, responses of those interviewed we entered in an exploratory pre-prepared sheet. Responses obtained can be summarized in several points:

1. The use of applets and multimedia in general – most responded negatively, as reasons they reported financial difficulties, problems in the use and with the availability of school computer lab, that they don't view themselves to

be competent to work in MBL and important for their negative attitude is supposedly also students' lack of interest.

2. If you already use something, how and when? There was the united response "applets from the web and we use them not very often". The reasons for that are the material and technically related problems, many of the teachers have only one computer available so they are limited to demonstrational use of applets and multimedia.
3. If the teacher doesn't want to draw on the blackboard (whiteboard), he uses the help of physics applet (this one sounds somewhat tragicomic).
4. How do you view the possibility that you yourself would create physics applets? Teachers in unison see themselves in the role of (mostly passive) user and consumer. Arguments – they are not in the mood to do anything extra (beyond their competences), resultant effect would be rather disappointing (children don't care about it anyway), they perceive their skills in creation of applets as limited and thus their creative activity would take disproportionately long (disproportionately in comparison with the overall effect, which can, according to teachers, also be achieved by using ready-made product). One of the teachers, with qualification for physics and computer science, has stated that he has programmed few applets some time ago (in Java programming language), but if he has to critically evaluate its contribution to his physics lessons, it was clearly not worth all the effort – he doesn't preclude the creation of applets, but he rather uses the professionally designed ones.
5. Can you imagine using an applet that is editable by the ordinary computer user (he can add or remove some elements, edit graphical aspect or modify the values of some constants which are present in the model)? Again the clear answer – teachers are expecting activities that are custom made for their teaching process. This is an inspiration for us as well as for other professionals who are dedicated to research and development of physics applets.

This less enthusiastic attitude also nicely reflects the current state of education system and the status of (not only) physics teacher. Our findings are confirmed by the research of leading Slovak experts in the field of theory of physics education [17].

Conclusion

In this paper we have presented several options to use of digital technology in the physical experimenting on the part of the teacher. Our attention was focused mainly on such of them, which require the teacher to use a creative approach to problem

solving, but also not unduly exceeding his competences. We also took a look at design of virtual physics model by means of digitization of real-world phenomena (video measurement), at the process of solving the complex physics problem using simple commands in wolfram-alpha “knowledge engine” and we also outlined the basics of creating a simple physics applet which is modelling the projectile motion (let us say, ball thrown at an angle) with air drag. We have described the idea how it could be possible interestingly and creatively interconnect real-world and virtual experiment on the topic of “projectile motion”. The conclusion of this contribution is devoted to some few observations from our experience with in-service teachers’ training. These teachers quite successfully managed the creation and edition (both done in Coach software environment) of simple physics applet resulting in the interactive animation of the projectile motion. Their work was based on pre-prepared model of the falling body (free fall, in this case). We have also briefly presented some selected opinions of small group of in-service teachers, with whom we discussed their attitudes towards usage of applets in physics teaching. It turns out that the expectations of authors/programmers of softwares for (co-)creation of applets are up to now rather idealistic than realistic. But the creativity is not threatened, under the word ‘creative’ you don’t really need to see the creator. Also co-creator is a welcomed occurrence.

Acknowledgement

This paper was elaborated with support of project KEGA 130UK-4/2013 “Podpora kvality vyučovania tvorbou materiálov prepojených na učebnice fyziky” (Supporting the quality of education by material creation connected with physics textbooks) and VEGA 1/0509/13 “Indikátory hodnotenia prírodovedných zručností” (Indicators of science skills assessment).

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THE EXPERIENCED PHYSICS TEACHER AND HER FIRST EXPERIENCE WITH DATA-LOGGER.

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Abstract

In this paper we present our experience with introducing CMA interfaces as CoachLabII+, MoLab and Vincilab to physics education in Slovakia. The situation in Slovakia is similar to other countries with less investment to education, where not all physics teachers and not all schools have any data logger. We are starting with definition of learning by W. Harlen "learning is making sense of new experience by a child in collaboration with others". Then we discuss strategies to inquiry based physics education and the aspects of "design of scene for learning", importance of giving final information about physics phenomena to students in IBSE and selected differences between transmissive and inquiry based science education. The strategies we illustrate by selected concepts from secondary school's physics. The outputs of our research we present in the form of simple multiplication: effect to learning = carefully selected equipment x carefully selected methods.

1. INTRODUCTION

In this article we are presenting results of our research with introducing data loggers in Slovakia in physics education in lower secondary and higher secondary schools. Especially we are dealing with formation of physics concepts making use of Coach 6 system. In our educational system still less than half of the schools have one or more data-logger. However, we still have enough teachers using real experiments and teaching using basic (mostly intuitive) inquiry based methods, which are preferred in our curriculum. We have worked with more than 100 physics teachers and deeply studied more than 20 of them, which we put to the category – experienced physics teacher with no experience with data logger.

Prior to our study we were aware of the main obstacles in using ICT generally [1]:

1. Doubts held by teachers over the value of ICT in promoting learning in science lessons;
2. The lack in many ICT resources of a clear rationale for their inclusion in teaching;
3. Lack of adequate training for teachers;
4. A lack of time for teachers to plan for effective use of ICT in their lessons;
5. The planning difficulties associated with banks of networked computers being located centrally in rooms with had to be booked in advance;

6. Teachers feeling threatened by the presence in a classroom of a new, powerful source of information;
7. Lack of confidence on the part of many teachers with hardware and software;
8. Shortage of computers;
9. Lack of technical support;
10. Unrealistic expectations about the nature and speed of change on the part of those implementing activities.

Firstly we have clearly seen that for data-loggers in Slovakia the most relevant obstacles are 1, 3, 7 and 9. This was seen from our research within EuISE project (2005-2008) [2]. We have formulated also 8 findings:

Finding 1: teaching students to use software for MBL

The discrepancy with the situation from 20 years ago (reported e.g. by Beurs, Ellermeier [3]) is that we do not see any necessity to teach students to use the software. The research done with more than 400 students (age 15-18) on software Coach5, Coach6 on the level of measurement, data processing and presentation proved that the students are only needed to be informed about the parameters of the system. Software is so user-friendly that we can start to use it on an intuitive level. This finding does not apply for software for modelling and video measurement, here some instructions are necessary if want students to use them independently and effectively. From this viewpoint this is good, if these pieces of software are joined in one software environment, such as Coach6. This finding does not apply for teachers; teachers need some instructions and training.

Finding 2: language, translation of software

We have found no problem with using software in English language with students of secondary schools in Slovakia, BUT the majority of the teachers are not able to use it, the teachers need software to be translated to Slovak language.

Finding 3: equipping and teacher training

The supply of equipment (interface and sensors) is necessary to complement the teacher training. We found just as effective 3-4 days face-to-face training and at least 1 year distant learning with a final report demanded from each participating school.

The supply without face-to-face teacher training, and also teacher training some months before supply, we found as not effective. Short teacher training (1-2 hours) done without instant delivery of equipment to school can be considered just as information for the teacher about possibilities and inspiration for teachers to activate them in effort to gain the equipment (e.g. for writing good school projects as a reac-

tion to projects calls). Some schools (teachers) seem to be unable to procure goods (any type needed for education) that they both desire and can afford.

Finding 4: ICT tools in science disciplines and subject Informatics

School subject called Informatics (Computer Science) can help usage of ICT tools in physics (and other science disciplines), but this is more an exception than a rule. In Slovakia we have such a subject but it has its own goals and content – it can help in developing general student competence related to using ICT tools, not competences for special software and data logging hardware. The cooperation between these two subjects can be in the field of programming (robotics and higher level of measuring), but this is not a prescribed content of science subjects. On the other hand usage of MBL tools in science disciplines can help Informatics in fulfilling its goal to develop basic knowledge and understanding of information processing (acquisition, processing and communication). MBL tools offer concrete (not abstract) examples for fulfilling this goal.

Finding 5: ICT tools and mandatory documents (curriculum design)

The incorporation of ICT tools (data loggers) offers much more activity-oriented education and this shift can be strengthened by curriculum design.

In Slovakia for physics education we have 2 types of mandatory documents: Standard for all students and Requirements for final exams for students taking final exam in Physics. In the Standard there is only a general sentence “using ICT in problem solving and modelling of physics phenomena”. The most specific are Requirements for final exams; candidates should be able to use ICT in modelling of physics phenomena, in processing measured data and be able to work on internet. All these sentences are insufficiently specific, so teachers and students are not really motivated by these documents to use ICT in physics education.

On the other hand, for example in the programme document for the International Baccalaureate physics syllabus, there is clearly stated that each of the following must be used at least once during a course with each student: data logging in an experiment, software for graph plotting, a spreadsheet for data processing, a database, computer modelling/simulation.

Finding 6: ICT and active learning

The truth that ICT tools have potential to activate students is fully proved by many researchers - these tools can provide students with quick response to their actions – at the same level in direct measurement, as in modelling. The “what if” questions are often easily investigated during a stage of building hypothesis. On the other hand, this potential is not self-exploiting. To take advantage of ICT tools, these should be not taken as something odd, or special, BUT should be incorporated into

the whole process of physics education. The process of physics education in secondary schools is usually centred around a set of textbooks, or on teacher instructions. There are good examples of effective use of ICT in both approaches. One example of an approach in which the activities with ICT tools are incorporated directly to the textbook is Spectrum Physics [4]. The second approach is successfully used in many schools by teachers using textbook [5] as source of information and leading students to use ICT tools by oral instructions and demonstrations.

Finding 7: MBL experiments and written exams

ICT tools (MBL tools) are effectively used in measurements and experiments, in laboratory and fieldwork. But some students and also some teachers are focussed upon high level exams; they try to prepare themselves for exams and quite often do not follow all the goals of physics education. We have tried (and not only us) to incorporate some aspects related to MBL tools to written exams questions. Some examples are:

On our pre-search we see, that such questions in written exams motivate teachers to include MBL experiments in their teaching plans and also bring them ideas for new attitudes and new experimental designs.

Finding 8: Strategy of laboratory work

Focusing students' laboratory work on planning, data collecting, data processing, evaluation, manipulative skills and personal skills has been proved as an effective way in keeping the students active. The combination of this new (new in Slovakia) strategy together with new equipment made the laboratory work much more effective in relation to time and also in relation to the goals of physics education. The design of experiments by students takes some time and we should allocate this time. Quite a reasonable number of teachers considered this time as not effectively spent. With such teachers we should patiently discuss the goals of physics (science) education.

These findings are results of our previous study. Now we plan new research build on them. We would like to focus on meaningful utilisation of Coach 6 system in process of concept formation in physics education in lower secondary and higher secondary schools. Meaning of concept formation can be understood from two perspectives – as concepts related to data-logger utilisation (concepts mainly focused to teacher) and physics concepts (concepts developed at students, with the help of the teachers and data-loggers). We would like to analyse both points of view. In the next parts of this article we introduce our theoretical background, initial ideas and results of our pre-research.

2. CONCEPT FORMATION

The base for meaningful communication is to understand concepts which are used by all of the participants in the same manner. This applies for everyday talks, for expert/professional discussion and also for school communication. If there is some misunderstanding it is often caused by different ideas about meaning of the used concepts. Especially in technical terms it's not enough to know definitions or have an intuitive idea about them. It is necessary to work with them in different situations, to have some experiences. The meaning of the concept is gradually changing and clarifying.

There is a lot of evidence that understanding of physics concepts is not like expected and required. Some of the first and key researches studies come from D. Hestenes and I. Halloun [6]; [7]. They focused on fundamental mechanics concepts, analysed common sense beliefs about motion of college students and created taxonomy of misconceptions. To main results of these studies belongs design of Force concept inventory (FCI). This unique test is mostly used to evaluate the effectiveness of instruction. Other important studies in area of concept formation were made by D. Trowbridge and L. McDermott [8]; [9]; [10], [11]; [12]. In addition to lack of understanding of kinematics concepts they inquired understanding of the basic concepts in electricity. From many other researches we can mention studies of C. Rie-ner, D. Proffitt and T. Salthouse [13]; K. Ravanis, K. Zacharos and A. Vellopoulou [14].

We can say that field of usual beliefs of students, their misconceptions is relatively well explored. Several lists of common misconception of most areas of physics in primary, secondary and high school physics can be find, for example in American Institute of Physics [15], and in New York Science Teacher [16].

Researchers coincide in some facts about lack of understanding of physics concepts. Prior knowledge of students has big influence. Everyone have naturally some ideas how things works, beliefs about world or nature, explanations of phenomena a long time before they learn it in school. They are created based on experience, own observation of things around us. Words like force, heat, light, waves, etc. are intuitively used in everyday communication. Preconceptions are formed. Some are correct but a lot of them are not consistent with scientific knowledge system. And all are really strong and usually persist after school instruction, especially transmissive instruction. [17]; [18]; [19]; [20]; [21]; [22]. To understand why is so difficult to change student misconceptions it is beneficial to examine this problem in point of view of cognitive psychology.

Organization of concepts

There are many researches in cognitive psychology focused on the process of concept formation. In this paper we briefly summarize important statements. First there

is a question about organization of the concepts in our mind. Although it belongs to open problems of cognitive psychology there are several approaches to view this. We build on the prototype approach. According to this concepts are organised like list of characteristics or summary description. A simple way to create prototype to some concept is to ask a group of people for concept attributes. These features have different significance. It can be seen by different frequency of occurrence in the answers. A new object is considered a category member if it will sufficient coincide with prototype. [23], [24]

To illustrate this we chosen concept force. We asked a group of the students in bilingual high school to write several attributes of the force. They named followings: “push”; “pull”; “measured in newtons”; “has magnitude and direction”; “vector”; “it depends on the mass”; “it causes attraction or repulsion”; “can destroyed something”; “can move something”; “it’s useful”; “it causes movement”; “interaction between two or more objects”. Now we can think about centrifugal force. Is it force for this group of students? The answer isn’t clear. It depends on how are particular attributes significant. If someone considers the most important feature „interaction between objects“, centrifugal force cannot be force for him. In the view of minimum frequency of this feature we suppose that centrifugal force is member of a category of forces in this group of students.

Obviously, what the concept means and how we understand this concept might be two different things. There is definition and real characteristics of concept and then everyone has own ideas about it, own prototype of the concept.

Concept learning

The other important question of cognitive psychology is how we learn new concepts, how we create prototypes of concepts. It’s known that there isn’t only one single process. The way of learning concept depends on situation or task in which new concept appeared. If we need to decide in which category an object belongs we focus on distinct features of these categories (diagnostic). On the other side, if we want to assign some feature to object we consider important typical attributes of category (non-diagnostic). [25]

It is not easy to separate these two tasks during instruction. They are mixed or follow each other in the most cases. But there are two examples to illustrate the mentioned differences. Illustration of the first type of task is hypothesis testing. Simple experiment can be made. Balloon is filled with 2 dl of water. A sparkling drink tablet is added into balloon. Then is it quickly closed and placed in a scale. Decreasing of weight can be observed. Students are asked to explain this phenomenon. One of the most common answers is: “When tablet is dissolving in the water gas is produced. Tablet was heavier than gas. Thus weight of the mixture in the balloon is lower than in the beginning.” Someone can add an alternative explanation: “Balloon

is flexible. When the gas is producing a volume of the balloon is increased. This is a reason why balloon is more buoyant. "To make decision about correctness of these statements is necessary to compare them and identified their differences. In both explanations is producing of gas important. But the second is based on change in volume of the balloon. So student can find out important information when the experiment is repeated with another inelastic container instead of the balloon. It can be seen that attention was focused on diagnostic attributes.

Another task is to give example of using the phenomenon of electromagnetic induction in daily life. Students focus on typical (non-diagnostic) characteristics of this phenomenon as production of electric voltage, variable magnetic field, etc.

Now is the question of influence of prior knowledge on learning concept. In the past it was ignored in studies in cognitive psychology. Concept formation was examined at non-existent fictional objects. Participants of these experiments had any experience with them, so used different process of thinking as in real life. Of course other researches were designed to find out more information about learning concepts. [26], [27]

Important result of these researches can be formulated: "prior knowledge determine the significance of category features".

It causes a lot of deep misconceptions connected with concepts heat and temperature for example. So, children think wool is hot. They have an experience if they are cold they will put on woollen sweater. They know that it will warm. But they never put on sweater in hot wheater. Similarly they have experience that they feel metal colder than wood in the winter.

So, by decision what object has higher temperature is important information about material of object and its packaking. This features have big significance and are strong because, they are based on their own experiences.

On the basic of the above we consider wrong to say about removing misconceptions. It is not possible to make it for short duration in school. More accurate term is a conceptual change. During instruction we can point out the wrong prototype attributes and weaken their role by decision-making and on the other side strengthen the significance of the right ideas. Several studies shown that transmissive/traditional instruction only slightly improve the concept understanding. [17], [20], [21]

Naturally, there are questions: „*What is the way to form physics concepts in high schools? What are the most important parts of process of concept formation? What teaching strategies are effective?*”

Teaching strategies for conceptual change

P. Scott, H. Asoko and R. Driver [28] divide instructional strategies for conceptual change into two groups:

- teaching strategies based upon cognitive conflict;
- teaching strategies based upon development ideas consistent with scientific point of view.

The first group of teaching strategies built on promoting situation when expectations of student about some phenomena are inconsistent with reality. Students make prediction based on concepts which consider relevant in this situation. The key influence has how they understand these concepts, which attributes of concepts are important for them. If reality is different as student's expectation, conflict can arise. A natural need to resolve cognitive conflict can lead to learning. Students want to make sense this new experience.

The second group of teaching strategies built on idea that not all ideas are incorrect, not all conceptions are misconceptions. Analogy to strong and correct beliefs can be made. Important step in this process is comparison between target task and anchor ideas.

Obviously, there are common characteristics of both groups of teaching strategies:

- student activity;
- activating of prior knowledge.

We want to mention other important thing which links both these approaches. To form new concept it is necessary to give many examples = representatives of the concept (experiments, tasks, problem solving, models, animation, etc). It's the way how separate common attributes and create prototype. We will illustrate it in the next section but before we want to point out necessary part of learning process – group work.

Group work

According to definition by W. Harlen [17] “learning is making sense of new experience by a child in collaboration with others”. So, important part of instruction is decision whether and how to divide students into groups. At first, what are the advantages of group work?

Group work is the active practice. It provides students an opportunity to practice methods and rules at work, and also vocabulary. The less courageous students who usually not stand out before full class can be elicited to the activity in a group. Group work is closely related to self-checking and mutual assistance; it includes a huge learning potential. It develops the student's ability to work with and communicate with others. Students are get to know each other by means of group work and this can lead to the creation of group loyalty. Students' opinions are being accepted

and valued in group work unlike teacher talk when they are being ignored. The integral part of the group work is discussion between group members. Simply said: “group work is an adaptable and powerful teaching strategy, with marked advantages; it is an essential feature of almost all modern teaching“ [18].

Sure, there are some disadvantages of group work, some things are better to do alone. Excessive influence by determined and vivacious individual can threaten in group work. It may result in disagreement. Some members can remain passive and not show any initiative. However, this problem can be easily solved e.g. by allocating specific tasks to each member of the group.

If the goal of group work is to acquire new knowledge, then a group of students must be created in order to encourage its members to the activity. Awareness of this fact causes the formation of groups is one of the most important parts of group work. In creating groups it is an important number of members and a method of forming the group. Groups can be formed in several ways, e.g. by random grouping, by friendship grouping, by achievement or experience grouping, by deliberate mix and by proximity grouping. The number of members in the group is determined by type of activity, respectively the amount of work. We can distinguish small groups (mostly 3-4 members) and large (at least 5 members) by number of members in the group. Both types of groups have their advantages and disadvantages [18].

The advantages of larger groups can be, e.g.:

- the greater certainty in the correctness of the results obtained, and the more likely that group will be to challenge the teacher’s opinions;
- the more likely it is that the group will interpret the task correctly.

The disadvantages can be e.g.:

- the slower the decision-making process;
- the more likely the passive members.

The advantage of smaller groups is a small probability of passive members, and the group is able to make decisions quickly.

3. USING OF COACH 6 ENVIRONMENT IN PROCESS OF CONCEPT FORMATION

Measurement

“Measurement activities are used to collect data from sensors e.g. for temperature, light intensity, sound level, pH, etc. and to display, analyse and process the measurement.” [29]

What is the difference between using CMA interfaces and conventional measuring equipment? Has the use of sensors any benefits in process of concept formation?

Primarily, we can present measured data in tables or diagrams immediately during the measurement. This is a big advantage because it makes possible to instantly compare prior knowledge of students, their preconceptions and reality.

Of course, it's necessary to compel students to formulate their thoughts, their expectations before measurement. There are various ways to do this:

- demonstrate a related experiment and ask students for explanation;
- explain what and how will be measured and ask students for prediction in verbal form;
- explain situation and which variables will be measured and ask students to predict relationship of the variables as a graph.

The other advantage of using CMA interfaces is analysing measured data. It is an opportunity to immediately ask and look for answers regarding not only measurement but also a new concept. It means to solve questions like "what if...?". Responses may lead to the need to create a new concept, new variable or phenomena.

Motion diagrams

In Slovak curriculum is mechanics one of the first parts of physics which high school students meet. Although, it seems to be intuitive, there are many misconceptions connected with this topic. [8]; [9]; [6]; [7]. Effective tool how improve understanding fundamental concepts such distance, displacement, speed, velocity and acceleration is to link real motion of students with motion diagram.

In suggested activity students are asked to move:

- according to displayed position diagram [30], [31], [32];
- according to position diagram which they seen before motion, but it isn't shown during motion [32];
- according to displayed position diagram, value of time and distance from sensor [32].

Their current position is sensed by an ultrasonic sensor. In the first and the second case measured data are immediately displayed in diagram. In the third case they will see results after the measurement.

Immediately comparison of expectations and reality during the motion is typical of this activity. Students can see at once whether the graph lines correspondent. Thus, they see if the interpretations of displayed graph are correct, or not.

Nature of the activity compels students to think about given problem. The expectations are formulated with their bodies and then verbal after the motion: „*I thought I should go back.*“

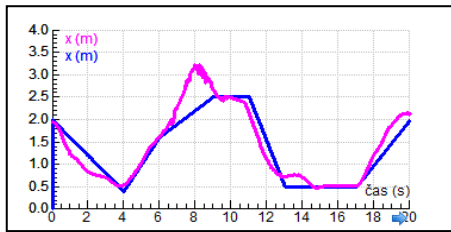


Fig.1 Motion diagrams

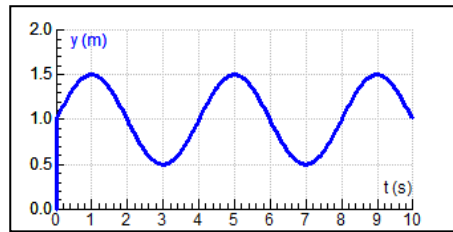


Fig.2 Motion diagrams 2 –pattern of motion

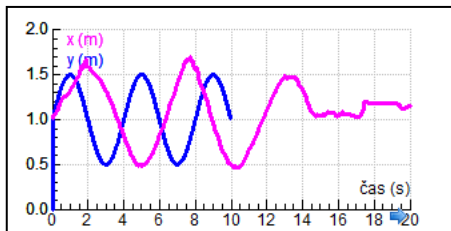


Fig.3 Motion diagrams 2 –pattern of motion and results of measurement

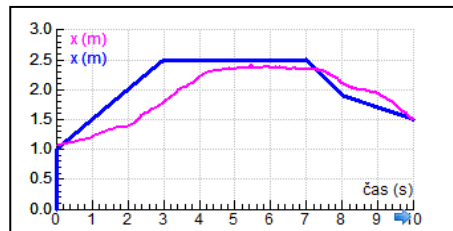


Fig.4 Motion diagrams 3 –pattern of motion and results of measurement

We want to point out the importance of greater number of different tasks. How we mentioned in process of concept formation is crucial to ensure a variety of examples = representatives of the concept. Students have opportunity to identify important common features of the concept such axis of graph, their scales and displayed dependent and independent variables, slope of the graph and their relationship to the motion (change of position, distance, speed, direction of the motion, etc.).

We realize that described activity is only start to form kinematics concepts. It's necessary to solve other tasks and make other activities.

Absolute zero temperature

Horváth [33] suggests forming concept absolute zero by the inquiry of the isochoric process.

Students have task to find out the relationship between pressure and temperature of the air in the rigid closed container. They have to find a way how change an independent variable and how measure both variables.

There is one of the possible apparatus in the Fig. 5. Closed container filled with the air is immersed in the water in a kettle. When students turn on the kettle water and also the air in the container begins to warm up. There is a sensor of temperature immersed in the water which also records air temperature. Air pressure is measured by a pressure sensor. Measured data are presented in p-t diagram immediately during the heating (Fig. 6).



Fig.5 Used apparatus

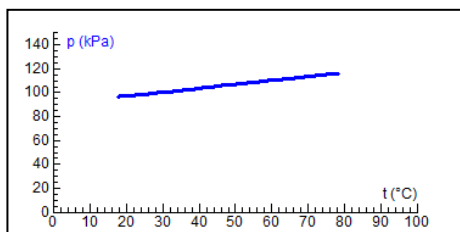


Fig.6 Isochoric process - measured data

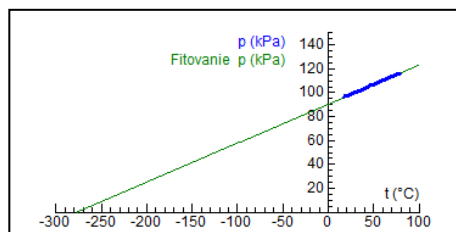


Fig.7 Isochoric process – Function fit

After measurement can teacher or also students asked following questions:

- How would be situation change if we cool the water?
- What function should be the measured data fitted? Is it a linear function?
- What is the meaning of the intersections of the function and coordinate axes?

CMA interfaces provide the possibility to answer. We can use tools like “Select/Remove data”, “Smooth”, “Derivate”, “Integral”, “Slope”, “Area”, “Function Fit” and “Signal Analysis”.

In this case is appropriate to choose option “Function Fit” (Fig.7).

Students find out that data could be approximate with linear function. There are two special points in the graph – intersections with axis of the graph. For students is easy to interpret one of them – intersection with the vertical axis. It informs us about the value of air pressure at zero temperature (on the Celsius scale). More interesting is the intersection with the horizontal axis. It informs about temperature at which is zero air pressure in the container. Now, there is the natural question whether gas pressure can reach negative values. What would it mean? How would it look on the molecular level? What would happen if we continued to cool the gas? It is even possible? What would it look if we made the measurement with different gas? How could we verify this hypothesis? These and the other similar questions are lead to form concept absolute zero.

We considered important that a new concept is a result of measurement. Naturally there is to need to name this temperature value. Of course, thereafter follows the introduction of a new temperature scale.

4. DATA VIDEO

Analysis of ordinary, everyday events and also unusual events which happen outside the classroom is possible to make with appropriate software such as Coach 6. In this paper we would like to mention importance of video measurement in process of concept formation. In our opinion the key advantage is the possibility to analyse processes with rapid progress or processes which can't be realised in laboratory conditions. Teacher can create engaging learning scenarios. There is a chance to solve problems/situations which are more interesting for students, build on their prior knowledge. It also means opportunity to include more representatives of the concept in the teaching sequence. As an illustration we have chosen activity which leads to formation of physics concept momentum.

Momentum

We start this activity with discussion about car crashes, with question why is heavier car safer than lighter vehicle. Most frequent student's explanation is that heavy car acts with more force to lighter car. It's interesting because the most famous Newton's law is actually third action-reaction law in this group of students. After reiterating this physics law they looked for mistake in its interpretation no in their argument. Sure, they indicate other reasons why is lighter car more deformed by car crash such „*heavier cars have better deformation zones*“.

We don't make any conclusions from this discussion yet. We suggest inquiry of car crashes of two objects. There are several options how do this. We observed two gliders with different weight moving towards each other in air track, but animations or videos could be used too. Students are asked to observe and describe motion of both gliders. They can see that heavier glider continues in motion in initial direction but with lower speed. Direction and speed of lighter glider change after crash. So, total change in velocity of the lighter glider is bigger than change in velocity of the heavier glider.

Some students don't know what the influence of acceleration to rider and passengers is. Through discussion we explain why rapid acceleration is dangerous for them, why it leads to injuries.

Now we can move from qualitative explanation to quantitative description of the situation. We want to find relationship between mass of cars and changes in their velocities. Students have to find plan of measurement. Again there are various ways to quantitatively inquire crashes of two objects. In this case we made video measurement. The various video shots of collisions of two gliders with different mass in

the air track were prepared. Students find out mass of gliders, initial speeds and speeds after collision (Fig. 8).

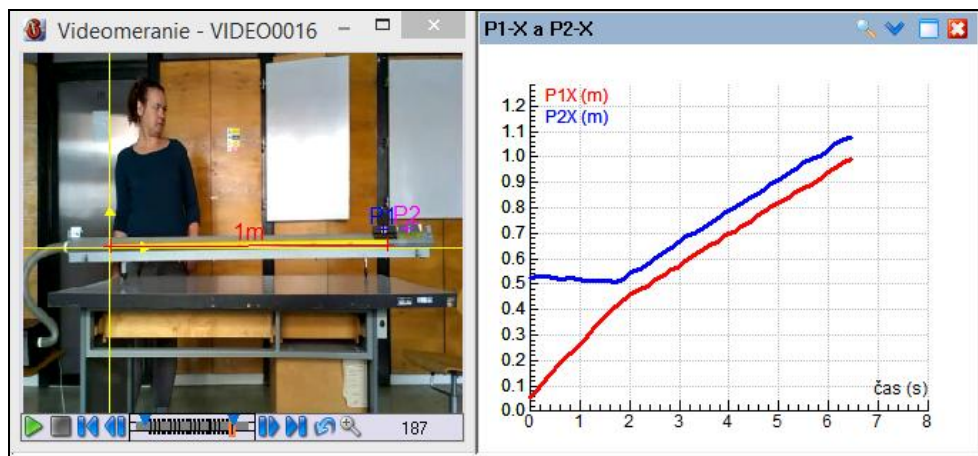


Fig.8 Video measurement of collision of two gliders in the air track

A series of experiments was made. Results of them can be presented by equation $m_1 \cdot \Delta \vec{v}_1 + m_2 \cdot \Delta \vec{v}_2 = 0$.

Teacher directs student's attention to product of mass and velocity and define new variable – momentum and generalize found equation as momentum conservation principle.

Of course, this activity is only beginning of the formation of concept momentum. It's necessary to continue with problem solving and experiments, for example measurement of speed of the air rifle pellet.

Modeling

We remember the statement of university professor R. Hajossy. During our first physics lesson he said: "So many people don't like physics. They hate it. In my opinion the main reason of this that physics is quite clear for them. They had to solve only simple unreal problems in the high school."

Slovak physicist Martin Mojžiš in TV programme Pod Lampou said: "Natural language of physics is language of differential calculus. But it is unattainable or too difficult for high school students. They learn it but in different language."

Modeling is the key tool how to partially solve both these problems. It allows to theoretically inquiry more complicated processes without hard mathematics.

There are suggested three possible ways of using modeling in the classroom:

- Use an earlier prepared model and discuss with the students how it works.

- Start with a prepared model or with parts of a model and build up a new model, after discussion with class.
- Start with „clear window“, and build up the desired model from scratch, during discussion with the class. (CMA)

In terms of the process concept formation each of these uses is meaningful. Similarly as the video measurement also modeling allows to study realistic situations students encountered and they have created some ideas about them. Teacher can verify the correctness of these ideas, strengthen the good and disprove others.

Unlike measurements and video measurements gives modeling opportunity to inquire “pure” phenomena without “disruptive” effects, like friction, air resistance, etc. Thereafter, we can observe changes when we take into account these effects. It means students can separate what are the characteristics of the concept and what is caused by something else.

Simple example of other using in the classroom is given in the next part.

Superposition of waves

Simple experiments to show superposition of sound waves can be made in classroom. Two speakers and tone generator are used. At the beginning are speakers next to each other at a distance of one and half meter in same direction, played same tone. Students are slowly walking through the classroom. They can observe that tone is louder in some places in the classroom and in the other places is quieter. A similar situation occurs when one speakers is placed behind the second speaker. When distance between them is increased observer in front of speakers can hear volume changes (Fig. 9, Fig. 10).

```

'Tento výpočet je založený na Euler .
t := t + dt
y_1 := ym_1*Sin(2*Pi*f_1*(t+(x-x_1)/v))
y_2 := ym_2*Sin(2*Pi*f_2*(t+(x-x_2)/v))
y := y_1 + y_2

t := 0
dt := 0.0001
ym_1 := 1
ym_2 := 1
f_1 := 440
f_2 := 440
x_1 := 0
x_2 := 0.385
x := 2
v := 340

```

Fig.9 Model of wave superposition 1

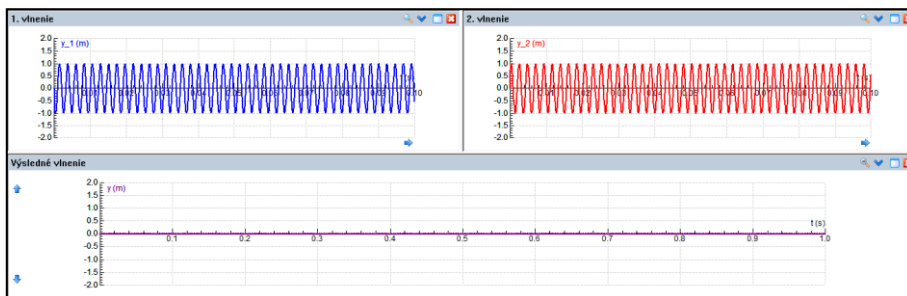


Fig.10 Destructive interference

During the third demonstration are speakers placed side-by-side but played slightly different tones (for example 440 Hz and 445 Hz). Observers can hear beats – volume goes up and down (Fig. 11, Fig. 12).

To explain these phenomena was created a model in Coach 6. Initial conditions like distance of speakers or frequency of tones can be changed. The shown graphs help to understand what happens in the referred cases.

```

'Tento výpočet je založený na Euler .
t := 0
dt := 0.0001

t := t + dt
y_1 := ym_1*SIn(2*Pi*f_1*(t+(x-x_1)/v))
y_2 := ym_2*SIn(2*Pi*f_2*(t+(x-x_2)/v))
y := y_1 + y_2

t := 0
dt := 0.0001
ym_1 := 1
ym_2 := 1
f_1 := 440
f_2 := 445
x_1 := 0
x_2 := 0
x := 2
v := 340
    
```

Fig.11 Model of wave superposition 2

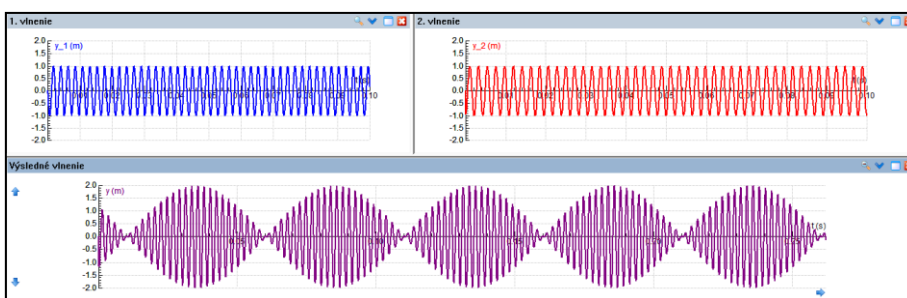


Fig.12 Beats

Animation

Although modeling is a very useful tool, presentation data in diagrams can be unclear for many students. Coach 6 allows the other way how represent data differ-

ently, more understandable – by using animation. Position, size or other features of objects which are parts of animations depend on the variables in model, program or on the sensor values. Development of animations in Coach 6 and their utilisation in the classroom is presented for example in [34].

We want to point out two aspects of animation which are relevant in concept formation. The first aspect what we mention is opportunity to observe processes in various initial conditions. This can be used by testing student's hypothesis. We would present this on the example of refraction. The second advantage of using animation in teaching process is that we can focus attention of students on same features of systems and also on differences of them. This provides to separate concept's characteristics. How we could do this? Animation gives us the opportunity to make visible important parts of systems like vector of resultant force, velocity, etc.

Refraction

At the beginning of this activity [35] students work in small teams. They make simple experiment; slowly pour water into the bowl with the coin glued on the bottom. Their task is to observe position of the coin, adapt condition that the coin is not visible at the beginning, but the coin can be seen after they poured water in. We want to know the student explanation.

After listening of their ideas we pretend leaving topic and start to talk about new situation. We use a story about a lifeguard a man who drowns. Lifeguard must to rescue him in the shortest time possible. The question for student is: „In which direction he should start running?“ After short discussion we agree to following terms:

- Lifeguard runs faster than swims
- There are no water flows in the sea.

We expect two hypotheses about idea trajectory:

- Lifeguard should run in the shortest path, in straight line between his position and the position of the drowning man.
- Lifeguards should swim the shortest possible distance, so he should enter to the water vertically to the position of drowning man.

We use the interactive animation in which they can change position of entry to the sea and measure time of rescue. Several easy tests are sufficient to find ideal trajectory. Is really surprising for students that it isn't a straight line how they thought.

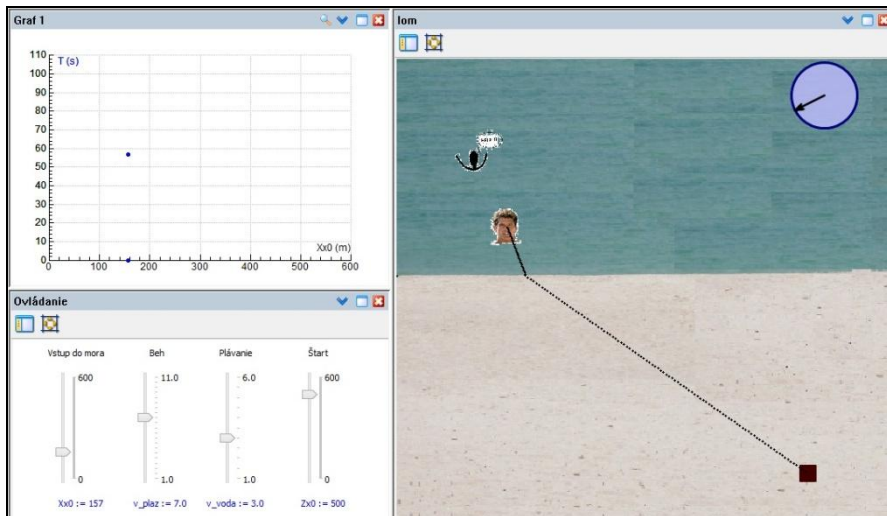


Fig.13 Lifeguard in Coach 6

We created graph (time of rescue depending on position of entry to the sea) to complete the situation. Student can make themselves certain that is only one specific trajectory.

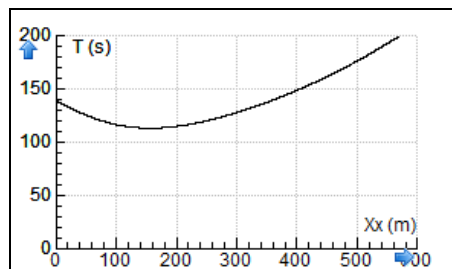


Fig.14 Time of rescue

Thereafter we connect both discussed problems. To help student to join two phenomena and make analogy we use statement: „Light is a lifeguard“. It means, in each medium light has different speed and between two points it travels along the path which is passed in the shortest possible time. Then we name this phenomenon like refraction of light.

5. CONCLUSION

This work supported basic principles of our work: *effect to learning = carefully selected equipment x carefully selected methods; and learning is making sense of new experience by a child in collaboration with others.* Also we should notice that

development of concepts related to utilisation of Coach 6. We showed that well developed software environment can be beneficial by formation of concepts in high school physic. But there is a group of concepts that can be developed at the teacher level. Similarly as children have own ideas about physics concepts also teachers intuitively understand and use concepts such as data-logger; data video; modelling or interactive animations. Prototypes of these concept scan be different for different orientations to teaching physics. We often use the list of orientations by [36]: processes, academic rigor, didactic, conceptual change, activity-driven, discovery, project-based science, inquiry, guided inquiry. Through teacher training can be meaning of mentioned concepts gradually changed and clarified. This is the way how to build a language of science teachers; to enrich professional discussion and avoid some misunderstandings. This is the topic of our research for the next years.

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USE OF INFOMERCIALS AS A METHOD OF ACTIVE LEARNING

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Abstract

This article purpose is to: analyze the effectiveness of the infomercial as a method of active learning, prove its usefulness with large groups of students, analyze the differences between putting into practice with students of first and last academic years and reveal the level of understanding acquired skills by the students. The application of this tool follows the experiential learning model. The results were getting by a questionnaire over 132 students of Marketing Degree. The results obtained support the use of the infomercial as a tool of development skills related to search information, creativity, communication and teamwork. It can be applied also large or small groups. Differences between students of several academic courses are identifying also, proving than the infomercial is a flexible instrument that allows students learn according to their needs.

1. INTRODUCTION

Nowadays, university students are expected to demonstrate high levels of knowledge in problem solving, interpersonal communication, and teamwork, time management and communication technologies [1, 2]. Developing such proficiencies will ensure that graduates will function effectively in business teams, communicate clearly with their colleagues and succeed in their personal and professional development [3]. In contrast to teacher-center approaches, learning approach in students involve them in doing things and develop a reflective thinking about the things they are doing [4]. This change of paradigm between the teacher-centre and student learning take implicit a change of methodologies, improving the existing or using other different.

Active learning approaches involve students to become in active, motivated and independent people through communication and collaboration. Students acquire and refine knowledge, skills and attitudes while being actively in learning process [5]. In this way, to encourage active learning, instructor must shift from providing instructions to lead the student's learning to qualify them in order to develop their own skills [6]

In the past decade, educators have been experienced with different forms of active learning [7, 8] to responding to the need in a change of paradigm [9]. Matveev and Milter [3] propound the use of infomercials to activate the active learning in their students. The infomercial is a communication tool, commonly used in TV programs

show of teleshopping. These authors prove that assigning the production of an infomercial to the students, enable them, through personal experience and observation equally, identify key factors that do more efficient the teamwork and public presentations.

Although the getting results by Matveev and Milter [3] are very positive, we consider that there are some unknown factors about the application of this method that must be clarified. First with the team infomercials assignment, the authors get high benefits to favor the self-managed learning, student participation or generate materials for self-work. But, we have not found other researches that reinforce these results, proving the goodness of this method. Had it the same benefits in different environment? Secondly, this method only has been used in last years of university so we have not knowledge if the advantages of using infomercials are showed in first years of university too.

Thirdly, the goodness of this method has been proved in lecture room of less than 30 students, so we don't know if the method would be good applying in lecture rooms with double or triple number of students [10]. Finally, authors point that infomercials assignment is useful to acquire many skills but this method doesn't show the level of assimilation of these skills by students.

In this research we consider the following objectives: a) confirm the goodness of Mateev and Milter's propositions about the assignment of the infomercials as a learning method, b) prove the useful of the method for learning to many groups of students, c) analyze the differences between first and last years of University with the application of the infomercials, d) prove the assimilation level of the acquired skills by the students with the infomercials. To achieve these objectives, we have proposed to the students of Degree in Marketing of the Rey Juan Carlos University, the production of an infomercial.

2. INFOMERCIAL AS A LEARNING ACTIVITY

The concept of infomercial, emerge from joint two words "information" and "commercial" [11]. It's a communication tool, used in products sales. In a learning context, we use infomercial as a learning activity for the students. In this way, the assignment of infomercial, mean the generation of contents by the students and with their delivery it is generating interest and wishes of learn more about some specific theme about the subject. Infomercial activity as an active learning method, enable students to develop more efficient skills than using only master classes or teacher-centre approaches [12]. Students working collaboratively exhibit more confidence and continuing motivation than those who work individually [13]. Team presenta-

tions also enable students to learn from one another and optimize their communication skills interacting between them [14].

To prepare this activity, teacher has to assign groups between four or six students. They have some minutes to do their presentation. Students will be responsible of research and select the topic that they are going to present, find the material necessary to develop the infomercial, assign the task to the members of the team, manage the work time previous and during the presentation and get the team working like a jointed team of work. The objective of every team is not to explain the contents of the subject; the objective is search some topics interesting for the students and related to the subject and transfer their interest and knowledge about the topic to the rest of the peers. The audience is the rest of the students of the class.

This activity was designed using the Kolb's model [15] of experimental learning. So the infomercial work has three phases for the students. First phase of the work: students have to elaborate the learning material and design the infomercial. During this phase, every team does a research, analyze and develop a topic that they are interested in and related with the subject. About labor market, some researches indicate an urgent need of develop work skills in teamwork, as well as improve interpersonal and communication skills [1]. Sundstrom [16] outlined that organizations are taking this structure in order to compete and survive. Students must to learn how to manage difficulties and improve teamwork performance, because these activities are fundamental to get succeed in this phase. Delivering students to the fundamentals of teamwork is extremely important as most businesses are structured around teams [17]. Teamwork not only provides a powerful context for learning, but also has a strong behavioral and cognitive impact on learning outcomes [18]. In addition, there are several reports showing that eighty per cent of organizations utilize work performs by teams [19]. In this way, learning with infomercials is characterized by a design aimed at developing teamwork skills, presentation and communication.

Second phase of the team infomercial assignment involves. Delivering every team group to the class. With the delivery, skills related to communication are developed in order to progress in business world. They have five minutes for this phase. We want they get to know about the Elevator Pitch technique. Students have to be able to learn how to speak to an audience, clarifying their objectives and their differentiating characteristics. This method has been essential to any person engaged in business [20]. The use of these five minutes was necessary due to the large number of students per group. During this phase students prove skills about: the use of technologies, speak to an audience and several strategies of presentation and persuasion, use of visual aids, contribution of persuasive arguments and know how to answer questions.

Last phase is Observation and evaluation of infomercials produced by other students. Some researches indicate that the effect of learning is minimal when students are required to observe peer presentations passively [21]. Therefore, at the end of every presentation, students must rank order the presentation, ranking them in order to persuasive value detected in other team infomercials. This is beneficial to improve individual skills. Students that form the audience listen and respond to the speakers with critical comments.

3. EVALUATION METHOD

Evaluation was done over 132 students of two groups of first year of Degree in Marketing of Rey Juan Carlos University in Madrid. The two groups was selected because both were been applied the active learning as a basis of acquire skills. The subject in which was used the infomercial work was in Introduction to Business, the same in both groups.

To evaluate this method we use a questionnaire with questions about design, delivery and observation phases. Questions were closed-ended. Students must to evaluate the answers in the questionnaire using a five points Likert scale. Questions were obtained of the results of Matveev and Milter's research. This type of procedure allows getting quantitative data providing their further treatment. Questionnaires were distributed in class at the end of all presentations. Getting data were analyzed using SPSS statistic program.

About data analysis, this research treats about two students groups, we consider necessary to confirm that there are differences between opinions generated in group 1 and group 2. For this, we realize an analysis of variance (ANOVA). The results of this analysis show that only 18 of 70 analyzed variable have significance ($<0,05$). So, we can conclude that between group 1 and 2 there are not substantial differences in order to evaluate the infomercial work, and it's possible to analyze the answers of both groups in an addition way.

4. RESULTS

Student's learning with infomercial

The results of student's learning with infomercial work are detected in Table 1. In that table are demonstrated learning acquired by student in every phase of infomercial work. During design phase, students consider as most learned are the skills related to information management, creativity and generation of ideas. Skills less learned are related to management of teamwork. These results are different than getting by Matveev and Milter in USA, with last year students of subjects about Business Organization. In this authors' research, more learned skills were team

management and them information management and creativity. Skills more learned during delivering phase are presentation strategies. Secondly, students consider that during this phase they had learned to gain confidence and reacting to audience and nervousness. Finally they consider that they learned oral communication skills too. These results are different than get in previous researches [3], where skills more learned by students were related to oral communication skills, followed by reacting to nervousness and presentation strategies. Observation phase, has been useful to learn: better organization involve better presentation, planning is a key for a good presentation, requirements of a good presentation and principal mistakes made, and the importance of using visual aids and maintain visual contact. These results are similar than get by Matveev and Milter during this phase.

Table 1. Student learning during phases

	Frequencies (in percentage)	Mean	s.d	1	2	3	4	5
DESIGN PHASE	Choose relevant information	4,00	0,92	0,00	9,09	14,39	43,94	32,58
	Generation of ideas	3,99	0,88	0,76	7,58	11,36	52,27	28,03
	Research current topics	3,98	1,00	1,52	8,33	15,91	38,64	35,61
	Get information	3,91	0,89	2,27	6,82	9,85	59,85	21,21
	Creativity	3,83	1,01	3,03	9,09	14,39	48,48	25,00
	Organising	3,83	0,84	0,00	9,09	17,42	54,55	18,94
	Sharing responsibility	3,79	1,00	1,52	12,88	15,15	46,21	24,24
	Minimising inform. to the imp. details	3,79	1,05	3,03	10,61	17,42	42,42	26,52
	Learning new concepts	3,77	1,10	2,27	15,91	12,88	40,91	28,03
	Group co-operation	3,74	0,87	0,00	13,60	12,90	58,30	14,40
	Time management	3,67	1,15	2,27	18,94	16,67	33,33	28,79
Confidence in team	3,61	1,33	9,85	16,67	5,30	38,64	29,55	
DELIVERY PHASE	Practice importance	4,30	0,86	0,00	6,82	5,30	38,64	49,24
	Short presentations	4,18	0,82	0,00	3,79	14,39	41,67	39,39
	Explain only principal details	4,16	0,77	0,00	3,79	11,36	50,00	34,85
	Gain confidence	4,09	0,98	1,52	8,33	9,85	40,15	40,15
	Reacting to audience and nervousness	3,97	1,09	2,27	11,36	12,12	34,85	38,64
	Speaking loud	3,84	0,94	0,00	12,12	16,67	46,21	25,00
	Being prepared	3,74	1,10	2,27	15,15	16,67	37,12	28,03
	Communicate in a clear way	3,72	0,91	0,00	14,39	15,91	53,03	16,67
	Speaking precisely	3,69	0,93	0,76	13,64	17,42	52,27	15,91
	Add enthusiasm	3,61	0,98	0,00	18,18	19,70	44,70	17,42
	Reading from notes is highly ineff.	3,45	1,27	7,58	18,18	21,21	25,76	25,76
OBSERVATION PHASE	Better org. involves better presentat	4,44	0,75	0,00	2,27	8,33	32,58	56,06
	Planning is a key for a good present.	4,32	0,79	0,76	2,27	8,33	40,91	46,21
	Principal mistakes made	4,28	0,88	0,76	4,55	9,85	34,85	49,24
	Different presentation styles	4,26	0,82	0,76	3,79	7,58	44,70	43,18
	Requirements of a good presentation	4,20	0,85	0,76	3,03	14,39	39,39	42,42
	Importance of using visual aids	4,15	0,96	1,52	6,82	9,85	38,64	43,18
	Making eye contact	4,02	1,02	0,76	10,61	14,39	34,85	39,39
	Speaking too fast	3,82	0,99	3,03	8,33	15,91	49,24	23,48
	Using humour	3,72	1,19	4,55	17,42	9,09	39,39	29,55

Maintain visual contact	3,72	1,05	1,52	15,91	15,91	41,67	24,24
Be prepared for questions	3,64	1,21	4,55	18,94	13,64	34,09	28,79
Tailoring to audience needs	3,52	1,08	2,27	19,70	21,21	37,88	18,94

It's true that all phases have some learning for students, 46.97% of students consider that delivery phase is when they have learned more. 32.58% of students consider that observing other team infomercials, they have learned more. 27% of students consider that design phase is when they have learned more. These results have differences too with Matveev and Milter. Students consider that design phase is when they had learned more.

Challenges experienced by students with infomercial

Challenges experienced by students in different phases of infomercial work can be observed in Table 2. We observe that during design phase, the biggest challenges that they have faced to: coordination of ideas with other team-members, learn how to trust in team-members, difficulties to meet them and get interesting information. These results are similar than previous researches. Biggest challenges faced during delivery phase have been: nervous, staying under time restrictions, coordinating different parts of presentation with team-members. In Matveev and Milter's research, challenges faced by students in these phases had a different ranking; firstly they consider the biggest challenge staying under time restrictions, secondly nervousness and finally coordination with team-members. These results can be consequence of being students of high courses.

During third phase, students mainly observe following challenges: boring and not interesting presentations, speaking for too long of team that are presenting, presentations reading for notes, or presentations with too much information. Differences found with Matveev and Milter's research were that students didn't detect presentations with too much information or quickly presentations. Equally as this research, biggest challenges that students faced were boring and not interesting presentations, presentations reading for notes, generating lack of commitment in the audience being this the biggest challenges they had.

Table 2. Challenges experienced by students

	Frequencies (in porcentaje)	Mean	s.d	1	2	3	4	5
Design	Learn how to trust in team-members	3,75	1,07	3,79	14,39	6,82	53,03	21,97
	Coord. of ideas with other team-members	3,60	1,06	3,79	15,15	15,15	47,73	17,42
	Difficulties to meet team-members	3,09	1,34	13,64	26,52	15,15	26,52	18,18
	Get interesting information	3,07	1,28	12,12	28,03	13,64	31,82	13,64
	Difficulty to participate equally	2,99	1,38	15,15	31,06	12,12	22,73	18,94
	Issues with comm. with group members	2,76	1,38	24,24	25,76	11,36	27,27	11,36
	Finding the right props to use	2,61	1,24	19,70	37,88	11,36	24,24	6,82
	Creative idea generation	2,50	1,21	22,73	35,61	14,39	21,21	5,30
Delivery	Disagreements	2,38	1,22	25,76	40,91	9,09	18,18	6,06
	Nervous	3,89	1,18	3,79	14,39	9,09	34,09	38,64
	Staying under time restrictions	3,35	1,36	12,12	21,21	8,33	34,85	22,73
	Coord. different parts of presentation	3,17	1,18	8,33	26,52	15,91	38,64	10,61
	Co-ordinating the technology	2,98	1,41	18,18	27,27	10,61	25,76	18,18
	Team member delivering their part poorly	2,97	1,42	18,94	25,76	14,39	21,21	19,70
Observation	Using PowerPoint in infomercial	2,89	1,43	21,21	25,76	13,64	21,21	18,18
	Presentations reading for notes	3,84	0,99	2,27	9,85	14,39	48,48	25,00
	Presentaciones poco impactantes	3,76	1,07	1,52	15,91	15,15	40,15	27,27
	Boring and not interesting presentations	3,72	1,01	0,00	17,42	15,91	43,94	22,73
	Speaking for too long of team	3,69	1,02	0,76	16,67	16,67	43,18	21,97
	Presentations with too much information	3,65	1,12	2,27	19,70	12,12	41,67	23,48
	Showing no enthusiasm	3,48	1,06	1,52	21,97	20,45	39,39	16,67
	Understanding peers who spoke too low	3,29	1,18	4,55	28,79	15,91	34,85	15,91
Speaking too fast	3,09	1,25	9,09	31,82	12,88	31,82	13,64	

In table 3, we can see students' evaluations about effectiveness of developed activities during infomercial work. Results point that in design phase, most effective activities to create a good infomercial were: team communication with IT, that is skill to communicate using information technologies like emails, followed of communication between team-members and participation of every team-member. In delivery phase, students conclude: knowing of the topic that are speaking about and using visual aids. And in observation phase, they consider that most effective is the use of visual aids. These results are similar than get by Matveev and Milter's research related to the actions more effective in delivery and observation phases. But in design phase more effective actions for these authors were those that were related to team and participation of all team-members, followed by team communication.

Table 3. Effectiveness of activities of learning in every phase of infomercial

	Frequencies (in porcentaje)	Mean	s.d	1	2	3	4	5
Team communication with IT		4,14	0,98	2,27	6,06	9,85	38,64	43,18

	Communication between team-members	3,88	1,10	3,03	12,88	9,85	41,67	32,58
	Participation of every team-member	3,83	1,13	6,06	8,33	12,12	43,94	29,55
	Being prepared for the presentation	3,69	1,07	3,03	15,15	13,64	46,21	21,97
	Importance of group effort	3,67	0,97	1,52	15,15	14,39	53,03	15,91
	Practising as a team	3,20	1,30	13,64	19,70	15,91	34,85	15,91
Deli- very	Know. of the topic that are speaking about	4,22	0,92	0,76	6,82	8,33	37,88	46,21
	Using visual aids	4,08	0,98	1,52	7,58	12,12	39,39	39,39
	Using humour	3,15	1,28	8,33	30,30	18,94	22,73	19,70
Ob- ser	Visual aids	4,33	0,78	0,76	2,27	7,58	41,67	47,73
	Using humour	3,67	1,21	3,79	18,94	15,15	30,30	31,82

5. DISCUSSION AND CONCLUSION

Described research in this work has researched about effects of infomercial in students teaching. As well as, it has served us to analyse the peculiarity of this tool as method of active learning and bridging the gap about its use in teaching areas. Firstly, our research as Matveev and Milter's research (Students of Business Area of USA), confirms the value of infomercial as a teaching tool for Social Sciences subjects. Get results confirm that this type of work is a powerful tool to develop teamwork and competencies of presentations. Specifically, results have proved that with this type of task students learn, skills like: choose relevant information, research current topics, importance of before practicing, and deliver only main topics, gain public confidence, planning how to do a good presentation, mistakes that wouldn't be made in a presentation or the importance of visual aids. Those are essential skills for business organizations [22] and education [23]. Confirming value of active learning and infomercials over other techniques more traditional [12, 24], where students don't develop actively these skills.

Continuing, results of this research could be especially useful for educators interested in develop a learning environment where students learn with their own experiences and their peers' experiences. The team infomercial assignment has been shown to facilitate student learning of course material while preparing, delivering, and observing infomercials. This find is in line with past research on learning and effectiveness of presentations in learning new material [14, 21].

Secondly, in the usefulness of infomercial in lecture rooms with a large number of students, results have been positive, confirming the possibility of using this tool in large groups of students. These results are similar than others active learning's methodologies applied in small groups of students [25]. But this researches are different than ours, because our research has been made in groups of a large number of student (two groups of 66 students each one). Even with this type of groups and accepting problems that involves a high number of students to applying active learning, students' skills developing get an average of 3.89 point over 5. Confirm-

ing the usefulness of this tool as a method of teaching in large groups of students. One of the problems that can face educators that want to use this tool is that passing time, students that have delivered can lose attention. To solve this problem, we decide that all students must give us a little summary of every other team presentation, explaining strong and weak points of each presentation. So, we not only get students' attention, also we get a reflection during observation phase.

Thirdly, we consider this method useful both students high years or first years of University. It's true that skills getting with infomercial work are different according to education level of the student. For example, during design phase, students of first years consider that most learned have been skills related to get information. But in Matveev and Milter's research, students of last years consider that skills more learned during design phase were those that were related to management of teamwork. These differences can be explained because needs of students' skills of different academic levels aren't the same. In this sense, our results identify differences between students of different academic years and are proving the flexibility of infomercial that allows students learn according to their needs.

Fourthly, results of this research have proved both skills get by students with infomercial work and assimilation level of these skills. Observation and delivery phase are when students consider get more skills. We have created a rank that shows challenges that have been experienced by students developing the infomercial work. In this case, observation and delivery phase is when students have experienced more challenges too. This ranking can be used for educators to improve how to make the decision of what method using to teach their subjects. As well as this ranking can serve as a learning guide for educators who want to use infomercial work in their classes.

Future researches, about use of infomercial, can be based on results of this research. Mainly in topics about management and evaluation of skills. For example, results of this research show that biggest challenges experienced by students, biggest skills acquired them. This observation can be checked with a regression research to relate both variables. On the other hand, we can study how knowledge acquired by infomercial work can become in own skills of teamworks in Organizations.

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LITERACY AND THE NEW TECHNOLOGIES IN EFL SETTINGS: HOW DO UNIVERSITY STUDENTS REALLY COPE WITH READING COMPREHENSION THROUGH ONLINE TASK-BASED ACTIVITIES?

C. GIRÓN-GARCÍA

Abstract

Task-based activities are of paramount importance for the purpose of our study. A task-based approach is understood by many researchers in the field as a new way of teaching a foreign language (Luzón, 2003; Breen, 1987; Candlin, 1990; Nunan, 1989; Zanón, 1990; Hernández & Zanón, 1990; Estaire & Zanón, 1992). Furthermore, these activities are aimed at engaging students in a more effective classroom communication. The objective of our task is related to promote the reading capacity of texts (Luzón & Ruiz-Madrid, 2008; Luzón, Ruiz-Madrid & Villanueva, 2010; Girón-García & Gaspar, 2012) that may encourage students learning to learn English, in other words, that students acquire a greater autonomy in (a) selection, (b) evaluation, and (c) use of authentic and supporting materials to study English through online task-based activities, also called WebQuests (Dodge, 2001; March, 2003; Blin, 2010).

Along this line, the main aim of our work is to discuss to what extent do online reading modes ('Navigating', 'Browsing, and 'Reading') affect successful task completion.

In order to obtain relevant results, a group of university students (Universitat Jaume I) worked on an English task-based activity. In this activity, students searched information in relation to the writing process; the main aim of this was to get students to surf the Internet to get a specific outcome, that is, to analyze how students read in a digital context (Girón-García, 2013).

1. INTRODUCTION

Since media are a central part of our cultural experience, training in media literacy should begin early in life and continue into adulthood, as "*new technologies are constantly creating new media and new genres, technical innovations and conventions are constantly emerging*" (Kellner, 1997: 5). At this point, it is the challenge of educators to teach media literacy through the use of media materials in order to contribute to advancing multicultural education. Thus and thus, many teachers have discovered that media materials can be valuable in a variety of instructional tasks, helping to make complex subject matter accessible and engaging for students.

Carrying out tasks (Cybertasks) in media literacy can often involve student participation, where both teachers and students together learn media literacy skills and competencies.

The use of ICTs entails lots of advantages. One of the positive features that ICT's imply is that they can help learners to take responsibility of their learning process. Furthermore, they also support the learner to develop cognitive and metacognitive strategies, and the development of an autotomizing competence with the design of on-line learning tasks. As a result, students plan, monitor and evaluate their own learning.

In this study, we take into account the design of on-line task-based activities (Cybertasks) which help students develop an autotomizing on-line reading competence (Luzón & Ruiz-Madrid, 2008), where their ability to read on the Web and make their own text interpretations take place.

2. TASK-BASED LEARNING ACTIVITIES AND STUDENTS' 'READING MODES'

In the 21st century, the advent of task-based activities is of paramount importance for the purpose of our study. Considering the literature written upon this issue, a Task-Based approach first appeared around the 90's as an evolution of the Communicative Approach framework with researchers such as Breen (1987), Candlin (1990), Nunan (1989), Zanón (1990), Hernández and Zanón (1990), Estaire and Zanón (1992); and is understood by many researchers in the field as a new way of teaching foreign languages. In addition, these on-line learning activities are aimed at engaging students in a more effective classroom communication. Thus, a new methodological work in the classroom appears called 'Task', whose main objective is that students use English as a foreign language to communicate naturally in the classroom.

In our experiment, a group of university students will work on an English task-based activity called 'Cybertask'. In this Cybertask, students will search information in relation to the writing process. The main objective of this kind of activity is to get students to surf the Internet to get a specific outcome, in other words, to analyse how students read in a digital context. Finally, in order to obtain relevant data, we will analyse their 'Reading Modes'.

Hereunder, we present the different types of navigation that we encountered for the purpose of the present work (Girón-García, 2013: 312-313):

As for the types of navigation, first, we designate as 'Navigating' method the rate of up to five seconds employed visiting the same site; second, we define as 'Browsing' method the rate where the student spends between five and fifty seconds in the same page.

In order to determine these time spans for each navigation type, we bore in mind the degree of complexity of the web pages proposed by the researcher. That is, if the site contains a low degree of complexity, we would need to apply less time to the types of navigation, since the time applied to the 'browsing' method (up to fifty seconds) in a very complex page could correspond to a 'reading' method in a very simple web page.

It is important to highlight that before determining these time spans for the definition of each type of navigation, a first working hypothesis was tested which consisted in assigning up to one second to the 'Navigating' method, up to 2.5 seconds to the 'Browsing' method and more than 2.5 seconds to the 'Reading' method.

Considering these time spans, a first check was carried out, which produced a great majority of subjects applying the 'Reading' method, as a provisional result. As that first hypothesis did not provide us with any relevant results, we decided to establish a second hypothesis that could show up greater contrast between the different methods. Therefore, we decided to assign new time spans. Up to 5 seconds to the 'Navigating' method, up to 50 seconds to the 'Browsing' method, and more than 50 seconds to the 'Reading' method. As a result, from this second hypothesis a clearer contrast between the different types of navigation resulted. In this sense, it is worth mentioning that we considered a time span of up to 50 seconds for the 'Browsing' method because the students who realised the Cybertask were not native English speakers and therefore they present a slower reading score. Furthermore, the web pages proposed by the researcher were very dense, thus, we also found it more appropriate to consider this time span (up to 50 seconds) due to the web pages characteristics.

Following task-based learning activities, it is important to take into consideration that electronic texts imply the use of the Internet, and at the same time, the latter offers the user with new ways to search information. But searching information on the Web can be sometimes confusing when people are used to extract information from traditional printed texts (Coiro, 2003). Thus, when observing students interacting with texts resulting from an Internet search, we could argue that they "*perceive Web text reading as different from print text reading*" (Sutherland-Smith, 2002: 664). This new on-line reading might result in frustration due to the unsuccessful search of information.

In fact, little research has been found on the use of the Internet as a teaching tool for language learning. But perhaps, it may be a way of engaging students with real-life materials, and thus, it might help "*improve self-esteem and attitudes toward learning, especially when used in the context of collaborative learning activities*" (Solomon, 2002: 19).

It should be borne in mind that the fact that students are involved in task-based learning implies that the teachers' responsibility becomes in engaging students in meaningful situations and authenticity in communication when they carry out a task in the classroom. Thus, in our context, a task refers to a type of learning activity designed to engage students in searching information on the writing process, for the purpose of the present study, in order to obtain specific objectives. Then, the main aim of our task is related to promote the reading capacity of texts that may encourage students learning to learn English, in other words, that students acquire a greater autonomy in (a) selection, (b) evaluation, and (c) use of authentic and supporting materials to study English.

In fact, task-based activities integrate the use of the target language (English) and content on a particular topic of interest. Thus, Brinton, Snow, and Wesche (1989) argue that content-based instruction engage students to interpret authentic texts as in a real reading situation:

“Employs authentic reading materials which require students not only to understand information but to interpret and evaluate it as well... [and] requires students to synthesize facts and ideas from multiple sources as preparation for writing” (Brinton, Snow & Wesche, 1989: 2)

Hence, content-based instruction offers a number of benefits:

1. Students' interaction with authentic materials relevant to their goals, thereby enhancing their motivation to learn better (Brinton, Snow & Wesche, 1989; Kasper, 2000; Warschauer, 1996).
2. Internet use integrates a great amount of reading and writing skills, as well as *“opportunities to practise them in meaningful contexts”* (Luzón, 2002: 21).
3. It promotes problem-solving and critical thinking (Warschauer, 1999).
4. The use of the Internet helps students become autonomous, so as they take control of their own learning (Luzón, 2003: 125). Furthermore, students choose the contents they want to learn, as well as how much time they will devote to the tasks proposed.

With the arrival of the Internet, new possibilities for learning have been provided, such as on-line courses and first generation WebQuests as a didactic tool to work in groups. According to Dodge (1997), a 'WebQuest' is a research guided-activity, where learners use information collected mainly from Internet resources. WebQuests can focus or be based on learning activities that offer the teacher the opportunity to integrate the Internet technology in the curricula, and thus allow learners to achieve their learning through knowledge construction.

Dodge coined the term ‘WebQuest’ as an *“inquiry-oriented activity in which some or all of the information that learners interact with comes from resources on the Internet”*.

Apart from the WebQuest model, I have decided to take into account the ‘Cybertask: The Writing Process’ model as a research tool for the present study. This type of activity has been adapted to the university context and the result has been called ‘Cybertask’.

In our own specific context, WebQuests acquire new features. Therefore, the ‘Cybertask: The Writing Process’ can be characterized as a third generation WebQuest that looks for teaching new literacies, bearing in mind two important aspects: multimodality and hypertextuality. In addition, this Cybertask also looks for developing autonomy and promoting an interest in developing learning capacities.

This Cybertask consists of a Short Term WebQuest-based-design activity to be realized and completed in a two-hour session, and it is designed with the purpose of learning to write through subtasks. Thus, (1) this activity is an objective that students covered in the subjects ‘Pronunciation and Comprehension of Spoken English’ (EA0910) and ‘Dialectology’ (H61); (2) this Cybertask allows an in-depth analysis: (a) students’ representations on ‘writing’, (b) their representations on writing, and (c) the importance of learning to learn; and (3) their ability to think about their own learning using the appropriate metalanguage, that is, metacognitive awareness.

The main objectives of Cybertasks are to promote new literacy skills and make the most out of such an activity for the development of language learning autonomy in ICT contexts. Apart from these, this design includes other aims:

- Teaching “new literacies” (ICT),
- Empowerment in terms of learning to write, and
- Metacognition and test of degree of autonomy (i.e. evaluating the knowledge acquired by doing this Cybertask). The evaluation of this Cybertask ‘The Writing Process’ is a device that shows the student’s degree of autonomy.

3. METHODOLOGY

The study we propose in this paper was carried out in three stages: (1) Elaboration and design of a Cybertask, (2) implementation in a language programme, and (3) realization of the Cybertask by the students.

The 'Cybertask: The Writing Process' deals with different strategies used when writing a document and it took two hours for the students to realize.

In addition, a number of 23 participants were selected from the English Studies degree at 'Universitat Jaume I' (Spain). Among these twenty-three students, only six were selected for the purpose of case studies. Although they gave their permission to use their data, and individual identification code was provided in order to safeguard their privacy as follows: *alxxxxx*.

Finally, the study took place during the students' regular class time. The modules were 'Pronunciation and Comprehension of Spoken English' (EA0910) and 'Dialectology' (H61) in the 1st and 4th years of the English Studies degree at 'Universitat Jaume I' (Spain).

4. RESULTS AND DISCUSSION

In the light of the results obtained and after analysing the data, further discussion is presented in this section taking the following Research Question as starting point:

(RQ) To what extent do reading modes affect successful task completion?

The analysis of the data may lead us to suggest the concept of 'Successful Task Completion'. However, this term could present a certain degree of ambiguity if we take into consideration the variability of assessment criteria. Let us highlight the fact that this evaluation was carried out by a Teacher not involved in this study and who was kindly requested to evaluate the 'Cybertasks'. Therefore, we need to define this term from both the Researcher and the Teacher's point of view. For the Researcher, 'Successful Task Completion' is:

- (1) Students' ability to deal with learning processes by means of managing different sources of information and selecting information,
- (2) Students' ability to synthesise and take decisions about the use of that information and their ability to build new knowledge in the process of answering the different activities,
- (3) Students' ability to reflect through a coherent discourse, which implies bearing in mind the process and not only the result of the task.
- (5) Students' ability for discussion.
- (6) Students' use of Reading Modes.

In view of the Teacher's Assessment in our study we observed that the criteria followed by this external Teacher were the following:

- (7) The correlation between the students' answer content and the expected content of the correct answers.

(8) The correct use of language with regards to grammar and lexicon.

In spite of the diverse perspectives some aspects are shared by these two points of view. Thus, for both the Researcher and the Teacher, ‘Successful Task Completion’ encompasses the following aspects:

(9) Students’ writing skills both in the activities and essay,

(10) Students’ ability to understand texts and answer the activities proposed.

These two points of view (Researcher’s and Teacher’s) do not contradict each other, but they are complementary, and allow us draw more precise conclusions.

As a consequence of all of the above, we will translate into qualitative terms the result of the Teacher’s Assessment adopting the following point scale and taking as a reference the maximum of 60 points in the Cybertask:

- Successful: 40-60 points.
- Medium: 20-40 points.
- Failure: 0-20 points.

If we apply this scale to our case studies, we get that students **al121323** (42/60), **al205270** (40/60), **al118216** (41/60) and **al118191** (44/60) achieved a successful result in Cybertask completion. On the other hand, students **al074451** (38/60), and **al227924** (31/60), achieved a medium result in the Cybertask.

Accordingly, we present a discussion of the following results in relation to the three different Reading Modes: ‘Navigating’, ‘Browsing’, and ‘Reading’.

- (1) ‘Navigating’ mode of navigation. Students with this navigation mode remain in the same Web page less than 5 seconds. Students with this type of navigation have been shown to have the ability to create their own navigation path and choose the Web pages offered in the order they preferred when they had to track for on-line information. This behaviour, in which students choose a different order of the Web pages than the one proposed as they appeared in the Cybertask presentation, has been displayed in their non-linear reading of these Web pages. Along this line, it is true that the ‘Navigating’ reading mode entails a superficial navigation on the Web. ‘Navigating’ students tend to carry out a general overview of the information because they want to be quick in finding out about the contents of a Web page. Once students have ordered the ideas in their minds, they select the information they are more interested in, mainly by means of key words.
- (2) ‘Browsing’ mode on navigation: the ‘Browsing’ mode is defined as the rate between 5 and 50 seconds visiting the same page. Students with this navigation mode “pecked at” information doing a quick sweep of the informa-

tion that they thought worth considering in order to achieve their Cybertask objective. 'Browsing' students examine the relevance of a number of Web pages or its contents quickly, which may or may not lead to their interests in relation to the information they need for the activities they have to answer. Therefore, this type of student carries out an orientation strategy that may or may not fulfil their expectations. We have observed that only one student, from our case studies shows the 'Browsing' profile **al205270**. Although this student has carried out the task successfully (84/60 points), 'Navigating' students from our case studies performed better.

- (3) 'Reading' mode of navigation: the 'Reading' mode is defined as the rate of more than 50 seconds employed in the same page. 'Reading' students are willing to cover all the information found on the page very carefully, paying attention to written texts, images, and visual elements that appeared in the Web pages offered. They felt that these elements could help them in quickly finding contents of the page that were most relevant to complete the Cybertask. When these students started surfing the net, they immediately got an overview of the Web pages offered in the Cybertask by means of a quick first look, and then they continued their navigation again respecting the order of Web pages as they appeared in the Cybertask presentation for each of the activities.

Finally, we should not forget that students' interaction with on-line texts (interactive texts and multiple-media texts) was different from interaction with texts in print formats. In other words, students' perception of reading information on the Web is different from reading printed texts. Therefore, according to our study, students created their own navigation path deriving into non-linear hypertext. In fact, given that hypertext is non-linear, then in our study students have been able to build their personal hypertext understanding it as the result of their reading process and regarding their navigation options. Thus, there is a difference between "hypertextual space" and "built hypertext" on behalf of the reader who has to relate certain information chunks, as Lemke's (2003) semiotic model suggests. Following this model, while students carry out their navigation process they may create new knowledge from that background information (i.e. information gathered in the Web pages proposed). Likewise, students' non-linear navigation allows them to associate their own knowledge with the new information (Villanueva, Luzón & Ruiz, 2008). Therefore, with regards to the meaning construction process, hypertextual reading opens up a new reading dimension in which readers and writers do not necessarily take up opposing roles. Although hypertext stimulates non-linear reading, this fact does not imply that students spontaneously develop the necessary abilities in order to perform such as complex reading satisfactorily. Perhaps that is why some of the student had the feeling of frustration in their search of information.

Establishing a relationship between the times employed and the task results, we could deduce that only 'Reading' students took into account strategies that imply: (a) Awareness of Web pages' features, (b) anxiety control, (c) ability to project previous knowledge in texts, and (d) awareness of task objectives.

As a result of the combination of these four factors, these two 'Reading' students (**al074451** and **al121323**) were more successful in task completion than 'Browsing' or 'Navigating' students. This success is due to the fact that they re-used the information from the Web in order to answer the questions in the Cybertask. Furthermore, these 'Reading' students expressed very detailed and justified information in their answers for each of the activities proposed.

5. CONCLUSIONS

The aim of the present work has been to examine to what extent the diverse reading modes exert an influence on the task process. Our Research Question pointed out to what extent reading modes affect successful task completion. In relation to the literature on reading modes, our results agree with previous research in the sense that students did:

- (a) Put into practise their reading skills on the Web, as well as their ability to understand what they read,
- (b) Interact with texts resulting from an Internet search (considering the Web pages proposed),
- (c) Perceive Web text reading as different from print text reading,
- (d) Navigate creating their own paths through the information in a non-linear way (in accordance with non-linear structure and rhetoric patterns of hypertext).

The combination of these aspects has favoured students' 'Successful Task Completion' from the Researcher's point of view. Nevertheless, this combination of factors in task realization has sometimes resulted in frustration due to the unsuccessful search of information. In fact, on many occasions, the answer was not found literally in a particular Web page but they had to interrelate several pieces of information in order to build the answer in a personal way and giving their own interpretation.

Indeed, we have proved that there is no particular reading mode in association with success in task completion. Some students argued that searching for information on the Web was sometimes difficult, in that it took very long to find the answer to the activities and it was frustrating.

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TEACHING AID MODEL HANDHELD ALGORITHM OF MISSED CONTRACEPTIVE PILLS

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1. INTRODUCTION

Medical education continues to be primarily structured around faculty authority and lecture. This promotes individualistic competitive environments rather than the co-operative ones needed for patient-centered medicine. The postmodern generation wants fun, power in their own hands, clear expectations and explanations, personal rapport with their instructors, honesty, and uninhibited use of technology.¹ Students are "becoming more diverse in ethnic background, age, and participation patterns."² This raises the question of whether it has already become immoral to teach without extensive use of active learning techniques that so enhance performance."⁴ Handheld algorithm of missed contraceptive pill is a teaching model which will fulfill the needs for modern medical education in patient centered learning.

Missing tablets among oral contraceptive users are the main reason behind unintended pregnancies in the community. The guidelines to overcome these missing tablets are available in flow charts. Unfortunately these charts are complicated, have a lot of wording, and easy to forget. That makes it difficult for the user to follow, and also for students to remember. Currently the users have no handy notes to refer to when an immediate action as required. Therefore teaching model of handheld algorithm is the essential tool for students, teachers and doctors to study the important facts regarding missed contraceptive pills and important teaching aid for nurses and midwives to give advice to patient in family planning clinic.

2. DISCUSSION

Contraception topic is the interesting topic among final year medical students. There are some difficulties in remembrance of facts regarding instructions upon missed contraceptive pill. It can be noticed in brain storming session of

small group discussion. Missing oral contraceptives is the one of the problem facing teaching in obstetrics and gynaecology.

It is not uncommon for prolonged intervals to occur between doses of self-administered medication.[5] Between one-third and one-half of users of medications in pill form miss enough doses to place them at therapeutic risk at least occasionally.[6] Self-reports have shown that 3-60% of oral contraceptive users, depending on the population studied, miss pills.[7]

Depending on their demographic characteristics, 3-27% of U.S. women using oral contraceptives become pregnant during their first 12 months of use.[8] The reasons for such large differentials are not known, but recent data show that women's use-related behaviors merit closer attention than they have so far received [9.] The risk of pregnancy is lowest for oral contraceptive users who use barrier protection any time they have coitus during the initial seven days of pill-taking and take all of the active pills (the first 21 of each 28-day cycle) without interruption. Oral contraceptive protection is expected to decrease when two or more consecutive hormonally active pills are skipped.[10] An increased risk of unintended pregnancy has been documented among women who have reported missing pills,[11] but this risk can be modified by two factors: the timing of coitus and the use of backup contraception.

The instructions for correct oral contraceptive use that are included in all patient package inserts, which have the approval of the U.S. Food and Drug Administration, state that coitus should be avoided for the first seven days after initiating oral contraceptive use, whenever two or more consecutive active pills are missed and when the hormone-free week is extended by more than one day. They also state that if coitus occurs during any of these intervals, an additional, backup contraceptive method (such as condoms) should be used until the woman has been taking hormonally active pills again for seven consecutive days.

Inconsistent use of oral contraceptives (OCs) exposes women to risks of unintended pregnancy. This study explored women's self-described reasons for missed OC pills. Data from diary cards completed by 141 women were studied to see how reasons for missing pills were related to patterns of pill use. The findings suggest that practitioners might improve OC use by focusing on the reasons that women miss pills, thus providing a more tailored approach that addresses individual risks based on women's personal experiences.[12] Despite widespread efforts to improve OC compliance, the results from this study suggest that the majority of OC users continue to miss active hormonal pills. Moreover, nearly a quarter of missed pill instances placed women at an increased pregnancy risk and in more than a third of missed pill instances, participants failed to take two pills the day after a missed pill. This is significant because, according to Hatcher and colleagues,[6] completely missing a pill may decrease women's protection against pregnancy. The most commonly cited reasons by participants for missed pills included being away from home and not having the pill pack with them, simply forgetting to take a pill, or being unable to or forgetting to obtain a new pack of pills in time for the beginning of a new cycle. Whether two pills were taken the day following a pill miss, whether pills were missed consecutively, and whether the pill miss occurred at a time of increased pregnancy risk were related to the reasons for missed pills. Consistent placebo use was not a good predictor of consistent OC use. [13]Women generally do a poor job of identifying steps to take when multiple pills are missed. Graphic instructions are easier to understand than text-only instructions and less information is better. Findings suggest that rendering missed pill instructions in graphic format while scaling back on the breadth of medical information results in better comprehension. More than 60% of respondents knew what to do when one pill was missed, but most did not give correct answers for missing two or more pills in a row, regardless of the instruction type.[14] Side effects, such as nausea and vomiting or breakthrough bleeding, accounted for only 1.3% of the total instances of missed pills. It is interesting to note, however, that 10.7% of the instances of missed pills due to side effects were associated with increased pregnancy risk. Therefore, in addition to educating OC users about side effects, medical students ,nursing

students and health care providers might also emphasize teaching new users how to take pills correctly when side effects do occur.[15]

Based on feedback from students and observing student participation, we feel this teaching model as a renovation of the traditional lecture-based undergraduate medical curriculum contribute to learning in Obstetrics and Gynaecology. The long-term impact of using handheld algorithm will help students and doctors in team-oriented, patient-centered clinical practices.

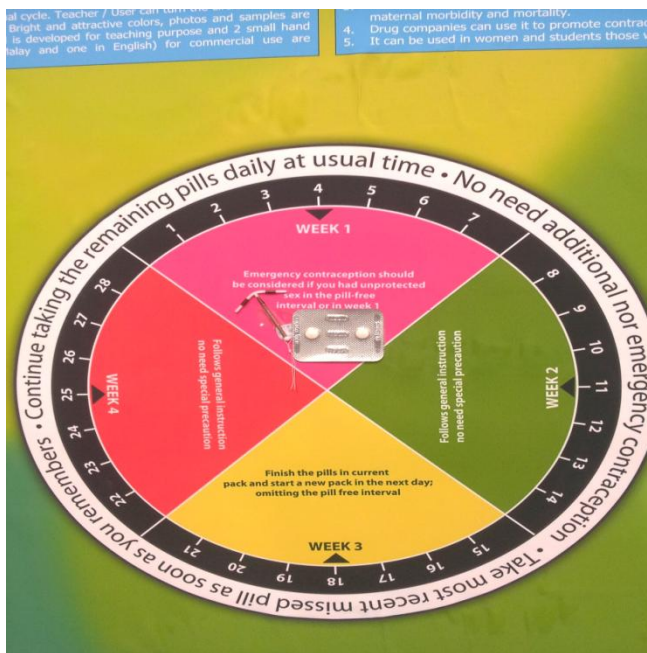


FIGURE (1) Handheld Algorithm of Missed pill

3. OBJECTIVES

This innovation aims to fulfill the requirements of students, users, practitioners

1. To get handy, user friendly, easily understandable notes for students, users, and practitioners.
2. To achieve a teaching tool for teachers and students.
3. Developing and practicing interpersonal and communication skills;
4. Introducing and modeling a technique for conveying complex medical concepts in an accessible simple way for students to use in the future with their patients.
5. Incorporating a wider variety of strategies linked to learning styles to help students understand the content more thoroughly.
6. To improve contraception compliance.

4. INNOVATION

Instructions of management of missed oral contraceptive pills will be shown in circles. The algorithm contained 2 circles and 1 arrow. Trouble shootings during using contraceptive pills are shown in a circle. It is shown according to weeks and days of the menstrual cycle. The instructions and actions are written clearly in other circles. The external circle deals with the trouble shooting of missing 3 or more pills.

The arrow point out to the steps that should be followed in case of missing 1-2 pills.

Teacher/ User can turn the circles and arrow to see the instruction. Bright and attractive colors, photos and samples are used. A Big 3-D model is developed for teaching purpose and 2 handy models are developed. They are bilingual to be user friendly in community.

Usefulness

1. Lecturers can use as a teaching aid to give the medical students during contraception lectures. Students can learn easily and able to manage missed pill.
2. Doctors can give it to oral contraceptive pill users in family planning clinic. It will improve compliance.
3. It is useful to prevent unintended pregnancies and indirectly reduce termination of pregnancy and maternal morbidity and mortality.

Family planning personnel can use this handy notes to during counseling to reduce anxiety of OC pills users about forgotten pill and this may encourage to have more OC pill user.

Commercial potentialities

It can promote the sale of oral contraceptive pill if the algorithm attached with pill.

A clear 3D teaching aid can be used to teach nursing and medical students.

Hand held algorithm is easy to carry& will use attractive color and pictures .Instructions are written clearly.

Oral contraceptive pill users can bring it in their purse and they can see it whenever they missed their pills.

Pilot study

In an in-house trial, different groups, from different background of 50 women in medical and nursing students, teachers, supporting staffs of UMS and house wives. Their impression is good. They got satisfaction; clarity and easy remembrance.

Women who are not well verse in English find the Malay version very useful to them. It is also a very supportive teaching tool for medical and nursing students.

STATISTICAL ANALYSIS

Fifty final year medical students were agreed to answer the multiple choice questions (MCQ) regarding missed contraceptive pills. Pretest and posttest MCQ were being answered by students. Post test MCQ was done after usage of hand held algorithm. Data analysis was done by using SPSS version 19.

Table (1) Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean	
Pair 1	PRETEST SCORES	7.22	50	1.475	.209	7.22 ±1.75
	POSTTEST SCORES	9.24	50	1.098	.155	9.24 ±1.098

Table (2) Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	PRETEST SCORES & POSTTEST SCORES	50	.219	.127

Table (3) Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	PRETEST SCORES - POSTTEST SCORES	-2.020	1.635	.231	-2.485	-1.555	-8.736	49	.000 P=<0.0001

1. Mean PRETEST SCORES 7.22 ±1.475
 POSTTEST SCORES 9.24 ±1.098

2. Mean Diff = 2.02±1.635

3. t = -8.736 at df 49, p =<0.0001

Post test results showed significantly higher values than the pretest score.

Table (4) Feed Back of 50 medical students after introducing handheld algorithym

	NO	YES
Device size is handy	6	44
Instructions are clear	8	42
Description of Different Scenarios are understandable	7	43
Facilitates understanding of different actions	4	46
Enhanced ability to remember	4	46
User friendly	3	47
Useful teaching aid	1	49
Practical for daily use	1	49

TABLE (5) Feed Back form for 50 Medical students after introducing handheld algorithm

After using the [HHD] go through this questionnaire and encircle the option that reflects your opinion.				
Your comments are highly appreciated.				
*** In your opinion ...				
			Number of student say yes	Number of students say yes
1	Device size is	Handy	44	Small/ big (Please identify)
2	Instructions how to use device are	Clear	42	Unclear
3	Statements that describe the different scenarios of missed pills are	understandable	43	Vague
4	Understanding the different actions in case of missed pills	is easier by using the device.	46	is easier by using the flow chart.
5	Your ability to remember different actions using the device is	Has been Enhanced	46	is Not changed.
6	Overall , the device usage is	User friendly	47	Complicated
7	You think the device is useful as teaching aid	yes	49	No

1. Any significant advantages in this device?

2. Suggestions for next generation of the device:

4. CONCLUSION

This handheld algorithm and 3D teaching aid are developed to fulfil the needful areas of teaching and learning of students and OC Pill users in medical field. The perceived immediate benefits need to be observed in relation to undergraduate medical education. The long-term effectiveness of using teaching model of hand held algorithm will be essential in interpersonal skill development of students in team-oriented, patient-centered clinical practices.

ACKNOWLEDGEMENT

Thanks are due to;

1. Professor Dr. D Kamarudin D Mudin, the dean of SPU, University Malaysia Sabah, for his constant supports on research, innovation and publication.
2. Associate Professor Dr Helen Lasimbang, head of department of reproductive health department, SPU, UMS, for her translation of Malay version and encouragement to conduct innovation.
3. Associate Professor Dr Daw Khin Saw Naing, head of department of public health and community medicine for her advice on statistical analysis and invaluable guidance.

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DISAGREEMENTS IN EFL: (IM)POLITENESS AND PRAGMATICS IN FOREIGN LANGUAGE LEARNING AND INSTRUCTION

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Abstract

This paper focuses on the shape of agreement and disagreement in English as a foreign language (EFL) discourse from an (im)politeness perspective that draws on Brown and Levinson's (1987) Politeness Theory, and frameworks of face aggravating language, rudeness and impoliteness. An analysis of (dis)agreement sequences as face attention (polite) or face damage (impolite) units was thus conducted in EFL exchanges. Learners' agreements and disagreements were observed to adopt the shape of jointly constructed floors of a collaborative nature, and jointly constructed floors of a combative condition respectively. Agreements were mainly tailored as attention to positive face or the desire to be approved of (Brown and Levinson, 1987) along with "non-pure face attention" (García-Pastor, 2007, 2008). Disagreements, on the other hand, were primarily cast as "non-pure face damage" (*ibid.*), and, to a lesser extent, damage to positive face and negative face, i.e., the desire to be unimpeded upon (Brown and Levinson, 1987). These findings were then compared to L1 English (dis)agreement production, resulting in a different use of mitigation devices in EFL discourse on the whole. Such use points out learners' need of greater awareness of the linguistic resources commonly employed for voicing (dis)agreement in the target language.

Keywords: EFL learning and instruction, (disa)greement, (im)politeness, face attention, face damage, pragmatic competence.

1. INTRODUCTION

The present study deals with the shape of agreement and disagreement sequences ensuing in interactions conducted in English as a foreign language (EFL) from an approach that is based on Brown and Levinson's Politeness Theory [1] and frameworks of face aggravating language, rudeness and impoliteness [2], [3], [4], [5], [6], [7], [8], [9], [10], [11]. (Im)politeness investigations on discourses in which English is not used as a first language are scant if balanced against (im)politeness research conducted on L1 English. Additionally, (im)politeness phenomena are part of a

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speaker's pragmatic competence [12], namely, his/her knowledge of the linguistic resources for conveying and interpreting communicative action and relational or interpersonal meanings in a specific language [13]. Helping learners develop their pragmatic competence in a second or foreign (L2/FL) language is essential for them to be able to master it fully. Therefore, this study has aimed to jointly contribute to both (im)politeness research and EFL learning and instruction concerned with the pragmatic aspects of the target language.

2. (IM)POLITENESS AND PRAGMATICS

In light of the above, this study can be situated in the context of studies on (im)politeness and interlanguage pragmatics research. First, politeness and impoliteness have been conceived as a continuum of linguistic behaviours and attitudes that define our social bonds across contexts, and are grounded in an individual's cognition [14], [15], [16], [17], [18], etc. A face-based view of (im)politeness has also been adopted in this paper, whereby politeness has been understood as intended face attention, and impoliteness has been considered intended face damage [2], [3], [4], [19].

Accordingly, agreement has been seen as face attention, since it involves the issuing of an opinion or belief attuned to the view expressed by another speaker, whilst disagreement has been seen as face damage, as it entails the expression of an opinion or belief contrary to that of another speaker [20]. Nevertheless, the possibility of agreement taking the form of face damage, e.g., in ironic or sarcastic instances in certain contexts, and disagreements adopting the shape of face attention, e.g., after self-deprecations, was not dismissed. In any case, both agreement and disagreement necessarily go beyond single turn units, thereby spreading over discourse. In addition, both agreement as face attention and disagreement as face damage in this paper have been established to orient to "positive face" or the desire to be approved of, and "negative face" or the desire to have freedom of action [1].

(Im)politeness is part of a speaker's pragmatic competence, since at a cognitive level it amounts to knowledge of appropriate and inappropriate behaviour in a specific communicative situation [12]. Pragmatic competence is usually defined in interlanguage pragmatics research as knowledge of the linguistic resources for conveying and interpreting communicative action and relational or interpersonal meanings across contexts in a specific language [13]. Therefore, pragmatics includes a pragmalinguistic component which refers to the linguistic substance of a language and a sociopragmatic component which alludes to its socio-cultural dimension [21].

From this standpoint, agreement and disagreement in the target language amount to learners' knowledge of a series of linguistic elements to perform and understand both types of communicative actions with different kinds of interlocutors in different communicative situations. Learners are expected to put such knowledge to use

in their interactions in the foreign language, despite the fact that conscious knowledge of pragmatics in the second or foreign language does not always entail learners' use of such knowledge in performance [22]. Therefore, an analysis of learner language as regards the production and understanding of these communicative acts may provide teachers with useful information they could use for awareness-raising of agreement and disagreement performance in the target language.

3. METHODS

According to the aim of this study, the following research questions (RQs) were formulated:

RQ1: What is the shape of agreement sequences in terms of face attention in learners' interactions in EFL?

RQ2: What is the shape of disagreement sequences in terms of face damage in learners' interactions in EFL?

In order to provide an answer to these questions, a series of exchanges between L1 Spanish learners in EFL were audio-recorded and transcribed (see Appendix for transcription symbols). These interactions amount to a total of approximately 20 hours of ongoing talk, and they consist of two-party conversations of 30 minutes duration each, in which four topics altogether were discussed: parents' influence in their children's life and future, abortion, the use of school uniforms, and euthanasia. These topics had already been observed to prompt agreement and disagreement among conversational participants. Exchanges in L1 English were employed after the analysis as a basis for comparison in (dis)agreement performance.

As regards our analysis, politeness and impoliteness strategies were identified first in the data following, to some extent, the politeness, aggravating language, rudeness, and impoliteness models previously mentioned. Politeness and impoliteness strategies yielded larger positive and negative face attention units, and positive and negative face damage units with agreement conveyed through the former, and disagreement issued through the latter. These face attention and face damage moves were also of a 'pure' and 'non-pure' nature with non-pure units consisting of face attention moves characterised by the presence of some face damage (non-pure face attention), and face damage units characterised by the presence of some face attention (non-pure face damage) [10], [11].

4. RESULTS

Learners' agreements and disagreements in EFL were observed to adopt the shape of jointly constructed floors [23], i.e., F2s, of a collaborative nature in the case of agreement, and of a combative condition in the case of disagreement. By contrast, agreements and disagreements in L1 English tend to adopt the form of individually

built floors, namely, F1s. Extracts (1) and (2) below exemplify these findings. The abbreviations L1 and L2 therein stand for learner 1 and learner 2.

Extract (1). Agreement in the form of a collaborative F2 between learners. Topic of discussion: Abortion.

- 1 L1: =and you (.) you have tooo (.) too (.) to be able too (.) take
2 your ↑choice and too (.) to build up your perso↑[nality
3 L2: mhum]=
4 L1: =and it's (.) I don't know (.) you can do it by yourself (.)
5 maybe they can uh help↑youu (.) but (.) only HELP
6 L2: mhum for give their o↑pinion
7 L1: give advice
8 L2: ye↑ah
9 L1: it's only that way
10 L2: but not to choose for them [...]

Extract (2). Disagreement in the form of a combative F2 between learners. Topic of discussion: Parents' influence in children's life and future.

- 1 L1: I don't (.) I don't think that (.) I don't ↑think that that teen-
2 ager] (.) that eighteen years-old teen↑ager (.) uuhm (.) take a
3 that ↑year to think about what he wants to do
4 L2: [well I disagree
5 L1: because of I think] (.) he's going to (.) to take that that year to
6 get ↑druunk (.) to have paarties (.) to [to liive a little bit
7 L2: well I mean] (.) that depends to you but I think you're going
8 to get destroyed also (.) [you're going to get drunk (.) you're
9 going to (.) you can say
10 L1: o↑k but you are (.) o↑k but you are] (.) in the university and
11 you can ↑study (.) but you can ↑do many things at the same
12 time (.) you can (.) having that uhm studdies and you caan
13 L2: well (.) I really disagree about that (.) [I think that the gap
14 L1: you can you can] (.) have ↑fun (.) and you can ↑study

In Extract 1, both learners agree on the idea that parents can help their children on the issue of abortion in the form of advice-giving, but never making a choice for them. In so doing, learners in this example co-construct agreement throughout the interaction, in such a way that they complete each other's turns in lines 6, 7, 8, 9, and 10, yielding a collaborative kind of floor.

On the other hand, learners in Extract 2 disagree on the idea that teenagers are mature enough to take advantage of a year off school in order to actually decide what they want to do with their lives. Therefore, for learner 1, parents should decide whether their teenage kids can leave school for some time, whereas for learner 2, the latter deserve this opportunity to be able to manage their time better, hence become more mature. Learners' disagreement in this example emerges at a structural level in the shape of a struggle for the floor, which, *inter alia*, can be observed in the different overlapping turns they produce (lines 4-5, 6-7, and 8-10). The result of this approach to the floor is a jointly built combative floor.

Agreement was also found to prevail over disagreement and to generally take the form of pure positive face attention as shown in Extract (3), albeit non-pure positive face attention, i.e., face attention which includes some face damage, was also encountered.

Extract (3). Agreement in the form of pure positive face attention between learners.
Topic of discussion: Parents' influence in children's life and future.

- 1 L2: = I think] I think that they can decide when they are children
2 for example (.) eeh (.) what school the parents want tooo (.)
3 to [bring
4 L1: bring]
5 L2: the children ooor (0.5) if they don't want thaat (.) they go
6 with otheer (.) other people (.) the friends=
7 L1: =the friends=
8 L2: =but when they are teenagers or they are (.) eeh (.) like us (.)
9 they can decide because (.) the life (.) you ma make your life
10 (.) and you decide (.) mmhum (.) thinking about yoor (.)
11 your [own i↑deas
12 L1: yourself you are]
13 L2: so the the (.) your parents don't (.) doesn't (.) don't know (.)
14 what do you think what do you want so (.) when you are
15 children (.) you they (.) they have the obligation to (.) to de-
16 cide mhm=
17 L1: =something=
18 L2: =something but when you aare (.) year (.) no (.) ↑older

In this example, both learners fully agree on the idea that parents have to decide for their children on the school they have to attend to when they are little. In so doing, they are orienting towards each other's positive faces, that is, their desire to be approved of, liked and understood mainly by means of the positive politeness strategy "give understanding, cooperation to the hearer" (lines 4, 7, 12, 17, 18) [1]. This

strategy emerges here in the form of repetitions and contributions to complete the previous speaker's turn, especially on the part of one of the learners (L1). In this way, learners in this example are also reciprocally asserting or presupposing knowledge of, and concern for, their needs and wants, thereby noticing and attending to one another.

Concerning disagreement, partial disagreement was predominant over full disagreement in the shape of non-pure face damage, that is, face damage which has a face attention component. However, disagreement tailored as pure positive and negative face damage was also observed. The following examples illustrate this.

Extract (4). Partial disagreement in the form of non-pure positive face damage between learners. Topic of discussion: Parents' influence in children's life and future.

- 1 L2: [...] I have the example with my sister (.) Iii (.) I for example
 2 I can tell her (.) *I don't like your friend tal because I have*
 3 *seen ↑her eh (.) with a boy in the in the tal (.) smoking' and*
 4 (.) I can (.) I want I want the best for my ↑sister (.) and if Iii
 5 (.) see that (.) I realise that (.) for example my sister is not (.)
 6 eeh (.) aas (.) mature (.) aas I would ↑like (.) and she perhaps
 7 iif (.) her friend (.) tells him (.) tells her (.) "this is very funny
 8 na na na na na" (.) she can't eeh (.) decide (.) by ↑herself (.)
 9 sheee
 10 L1: *yes you are (.) you are ↑free to say (.) to say her (.) to say to*
 11 *her (.) it's better go with the other group (.) but you (.) you*
 12 *are ↑not (.) the authority to say (.) noo (.) you (.) [broke*
 13 L2: noo]
 14 L1: up with=
 15 L2: =it's true (.) this is true [...]

In this example, learners partially disagree on the idea that teenagers have to decide for themselves as regards their groups of friends. Partial disagreement is conveyed here primarily through the structure "yes...but" (lines 10, 11). In (im)politeness terms, this is expressed by means of non-pure face damage with face damage observed through the "but" structure of the learner's (L1) turn, and face attention seen through the "yes" structure of her intervention. More specifically, learner 1 pays positive face considerations to learner 2 in the "yes" part of the unit by means of positive politeness strategies such as "notice, attend to the hearer" (line 10) [1]. However, in the "but" part of the unit, she damages the former's positive face by belittling or diminishing the importance of his actions, values and opinions at the same time that she hurts his negative face by increasing imposition weight on him,

and refusing such actions, values and opinions [10], [11] (García-Pastor, 2006, 2008). Finally, learner 2 concedes, so that consensus is reached.

Extract (5). Full disagreement in the form of pure positive face damage between learners. Topic of discussion: Abortion.

- 1 L2: [...] but if you're not mat (.) well (clicks tongue) (.) of co-
2 course (.) a as I have said (.) I'm in favour of abortion in in (.)
3 not in any ↑case but in most of the cases (.) but (.) I think that
4 befoore (.) if you're not sure of what you're going to ↑do. (.)
5 and yooou have the possibility of getting pregnant (.) if you're
6 not mature to have a ↑baby (.) also you (.) uuh (.) y didn't (.)
7 you're not mature (.) to have sex
8 L1: I I don't think so
9 L2: ↑I think so because (.) you are (.) taking the (.) the risk of
10 being ↑pregnant (.) [and
11 L1: but you are taking the risk
12 L2: you are]
13 L1: if don't uh (.) take protection

Learners in this extract bluntly disagree on the idea that women should avoid having sex if they do not want to get pregnant. Such disagreement is mostly salient in lines 8 and 9 through the opposition format “I don't think so/I think so”, which entails the use of positive face damage strategies like “convey dislike for, and disagreement with the hearer and close others”, and “belittle or diminish the importance of the hearer and the hearer's things, actions, values and opinions” [10], [11]. These strategies appear in combination with the negative face damage strategy “refuse H and H's things, actions, values and opinions” here [10], [11], whereby both learners hurt each other's negative faces or their desire to be unimpeded upon.

Finally, different mitigating devices were found in learners' agreements and disagreements, especially in the latter, when compared to L1 English (dis)agreement production. In particular, these mitigating elements refer to the use of turn initial “but”, the employment of non-conventional agreement tokens before disagreement, and voicing disagreement too soon. Extract (5) above illustrates these findings, since learner 2 disagrees with learner 1 using “no” (line 13) as opposed to other disagreement forms expected in L1 English such as “I disagree”. Additionally, this learner expresses partial disagreement through the non-conventional agreement token “It's true, this is true” in the foreign language (line 15). This expression, however, does reveal a conventional form of agreement production in L1 Peninsular Spanish.

5. CONCLUSIONS

The results of this study reveal learners' need of greater awareness of the linguistic resources commonly employed for producing agreement and disagreement in EFL, especially in the case of the latter. Therefore, a better understanding of how certain linguistic functions (e.g., agreeing and disagreeing) work in a second or foreign language may be helpful in this regard, so that more effective instructional treatments and designs can be implemented by teachers in the EFL classroom.

This study has thus aimed to have modestly contributed to (im)politeness research by gaining a more comprehensive picture of (im)politeness phenomena in general, and in EFL discourse in particular, and to second or foreign language learning and instruction concerned with the teaching and learning of the pragmatic aspects of the target language.

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Appendix

(1.5)	Pause in tenths of seconds.
(.)	Pause shorter than a tenth of second.
[]	Overlap.
=	Latching.
ooo	Sound stretch.
↑Oh	Rise in pitch.
YES	Louder volume.
<u>yes</u>	Stress.
(nods)	Actions, gestures and noises.
y'cd	Contraction.

“DIGITAL LEARNING SPACE” SOCIAL MEDIA AND EDUCATION: THE POSITIVE EFFECT OF FACEBOOK IN EDUCATION

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TSOUKLEIDI

Abstract

Over the past years ICT has been introduced and established in education. To this end social networks like Facebook and Twitter have also been employed, providing a completely new dimension in the educational process. Internet classes have formed a completely new learning environment in which student-student and teacher-student interaction is enhanced and knowledge is further disseminated. Facebook has been utilized to create a page, Digital Learning Space. It is a fully-featured page intended to manage course materials, share resources, perform assessments, publish articles and facilitate communication and interaction. The page is characterized by flexibility along with a variety of educational material and mind games to reinforce mental skills while the content is continuously enriched with new technologies. Furthermore, the page has established its own educational culture resulting in a vibrant community. Another important characteristic of the page is that it does not address exclusively students but a broader audience interested in education.

1. INTRODUCTION

It is widely accepted that Web-based communication technologies have been prevailing over the past decade in all aspects of human life conducive to altering human interaction and discourse. In the light of these tremendous changes in human communication and interaction education could not stay intact. On the other hand, the economic recession is an objective reality that penetrates the educational system and, as it has been realized, it is gradually conducive to the reduction of the education provided. The issue of free education is cancelled, the education, theoretically, will be the upper social classes privilege and, in this case, technology intervenes, which seems to change the aspect about the evolution of the educational conditions and the political reality. The teachers' action formulating software for teaching and syllabus organization for students contribute to knowledge and the

lower strata students' investigation, in which, through virtual learning, they acquire information and knowledge to cover deficiencies stemming from the insufficient educational system that seems to abandon them.

Internet classes, as an educational community act of care outside policy, formulate a learning environment by implementing various learning theories. There exist the granted learning objective and specifications as well as the performance control. Teaching seems to be placed in the forefront but through another interactive communication, within a learning environment in which the investigatory learning provokes the student to further his knowledge.

It is observed that new technologies, with which young learners are familiarized, are utilized but there is a shift from mere peregrination and playing to systematic study so that new information is transformed to knowledge, syllabus is grouped, the cognitive content is codified and cognitive units are organized so that the syllabus content to be examined is eventually registered.

Additionally, the economic recession, which is being currently experienced, can function as a challenge for technology, to process educational and political reality data and construct, within the students' off-school time, a flexible environment of knowledge in which educational principles will be integrated and knowledge will be constructed by taking into consideration the learning scenarios as well as the virtual world in which the students should work to acquire knowledge at the very moment when they and their families are not able to support expenditures for any tutorial training.

It is important that, during an economic recession period, different specializations of teachers and other computer scientists collaborate in order to form a learning environment based on the educational books within an action plan in which the objective is a supplementary qualitative training. The increasing number of websites provides the student public the opportunity of choice. The educational work provided is therefore evaluated by students who choose or reject and that is where the fascination or challenge for the scientific force being engaged with new technologies related to teaching subjects and mainly the students' preparation for the University entrance examinations lays.

According to the social learning theory learning occurs in social contexts and is influenced and empowered by social interaction. In this framework, active participation is encouraged along with students' self-actualization and self-regulation. Classroom can be characterized as small scale learning communities where students, forming separate groups of learners, share a common interest in the learning process. They learn both through autonomous and collaborative work. In

the case of collaborative work a supportive atmosphere is developed while success among members of the same group is further encouraged.

Education is a domain in which there is a continuous pursuit of new ideas and innovations to be implemented to meet the students' ongoing educational needs and requirements. On the other hand, teachers seek for new ways to make the educational process more interesting, vivid and student-targeted. Besides, in the multicultural and pluralistic societies of the 21st century there is obviously an increasing need for civic education and establishment of democratic principles necessary both in the classroom micro-society and in the broader social structures. New technologies have considerably contributed to this end over the past years through the use of Internet platforms such as You Tube and social networks like Facebook or Twitter.

Up until now, the theoretical model of technology function with educational content orientated towards tertiary education has been developed. It is important to mention that if the basic issue is the educational carriers' ideology wishing to contribute to the lower strata tutorial training to succeed in tertiary education, the other issue is tied to the organization of internet cognitive areas to become attractive for young people that is students. It is obvious that Greek school students have been taught through a frontal teaching model, a system of imposed discipline and examination. Therefore, the system of tutorial training through technology should take into consideration the educational system structures and how the trainee functions. At the beginning of the economic recession, students supplemented their typical school education with tutorial training at home. Therefore, the lack of possibility regarding tutorial training at home, the limited number of teachers at school, at the lower social strata students' expense, should be substituted by a dynamic form of knowledge provision in various cognitive objects through the interactive cognitive areas. In this case, the interactive cognitive areas combine scientific knowledge provision tied to validity and reliability as well as psychological and pedagogical principles to activate the students' motives and interests. The fact that the young person must function as a student on the internet that is to communicate with a means, to converse with, to process cognitive fields, to familiarize with concepts and to co-formulate along with the "invisible" educational carrier the learning procedure should not be overlooked.

Within this framework, the student should feel assisted in all stages and, furthermore, a general program can be adjusted to his own needs. In particular, according to the means of teaching, a tutorial type software function is characterized by: 1) content structure, 2) interaction forms, 3) organizational plan,

4) cognitive object formulation, 5) concordance between the student software and the subjects' content to be examined in entrance examinations to tertiary education and 6) goals setting based on age.

In particular, school book units which are compulsory to enter to tertiary education are utilized and emphasis is placed on a flexible form of presentation in which images or smart dialogues intervene so that the communicative model through visualization and smart inter-reaction is reinforced. Interaction between student and educational material is done through a communicative system in which the student answers specific questions and gets the impression that the teacher stands opposite him monitoring, making stressing and is with him throughout the whole procedure of his study. Thus, even though there is no personal contact, it is substituted by a communicative model with all the characteristics of psychological support and reinforcement.

The basic element of organizing the syllabus that is the categorization of everything to be studied is the connection between theory with specific exercises and the corresponding repetitive tests so that the student trusts the study procedure through a particular software. It is observed that the cognitive object, as it is exclusively preordained only for the University entrance examinations, does not contain supplementary knowledge about the objects but the determined syllabus foreseen by the Ministry of Education for the Lyceum graduates' entrance examinations.

It is important for the syllabus and software planning that the students' age is taken into consideration that is their special interests, so that the discourse, structure and content are adjusted to the teenagers' special characteristics. The Greek students are familiarized with new technology, the communication with their peers is carried out through the social networks; therefore, they have already schematized a communicative code that seems to be utilized in the content of the internet – tutorial classes, as well.

The educational policy, as a composition of the procedure according to the more recent tendencies, is connected to the e-learning education by developing a dialogue with the tendencies in society, economy and politics and through these towards “pre-cognizance” for the delinquent individuals' incorporation into the social whole without the stigma of social exclusion. The e-learning model is based on four constructing pivots – stages: a) the trainers and trainees' activation, b) the organization of programs through the computer with different themes, c) the development of educational aims of a realistic content and d) the implementation of an educational and entrepreneurial program.

Another point of technology-related consideration is that through modern technologies delinquent individuals are also familiarized with the content of knowledge necessary for them in order to take over entrepreneurial initiatives on a professional level. On this level, modern technologies operate as an open window to the world creating “opportunities” for the people that affect their living and social surroundings.

The special programs designated for computer courses are regarded as necessary in order to be utilized as an opening towards social networks by the individuals themselves, as a communication model with other groups of the population. At the same time, they can operate as an interactive program of acquiring knowledge and skills for the taking over of entrepreneurial works. At this point, it is observed that the use of new technologies by individuals, after their delinquent behavior, is connected to the management of three fields: a) time, b) opportunities according to their age and c) broader professional opportunities management.

2. FACEBOOK AND ITS POSSIBILITIES

Facebook is a social interaction and communication platform which was developed in 2004 by Mark Zuckerberg, a Harvard University student. Its primary aim was to bring together students to communicate. Later on it expanded to schools around Boston and began accepting memberships from students and graduates across the United States. In the course of time Facebook has been widely used by billions of people around the world for communication, sharing information, exchanging viewpoints and opinions.

Social networks are a whole new reality, mainly, in the young’s life. It is about active message interaction connections to broader population groups. Social networks are the young’s modern, brief “postman” through which they directly or indirectly address different groups of young. The social network is tied to globalization since messages, facts and happenings are interrelated, formulated through formal or informal interactive relationships in which the communicative environment is transformed as long as the users’ range is expanded.

A form of participation policy seems to be formulated which is diversified from the ordinary movement actions or other forms of participation. Therefore, the standpoint about the young’s non political attitude is cancelled by an idiosyncratic integration into a political activity in which the young express themselves along with the formulation of viewpoints and selectively end up to movement actions.

Such phenomena were observed in the political young population of Tunisia, Egypt etc. as well as of Greece where in December 2008 juvenile groups created a reaction and disapproval core against the capitalist methods of governing while at the same time they disapproved the adults' passive attitude. Thus, the new generation seems to have a different political role and word which is formed, formulated and spread throughout new technologies.

Furthermore, the dynamics of dialogue formulated through new technologies is pushed forward. The students-citizens act as citizens by monitoring the educational system, subverting the prescribed teachers' authoritative tensions, functioning within a framework for the creation of a democratic educational community in which students and teachers should develop a dialogue while teachers acknowledge students' rights since the information is disseminated with new technologies, the educational issues are made well-known and the past submission relationships do no longer exist.

High school and university students are familiarized with new technology which is used by them in every day communication. The school environment becomes visible since students exchange viewpoints about school organization along with the teachers' role and attitude. Avant-garde forms of contact and view's exchange broaden the young's communication. Even though the issue of limited vocabulary is projected, the words seem to acquire a special content and refer to expanded images actually moving beyond the limited expressional symbol, the word.

It is observed that they exchange photographs and, through a daily contact, comment and make situations or incidents apropos. The surrounding means within which they move are interweaved so that they are presented as a united whole. School, family and the broader social relationships are the content of everyday communication.

Over the past years Facebook has become as necessary to a large number of people as the use of computer for classroom engagement in learning in all the educational grades. It is considered the mostly used online service globally because it has gone beyond the traditional networking service and has become a "social utility" as it has grown in size and scope. The particular social network has been evolved to a system for communicating to others the interests, passions, pleasures and business of individuals. It is a means to "show off" the self in public conducive to creating, sustaining and enriching connections through this type of communication (Allen, 2012).

According to researches it has been found that Facebook provides educational characteristics such as interaction, collaboration, active participation, information,

resource sharing and critical thinking. Furthermore, it meets students' demands for connectivity along with interaction and socio-experiential learning opportunities in their learning contexts while it provides them with autonomy (Kassem, 2013).

A research conducted by a Belgian university in 2005 made obvious that the use of social networks (Facebook, twitter) helped the students of Junior and Senior High Schools to adapt themselves to the school demands and motivated the weak students to take action in the participation procedure. These social sites acquired a form of educational interest and were transformed into educational platforms. The results of the research were encouraging because they reversed the notion of the social networks as means of entertainment and provided a teaching perspective through an educational platform, without specialized software. In these sites, in which only the trainees had access, they could exchange opinions, upload educational material, practice on the existing educational material, get informed about things in progress, attend the classes missed and get advise from their teachers. The teacher's role was guiding and counseling, while both formal and not formal learning were combined.

The private groups created in the specific social network are a good option for educational purposes. These groups contain limited capability for exchanging documents, organizing and managing events. They are also a shared space for collective discussion and dissemination of information and knowledge. Thus, group activity can be kept separate. In this respect, private groups can be used to promote attention to other services which are important for assignments or assistance to students.

Traditional classroom boundaries can be transcended as formal learning can be promoted off the classroom environment by transferring initiatives from teacher to learners. In this respect it has been argued that the relationships between teachers and students can be improved and strengthened as discussion is facilitated on the network and by extent in class. Besides the learning communities that are created work together towards common goals.

Facebook can be perceived as a means to promote global-learning goals along with civic education ideals to generate adept and democratic citizens in the world society. In the light of this consideration it has been evolved to a platform of debate on current academic and global issues and an area of continuous deliberation, contributing in this manner to internal democratization and the formation of political culture and collective identities. In addition, social subjects can be organized and immobilized to take collective action towards a common goal. It can

also be argued that, in terms of pluralism, people are able to communicate many different ideas and standpoints as well as understand an array of complex issues and views which may be opposing to their cast of mind. Thus, they are reinforced in addressing different public opinions and become tolerant in handling them (Kassem, 2013).

Besides social and negotiation skills can be taught via Facebook in terms of safety, politeness and effective use of the network. A classroom page could be developed in which students are encouraged to writing workshops with peer review and teacher oversight. Online participation is a good means for shy and introvert students to actively participate and socialize through classroom tasks and projects. As regards classroom organization and management teachers should encourage students to “like” any important updates so that they know that learners got the message instead of emailing which could be ignored.

3. CONSIDERATIONS ON FACEBOOK APPLICATION IN EDUCATION

As it has been discussed above, there is a multitude of Facebook-related beneficial applications. Yet, the potential pitfalls stemming from this form of Web communication should also be part of our concern. It should be kept in mind that many people – Facebook users might be prone to being attached to the virtual world and gradually detached from the real one, turning out to be totally addicted to it.

There is also potential risk of invasion of privacy and unauthorized disclosure of personal information. Another issue of concern which seems to have been increasing lately is cyber-bullying and virtual harassment which is addressed primarily to children and adolescents. As a result a series of psychological disorders are generated, which can seriously affect the individuals’ course of life.

As regards formal university instruction, a number of instructors are reluctant in adopting it in the educational procedure, either because they have not been convinced about the range of opportunities provided or because they do not feel comfortable in integrating it into their traditional mode of instruction. A number of them also claim that this form of instruction does not fulfill the challenge of higher education which is concentrated on creating reading culture and fostering the development and cultivation of skills related to critical reading and thinking (Allen, 2012).

Even though Facebook can be used as a pedagogical tool for content creation and group-collaborative investigation and information discovery and dissemination university students are reluctant in accepting older adults – faculty members as friends. This happens because they feel that their privacy is intruded due to the established social norms and stereotypes that could generate embarrassment to both sides. Besides, instructors can not be addressed by students as Facebook friends due to the differentiation of their roles (Bruneel et al., 2013).

Up until now there have been established some regulations by Facebook administrators that enable users keep their information private. Nevertheless, in case the platform goes public in the future this will not be feasible and bring thousands of users before the dilemma of choosing their privacy against their favorite social network as users will not be able to have complete control over their personal information.

4. THE CREATION AND ADVANTAGES OF A FACEBOOK PAGE FOR EDUCATIONAL PURPOSES

Initially, a common decision was taken to associate our paper with ICT in Education. It is a general concept as the term ICT in Education includes a wide range of functions. More analytically, training can be elaborated through social media such as Facebook, Twitter, Wikipedia and You Tube.

Facebook was chosen as an educational medium because, to our beliefs, it is potentially a useful tool in the area of education as it allows an open dialogue between students and pupils within a familiar setting. Facebook provides an alternative solution for students who dare to articulate their thoughts and questions in-and-out of classroom. In this respect students are allowed to gather their thoughts, to state them in writing and subsequently to express them.

Besides, in the course of time Facebook has been widely used by billions of people around the world for communication, sharing information, exchanging viewpoints and opinions. In particular, both pupils and students have already been familiarized with platforms in which one can find incorporated videos, pictures, URL addresses and a variety of texts. Given the above mentioned a Facebook page was generated in which training takes place, information is provided and solutions are given to pupils, students and teachers' questions.

Our objective has multiple facets because our aim is to come closer to people of any age. Another basic reason is to come closer to their concerns and intellectual pursuits as well as to the new needs generated by the current social reality. Besides, the sensitization of those people who are indifferent and distant from the new facts generated by society intensely and rapidly is sought after. On the other hand, there is an opportunity for dialogue and thoughts transfer so that we are able to safely reach truth in any issue.

According to our beliefs this endeavor will be fruitful in the long run because it will be the stimulus for many individuals interested in visiting our page in which they will be faced with the opportunity to be informed, exchange viewpoints and, more generally, to further their cognitive domain.

This choice is deemed efficient as the idea that education changes in form and is adapted to new technologies will be disseminated. Of course, the fact that the expected goal-setting mentioned above should not be overlooked. Finally, the moral satisfaction received by its appeal to the audience should also be emphasized.

Facebook represents a potentially useful tool in educational contexts. It allows for both an asynchronous and synchronous open dialogue via a familiar and regularly accessed medium and it supports the integration of multimodal content such as student-created photographs, videos and URLs to other texts in a platform that many students are already familiar with. Furthermore, it allows students to ask questions of minor importance that they might not otherwise feel motivated to ask by visiting a professor in person during office hours. It also allows students to manage their own privacy settings and often work with the privacy settings they have already established as registered users. Facebook is one alternative means for shier students to be able to voice their thoughts in and outside of the classroom. It allows students to collect their thoughts and articulate them in writing before committing to their expression. Moreover, the level of informality typical to Facebook can also aid students in self-expression and encourage more frequent student-instructor and student-student communication. At the same time, Towner and Munoz note that this informality may actually drive many educators and students away from using Facebook for educational purposes.

Additionally, the privacy settings of Facebook can be difficult to understand and manage, leaving some potential users - particularly females and older students - uncomfortable about the level of privacy and safety provided to them. Furthermore, familiarity and comfortability with Facebook are often divided by socio-economic class, with students whose parents obtained a college degree, or at least having attended college for a span of time, being more likely to already be active users. Instructors ought to seriously consider and respect these hesitancies and refrain

from “forcing” Facebook on their students for academic purposes. Instructors also ought to consider that rendering Facebook optional, but continuing to provide content through it to students who elect to use it, places an unfair burden on hesitant students, who then are forced to choose between using a technology they are uncomfortable with and participating fully in the course. A related limitation, particularly at the level of K-12 schooling, is the distrust (and in some cases, outright disallowance) of the use of Facebook in formal classroom settings in many educational jurisdictions.

However, this hesitancy towards Facebook use is continually diminishing in the United States, as the Pew Internet & American Life Project’s annual report for 2012 shows that the likelihood of a person to be a registered Facebook user only fluctuates by 13 percent between different levels of educational attainment, 9 percent between urban, suburban, and rural users and only 5 percent between different household income brackets. The largest gap occurs between age brackets, with 86 percent of 18 to 29-year-olds reported as registered users as opposed to only 35 percent of 65-and-up-year-old users.

The page is a means of expression, promotion, advice and awareness in education-related new media technology. Ways and means, which vary in content, are introduced as they are essential tools for achieving our goal. A culture around the use of new technologies in education is being created. Education concerns someone as a unit for his personal development or groups of people such as a team, a student community or an organization.

The way in which we achieve this objective is by posting images and videos, published articles and other relevant pages. Also the publication technological tools such as the interactive boards, educational platforms which are tools both for students and teachers, as well as intelligence and observation games are some of the instruments which are used to achieve our goal. The page is a community and is constantly being enriched. The body of the page includes a Community of information and people and is based on information offered by both managers and its members. Guest reviews, communication with members through messages and the impact of publications assist the functionality of the page. The members of the page together with the managers share experiences, information and relevant knowledge.

The beginning of the page came with the publication of images. The goal of the page which concerns the role of Information and Communications Technology (ICT) in education is introduced by images. The design is carried out with the

programs of Adobe, Illustrator and Photoshop. Through images the page content is promoted to targeted audiences who are encouraged to visit the page. Through the use of images and pictures the new era is portrayed and the issue of the page is raised, provided that Facebook can be a training tool.

We describe the advantages of an online participation as it shares information as well as the need for a renewed vision of life into the digital world of communication and networking. The goals and functions of ICT as well as the way in which the educational services can be transformed to join the new era of digital technology are introduced through images. Furthermore, the members of a student community can be transformed from passive users to active authors of information and content. We show through the page that Facebook can overcome the walls and the limits of a class and become an educational community for exchange of knowledge and information. Facebook has already been used by billions of people around the world for communication, sharing information, exchanging viewpoints and opinions.

Through the Facebook page other means of technology, especially those of educational nature, are used, such as the audiovisual publishing of educational content videos via the YouTube website. This tactic supports the aim of the Facebook page with the publication of already published relevant opinions or articles on the educational action of Facebook. There is cooperation and interaction between Facebook and YouTube. On YouTube a film size relevant to Facebook can be uploaded and on Facebook one can post a video. In the case of educational messages, the publication of training courses with a goal to activate this mode of supply information and knowledge to such use by students and teachers is introduced. Becoming more comfortable with digital media is an advantage not only for students, hoping to compete in the global marketplace, but also for teachers, looking to expand their own roles as educators and participants in the Information Age.

Similar to YouTube, TeacherTube is a video file-sharing site where educators are encouraged to share lesson plans, tips and other instruction-based films. Professionals can build a digital portfolio to share with peers across the world. As they do this, the lessons they teach gradually address a wider audience, including areas that may not have equal access to updated content and materials and foster a sense of belonging to a community among those in education.

Through this the presentation of the Facebook page in the classroom can help students engage in an exploration-based approach to learning in which questions are encouraged over rote memorization of theories and rules. We also present several revered academic institutions, which have made agreements with YouTube. This way they are allowed to set up channels or individualized sites run by the schools

on You Tube.com, that include video clips made by the faculty staff and students as well as general information about the school.

The publications related to the student community's behavior and perception in the use of new technologies illustrate the positive attitude of the students in the use of technology but also the best results in the learning performance. The publication of this page portrays the need to strengthen the teaching – learning process in the natural classrooms through the use of media technology inside a classroom. Publications concerned with new educational approaches through the use of new technologies and the Internet reinforce the purpose of the page toward cooperation and the exchange of views of action about Facebook as a training tool. Through the publications we elevate the obvious interest for use of digital media and technology in education.

The publication of other web pages with relevant content helps on vigilance for technological awareness and use of the Internet and of social networking in education. Each site has its personal goal and strengthens the wider aim of our group page. Web pages aim at introducing digital media of education and educational tools while groups stand ready to support the introduction of technology in education and our page. A member of the society, in general, supports the introduction of technology in education reinforcing this goal. In the Facebook page interaction and cooperation can be developed and values can be promoted through its action.

So the attitudes and perceptions of students are examined along with their considerations with regard to the use of new technologies for educational purposes, more generally, in the context of lifelong learning. It is clearly a need for a redefinition of learning methods and the learning process, in general, as the need for adjustment to the new circumstances emerges. Thereafter the teacher is provided with the picture of the students' needs and methodological information can be used for further study in the context of upgrading the teaching act.

Carefully selected articles published in conference papers with judges can be posted in order to maintain an academic page profile with visitors documented and proper knowledge. The purpose of the texts is to examine attitudes and perceptions for the educational practice and to contribute to the upgrading of teaching assignments. Student-driven or student and teacher-driven the texts provide comprehensive insight into the use of new technologies in educational practice and enhance the learning process. Special emphasis is given to the way in which students learn. So, we are trying to approach the concept of lifelong learning, as the purpose of

education is to train the student in the way that enables him to learn and to lead himself to a process in which he discovers knowledge and reinforces himself on the basic.

New technologies can contribute as a catalyst in this process, since You Tube, Internet and social networks are a familiar environment for the user that can be changed from an arcade into a field of learning and interaction. The instruments which can be used in vocational training with a view to the introduction of digital technology in education can be seen in the page. This is useful both for teachers and students. This page is a place for all education and exchange of information and knowledge.

Our Facebook page is also presented in an activated way as there is a need for Information and Communication Technology (ICT) in autism. As students with autistic Spectrum disorders (ASD) usually have problems with social interaction, communication, good organizational and motor skills 'S present is activated and there is a range of very useful tools for a person with autism like the Ipads for autism, Touch Screens, Augmentative Communication Devices often known as "VOCAs" (Voice Output Communication Aids). The usefulness of ICT related to autism is elevated and the rest of the world becomes aware of the others' needs and helps the inspiration of new ideas in order to offer solidarity.

One of the tools which is present on the page is the interactive board which makes teaching more "live". Indicating the advantages of the application is an essential tool in the academic field of education. The use of an interactive board is necessary for students and teachers and the acquaintance with technological tools is common to all; from the members of an academic community to someone who is interested in the applications of technology in various areas of life such as education. Presentation tools are increasing in popularity for educators who want to share ideas and information with large or small groups of students. Interactive applications are in demand for educators who want to involve their students in learning with technology.

There are many educational platforms on the Internet. Some of these have been posted on the page. Open source software enhances education and cooperation. Their functions do not require any special skills and are easy to install and use. Through these platforms a wide range of tools are available to the user, teacher or student, for the management, organization and promotion of the educational act such as calendar, documents, forums, on-line courses, etc. Through these platforms a rich community on collective learning has been created. It is a global developmental project designed to support a social constructionist framework of education.

Moreover, by posting other web pages and with the promotion of educational platforms a comprehensive education management system and a collaborative learning environment are presented. These are innovative productivity tools which connect students and educators with important information crucial to student success while school administrators' real-time access to data for better tracking of institutional effectiveness is allowed. Educators, students and school administrators can manage courses, build e-Portfolios, create websites, join e-Communities and assess school work with rubrics and much more from a single location. Through each platform a community with people from all over the world who are passionate about learning and education is presented. Besides, each platform is adapted to individual needs and wishes concerning either individuals or groups, state academic community or to the needs of a body with administrative academic action.

Each member of the page can be either a natural person or an organization. For this reason tools for personal use are provided such as instant access to an intuitive environment with a variety of tools designed to streamline teaching, learning, collaboration and self-publishing tools. In the case of organization and school administration one can find the necessary tools to monitor the students' progress and activities, educators and departments by enabling easy measurement of learning outcomes according to various standards.

5. DIGITAL LEARNING SPACE

Digital Learning Space is a fully-featured page for managing course materials, sharing resources, performing assessments, publishing articles, facilitating communication and interaction through classroom portals. It is a flexible environment offering a powerful source for authentic assessment. We believe that through the page we learn better as we "see" how things work. An image, a visual tutorial is the best way to create a visual image in the minds of the page members. Not only does the visual dimension help to understand concepts better, but it also stimulates and encourages self learning. Educational videos, sites and games are possibly some of the most effective learning tools.

The presentation of mind games helps members either in their personal use and development or as inspirational tools throughout the educational activity. Memory, movement, emotions, visual perception, creativity and persuasion are just a few of the mental skills explored through mind games which are important skills for any academic member of the educational society. By posting some mind games we offer members the opportunity to test their mental skills and to take advantage of their

brain's natural tendencies. Game players are observed to regularly exhibit persistence, risk-taking, attention to detail and problem solving skills which are all behaviors that ideally would be regularly demonstrated in school. Through mind games the user has freedom to experiment, freedom of effort and freedom to fail.

The page is constantly updated by administrators and members and is a vibrant community with its own educational culture. The content is enriched with new technologies. The page attracts new members whose common purpose is the use of technology in education.

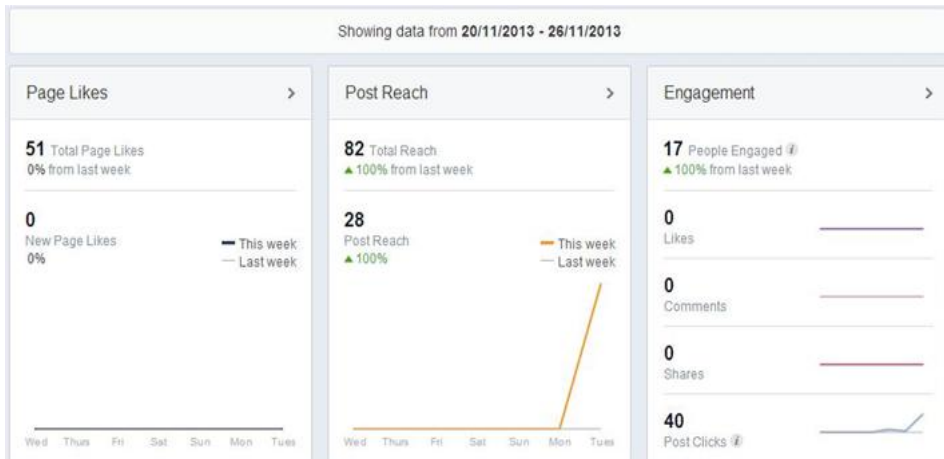
Advertising in the first phase is free. We tried to advertise the page through our Facebook pages in universities, educational institutions, research centers and, more generally, in education-related areas. This was done on the basis of an initial view to set up a community of individuals who follow the page to learn and to interact with each other in the first phase. So, we have tried to promote the page as much as possible as an educational material provider. Advertising was not supported financially although there was such an opportunity through Facebook. This is because we lack an initial capital.

After the completion of a sufficient number of members we aim to provide advertising through the page. Research Centers, private and general education providers will be able to advertise the material and services, while, at the same time, it will be changed to a platform to find advisory services related to education as there is no such equivalent in the Greek market.

The page does not necessarily address a narrow public education audience but it addresses, in broader terms, common people who are interested in education and want their active participation in the process of lifelong learning. The first advertising efforts made proved our objectives, as the number of members was increased and the foundations were laid for upgrading the page and redefining the objectives.

6. STATISTICS AND ANALYSIS

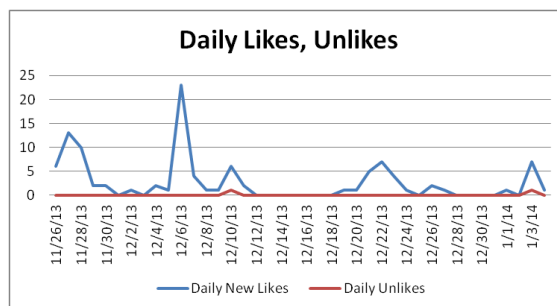
Overview

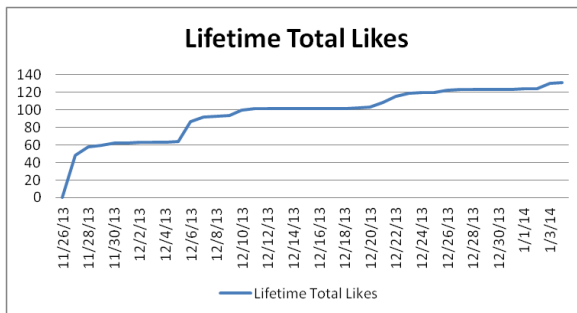


Since we first built the page the overview is being changing all the time. As we can see we have almost tripled our Page Likes from 51 Total Likes (20/11/2013) to 131 Total Likes (01/04/2014) in a period of 1.5 months only. So has the Reach. It has been almost tripled from 82 Total Reach (20/11/2013) to 220 Total Reach (01/04/2014) in the same period. As for the Engagement – which is the unique number of people who liked, commented, shared or clicked on our posts – it is about the same every week, there is no noticeable change.

In the following paragraphs we will analyze each category separately and more thoroughly.

Likes





Our page's Total Likes have been ascending through time and they are still becoming more and more day by day. This means that more and more people visit our page, read our uploads and they even

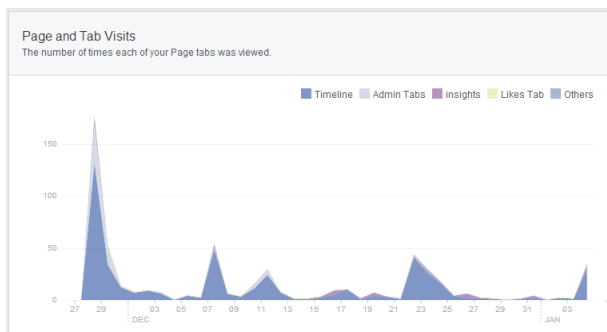
ask for more about interactive education and ways to use or exploit it. Also many people said that we gave them a boost into playing mind or hidden object games in order to coach their memory and improve their observability.

As we can see there were days that we didn't have any like at all and there were days that we had our most likes. That of course depends on the frequency people sign in to Facebook every day and during the day. We will see later on that our page excites the curiosity of people from all ages – even the older 65+ , not only the younger ones.

Through those 1.5 months we only had two unlikes which mean that people like our page and read our page. Something like that makes us to upload more material responding to the people's need for knowledge and ways of education for all ages.

In the next picture you can see the number of people who liked our Page and the most common places where they can like our Page. It is easy to realize that most of them like our Page from inside the Page Profile, followed by the rest of the places.

7. VISITS



There is a change in the number of times each of our page tabs was viewed depending on the day our fan signed in our Page. The weekend and the first 2 days of the week (that is Monday, Tuesday) they have viewed more than the rest of the days. That means that most of the people engage with Facebook during the weekend when they rest from a tired week at work.

8.5 Posts

Όλες οι δημοσιευμένες αναρτήσεις
7 Οκτωβρίου 2013 έως 4 Ιανουαρίου 2014

Δημοσιευμένα	Δημοσίευση	Τύπος	Στοιχείση	Αλληλεπίδραση	Αλληλεπίδραση	Προώθηση
27/11/2013 13:22 π.μ.	THE STUDENT COMMUNITY ATTITUDES AND PERCEPTIONS ON THE USE OF NEW			160	1 7	
27/11/2013 10:55 π.μ.	NEW TECHNOLOGIES, INTERNET AND LIFELONG LEARNING: NEW TEACHING			102	3 6	
21/12/2013 10:23 π.μ.	Η διδακτική αξιοποίηση του Scratch για την ενότητα "Προγραμματίζω τον Υπολογιστή".			95	9 8	
26/11/2013 11:12 π.μ.	Φωτογραφίες Χρονολογίου			95	10 6	
27/11/2013 4:40 π.μ.	let's play and improve our observability			90	15 16	
25/11/2013 10:34 π.μ.	Φωτογραφίες Χρονολογίου			79	9 6	
27/11/2013 4:43 π.μ.	Mind games help to coach your memory but also help in better assimilation of knowledge			77	12 9	
22/12/2013 11:27 π.μ.	Λογισμικό Χωροχρόνος!! για να κάνουμε το μάθημα της ιστορίας πιο ευχάριστο και			76	4 4	
4/12/2013 8:15 π.μ.	http://www.youtube.com/watch?v=bdnGQVDe1r0&feature=c4-overview-			75	4 6	
10/12/2013 1:29 π.μ.	Biomimicry is the imitation of the models, systems, and elements of nature for the purpose of solving			69	6 10	
22/12/2013 11:24 π.μ.	Προς χρήση εκπαιδευτικών και μαθητών!!			67	3 6	
4/12/2013 8:20 π.μ.	http://www.youtube.com/watch?v=LXGEGSHq2ss			67	1 10	

Most of our upload material has been viewed and liked which means people like our idea about making Facebook a tool for education and boost us to upload more materials and ideas. We are hoping that someday Facebook will be a global learning portal easy and free to access by everyone and that's what we are trying to make people see through our Page. This gives us a push to continue to upload material every day!!

8. CONCLUSIONS

It can be argued that Facebook has been the communication breakthrough of the past years. Millions of people worldwide have a profile page on the platform where they can post comments, photos, videos or any other links as a way to share news and information with their friends.

It is observed that virtual teaching is being evolved generating new areas of consideration and research as the form of typical school is cancelled since, due to economic recession, the field of educational preparation and guidance is being shrunk especially that of the lower strata that had a special need to cover their educational deficiencies as well as cultural ones provided that social inequality generates inequality regarding individual prosperity as the educational system in Greece, over the past years, had created access-to-prosperity conditions even for the lower strata.

The educational material provided through new technologies is actually resources enabling the individual to form its choices and preferences beyond limitations and exclusions imposed by the social classes system.

The young's familiarization with technology creates a new dynamic environment of social control. Expanded juvenile groups are informed about various issues and situations, compare, evaluate and judge. Facts and situations become visible and perceivable. If, until now, the educational community was theoretically "invisible" and reveled in its privileges of recognition and non disapproval, it seems that now this same educational community should create those prerequisites conducive to its acknowledgement and acceptance by the student population. High school and university students seem to have become mature through new technologies towards a direction of their participation in social environments in which they move. Besides, they activate themselves as citizens within the school environment the structure, content and educational carriers of which they evaluate. The fact that high school and university students, through social networks, comment on issues about the school environment, on a daily basis, brings discussion upon critical discourse

and political thinking since they place themselves in political issues and exercise social control over the educational environment the functionality and effectiveness of which is related to their own future, as well, during a period of economic recession, in particular.

During the current economic conditions experienced by the Greek society its choices are readjusted on the basis of the new data. The investment of the previous period in familiarizing with new technology appears to have a positive function towards another level in which even lower strata students, being familiarized with new technology, readjust their educational choices provided so that they substitute their personal tutorial training with the corresponding internet one. It is about a model in which internet spaces are utilized as informative fields in which the student prepares about the examinations through suitable questions and guidance. Interactive participation is based on the student's presence in all levels starting from asking questions up to the studying of the corresponding theoretical text and to the solving of the suggested issues to be investigated. It is observed that these websites, from pedagogical respect, follow the pedagogical principles of subject reinforcement and its gradual access to scaled exercises and problems. The student seems to be assisted by the monitoring teachers since, psychologically speaking, teachers communicate with their students in an off-school environment where the impersonal student has a name and the teacher communicates with him even for more personal matters.

As regards University students, new technologies, in general, and Facebook, in particular, are perceived as a positive means for student settlement into life at University, especially in relation to social events. Many people argue that it is a novel experience in the sense that traditional instruction is interweaved with innovative strategies and techniques providing even more advantages of interaction in a setting that is "natural" for younger generations.

Furthermore, a number of college instructors have Facebook accounts and claim that it is an important contribution to social and academic interaction as it provides the opportunity of exchanging academic information through uploading video and podcasts in classroom or for assignments. They can also have access to the digital learning styles of students facilitating in this manner student-to-student collaboration and provide innovative ways to involve students in their subject matter (Buzzetto-More, 2012).

As social scientists have argued, joining and being involved in groups has a positive and reinforcing impact on health and well-being while the educational

achievements rise when learners have this form of social life. Besides, memberships in social networks, when applied wisely, can help teach learners tolerance, acceptance and collaboration.

It is also noteworthy that a traditional part of humanism appears to be combined with a modern part of technology. Humanism is realized through individuals' participation that expands the lower strata students' cognitive fields and creates prerequisites of their attuning with the new social, political and economic conditions. What is certain is that these primary initiatives will undergo coordination and modernization during the following years so that discussion can be made over a "technological educational humanism" since lower social strata student categories that will substitute deficiencies and their social class decreased opportunities, through the expanded knowledge field, will be widespread, and this is an issue that will perhaps enhance social classes subversions.

It is important that even though, up until now, discussion was made about new technologies in contrast to humanism by attributing models of consideration projecting the cancellation of humanistic ideas through the implementation of technology, in the model being presented humanism as a motive formulates a framework of cognitive fields provision through technology (Veugelers, 2011). The educational carriers' familiarization with technology is eventually combined with humanism in terms of forming cognitive fields, mainly for the lower strata, by reinforcing their tutorial training through the elevation of technology, knowledge and humanism functional composition.

To conclude, although Facebook is welcomed to function as a pedagogical tool aligned to major pedagogical principles, safety and privacy issues as well as stereotypes and prejudice about the informal instructor – student interaction have to be faced cautiously. It should also be kept in mind that not all instructors are comfortable in using this platform. Thus, they should be further trained to become Facebook literate and feel comfortable with student communication. This way they will be able to align learning-oriented communications with innovative forms in which students are regularly engaged. In addition, the effective use of the platform for learning purposes could be based on the correct pedagogical approach to Facebook on the side of the instructors in the sense of its potential integration into the normal business of education. In this respect, the instructor will be responsible in determining its utility and will utilize it in ways that are contrary to conventional norms of instruction.

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HOW DOES THE SENSORY SATISFACTION AFFECT THE VEGETABLE INTAKE OF ELEMENTARY SCHOOL CHILDREN?

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Abstract

An inadequate consumption of vegetables is one of the main causes of chronic diseases, and it is also related to the causes of various forms of cancer. Having sufficient servings of vegetables helps to prevent cardiovascular diseases, cancer, obesity, diabetes and other chronic diseases. Therefore, “how to establish an appropriate consumption habit of vegetables for elementary school children” has become a necessary issue. The purpose of this research is to understand the correlation between the smell, taste, texture and other sensual features of vegetable dishes and the students' acceptance as well as consumption of these vegetable dishes during school lunch, and investigate the influence of sensory satisfaction on the consumption of the vegetable dishes. By means of surveys, the subjects of our study consisted of a total of 110 elementary students in Taiwan. To investigate the current status of eating vegetables during school lunch, the degree of how students prefer their meal, and to inquire into the reason behind the preference (or dislike) toward that day's vegetable dishes. The results showed that elementary students' sensory experience towards the vegetable dishes is positively correlated to both the acceptance and consumption of that kind of vegetable dishes. Among the kinds of sensory experiences, the smell of the vegetable dishes that students prefer has the affect consumption the most ($\beta=0.472$), while taste comes in second place ($\beta=0.463$). Our finding offers the references for school cafeterias when they work on innovating dishes according to students' favors. This can help nurture the proper vegetable-eating behaviors in students and motivate the future good eating habits when they are adults.

Keywords: sensory, eating behaviour, elementary student.

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1. INTRODUCTION

With the changes in social patterns, when people take food, they seek after delicacy and good taste. Such a dietary pattern increases the attack rate of many chronic diseases and cancer. According to the data from 1983 to 2003 published by the Ministry of Health and Welfare, Taiwan , over 31 years, the 10 major killers of the citizens of Taiwan are chronic diseases such as cancer, CVD, diabetes, CLD, cirrhosis, nephritis, syndrome, renal lesion, hypertension and stroke [1]. Researches show that insufficient intake of fruit and vegetables is one of the major causes of chronic diseases and is directly associated with the causes of many kinds of cancer. Taking in enough fruit and vegetables is not only one of the ways to maintain a healthy life, but also an effective way to prevent chronic diseases such as cancer, CVD, and stroke [2]. Many researches have also proved that sufficient intake of fruit and vegetables can reduce the occurrence rate of diseases such as many cancers, coronary artery disease, hypertension, and diabetes [3~4] and can increase life expectancy by 14 years [5].

Formosa Cancer Foundation raised the cancer prevention slogan of five-seven-nine vegetables and fruit, that is, the proposed quantity of vegetables and fruit is five servings of vegetables and fruit (three servings of vegetables and two servings of fruit) for pre-school children every day, seven servings of vegetables and fruit (four servings of vegetables and three servings of fruit) for men every day, and seven servings of vegetables and fruit (five servings of vegetables and four servings of fruit) for women every day. However, the research of adolescents made by [6] shows that only 31% of adolescents take more than five servings of vegetables and fruit every day. Wu et al. surveyed the school children in Taiwan and discovered that the average daily intake of vegetables and fruit is 1.8 servings of vegetables and one portion of fruit [7]. It is evident that the average intake of vegetables and fruit for adolescents and children is lower than the proposed quantity.

The dietary behavior in childhood has a significant effect on the development in adolescence and adulthood. Besides, many dietary habits once formed are hard to change [8]. If related factors that affect school children's fruit and vegetable intake behavior are found out and correct dietary behavior and lifestyle are formed at an early age, it will help develop a good dietary habit in future adulthood. Therefore, it is necessary for us to probe into elementary school children's concepts and behavior of fruit and vegetable intake.

An increasing number of people believe that the function of diet is not only its nutrition value, but also for many people it is the source of happiness, an enjoyable experience, and it even has the effect of soothing people's heart. In the conception of "satisfactory" intake of fruit and vegetables, "good" taste is the prerequisite for

consumption of fruit and vegetables [9]. A focus interview study shows that good taste is the key factor for the increase of fruit and vegetable intake. Taste is also believed to be the key factor that influences the intake of cruciferous vegetables [10]. It has been proved that taste preference affects food choice behavior [11]. A survey on consumers' attitudes towards whether their food is healthy and nutritious suggests that "quality" is most frequently mentioned, and "taste" ranks among the top three [12]. Clark's also suggests that sensory elements such as taste, texture, quality, smell, and appearance are determinants that determine whether a person will buy a certain food and are also one of the key elements that determine one's dietary behavior [13]. Therefore, this study concludes that sensory responses to food such as senses of taste, smell, sight, and touch may have a significant influence on school children's taste preference and intake of fruit and vegetables. The research made by Pollard et al. suggests that we need to do more researches to identify other potential genes associated with taste reaction and probe their influence on people's choice of food [14]. Therefore, this research is aimed at learning the influence of the satisfaction degree of sensory experience, such as the experience of smell, taste and texture of vegetables, on elementary school children's acceptance of vegetables and intake of vegetables when they have nutritious lunch at school.

2. METHODS

Participants

The object of this study is students of elementary grades 4, 5, and 6 (10-12 years old). All the students from four classes which were chosen by drawing lots served as samples of this study. On December 9 and 16, 2013, researchers handed out questionnaires in person to the students after they had had the nutritious lunch and asked the students to complete the questionnaires about the vegetables in the lunch they had had at school that day. In total, 110 valid questionnaires were collected.

Measures

The questionnaires for collecting data for this study are made by the researchers themselves, the content of which includes preference for vegetables, sensory experience scale of vegetables, and basic data. As regards preference for vegetables, the purpose is to learn the current situation of students' preference for vegetables. Therefore, open-ended questions are prepared so that the respondents can say what they want. The questions are "names of the vegetables for today's lunch", "your acceptance of this vegetable", "quantity of vegetables taken today", and preference or dislike level for this vegetable and the reason". The sensory experience scale of vegetables is adapted from Clark's questionnaires [13], five questions in total, on which a score of 5, 4, 3, 2, or 1 point(s) is given respectively in accordance with "Very satisfied", "Satisfied", "No objection", "Dissatisfied", and "Very dissatis-

fied”. After the preliminary examination of the sensory experience scale of vegetables, the Cronbach’ α is 0.67.

Data Analysis

The data collected in this study is analyzed by using the statistical software SPSS 12.0 and all the significant levels of the statistical tests are set at $\alpha = 0.05$. As vegetable preference is narrative data, content analysis is used. After the content is converted from two-digit coder to five-point scale, statistical analysis is made. The methods of statistical analysis used include percentage of times, Pearson product-moment correlation analysis and regression analysis.

3. RESULTS AND DISCUSSION

Background Data of Samples

The basic data of the samples in this study is shown in Table 1. There are 55 boy students and 55 girl students (each accounting for 50%). Among them, 54 students are from Grade 6 (49%) , 28 from Grade 5 (25%) , and 28 from Grade 4 (25%). In the background variables of self-rated body type, 15 students rate their bodies as “fat” (13.6%), 70 students rate their bodies as “medium” (63.6%), and 25 rate their bodies as “thin” (35.8%). In the background variables of dining out with parents, 104 students dine out with their parents for more than twice every week (94.5%).

Table 1. Percentage of Basic Information (n=110)

variable	Category	n	%
Gender	Male	55	50.0
	Female	55	50.0
Grade	Grade 6	54	49.0
	Grade 5	28	25.5
	Grade 4	28	25.5
Self-rated body type	Fat	15	13.6
	Medium	70	63.6
	Thin	25	35.8
Frequency of dining out with parents	Once	6	5.5
	Twice	64	58.2
	3 times	19	17.3
	4 times	11	10.0
	5 times	10	9.0

Satisfaction Degree of Elementary Students’ Sensory Experience of Vegetables

The satisfaction degree of all the elementary students’ sensory experience of vegetables is between “Satisfied” and “No objection”. The mean of vegetables for the smell is 3.56, 3.52 for taste, and 3.20 for texture (as shown in Table 2). It shows that the degree of the school children’s satisfaction with vegetables for nutritious lunch is above medium in smell, taste, and texture of vegetables, among which smell is the most satisfactory, taste comes next, and texture comes last.

Table 2. Mean of Students’ Sensory Satisfaction of Vegetables

Sensory Experience	n	Mean	Standard Deviation
Smell	110	3.56	0.85
Taste	110	3.52	0.83
Texture	110	3.20	1.21

Rating scale: Very satisfied [5], Satisfied [4], No objection [3], Dissatisfied [2], and Very dissatisfied [1].

Influence of Sensory Experience Satisfaction on Acceptance of Vegetables

First, Pearson correlation analysis is done for the purpose of learning the influence of elementary students’ sensory experience of the smell, taste, and texture of vegetables on the acceptance of vegetables. Results show that the smell, taste, and texture of vegetables are related to the acceptance of vegetables (as shown in Table 3). The table shows that the elementary students’ acceptance of vegetables is associated with the smell and taste of vegetables ($r>0.579$, $p<0.01$) but has nothing to do with the texture of vegetables.

Table 3. Pearson Correlation of Sensory Experience and Acceptance of Vegetables

	Smell	Taste	Texture	Acceptance
Smell	-----	0.866**	- 0.092	0.597**
Taste		-----	- 0.053	0.649**
Texture			-----	0.026
Acceptance of Vegetables				-----

** p <0.01

Then multiple regression analysis is done with the smell and taste of vegetables as the predictor variables and acceptance of vegetables as the criterion variable.

Through the multiple regression analysis, we find that both the smell and taste in the sensory experience of vegetables can effectively predict the acceptance of vegetables. The order to enter the regression model in turn is “taste” and then “smell”. The multiple correlation coefficient (R) between the two predictor variables and the criterion variable is 0.653, and the determination coefficient (R²) is 0.426, indicating that the two predictor variables that enter the regression model can account for 42.6% of the variance of the vegetable intake (Table 4). The multivariate regression model is as follows:

$$\text{Acceptance of vegetables} = 0.530 \times \text{Taste of vegetables} + 0.138 \times \text{Smell of vegetables}$$

Table 4. Multiple Regression of Sensory Experience for Acceptance of Vegetables

	R	R ²	ΔR ²	F	ΔF	B
Taste of vegetables	0.649	0.422	0.422	39.030**	39.030**	0.530
Smell of vegetables	0.653	0.426	0.004	77.350**	28.320**	0.138

** p <0.01

Influence of Sensory Experience Satisfaction on Vegetable Intake

First, Pearson correlation analysis is done for the purpose of learning the influence of elementary students’ sensory experience of the smell, taste, and texture of vegetables on vegetable intake. Results show that the smell and taste of vegetables affect vegetable intake (as shown in Table 5). The table shows that the elementary students’ intake of vegetables is associated only with the smell and taste of vegetables (r>0.810, p<0.01) but has nothing to do with the texture of vegetables.

Table 5. Pearson Correlation of Sensory Experience and Vegetable Intake

Dimension	Smell	Taste	Texture	Vegetable Intake
Smell	-----	0.866**	- 0.092	0.810**
Taste		-----	- 0.053	0.891**
Texture			-----	-0.084
Vegetable intake				-----

** p <0.01

Then multiple regression analysis is done with the smell and taste of vegetables as the predictor variables and vegetable intake as the criterion variable. Through the multiple regression analysis, we find that both the smell and taste in the sensory experience of vegetables can effectively predict vegetable intake. The order to enter the regression model in turn is “smell” and then “taste”. The multiple correlation coefficient (R) between the two predictor variables and the criterion variable is 0.745, and the determination coefficient (R^2) is 0.555, indicating that the two predictor variables that enter the regression model can account for 55.5 % of the variance of the vegetable intake (Table 6). The multivariate regression prediction mode is as follows:

$$\text{Vegetable intake} = 0.472 \times \text{Smell of vegetables} + 0.463 \times \text{Taste of vegetables}$$

Table 6. Multiple Regression of Sensory Experience for Vegetable Intake

	R	R^2	ΔR^2	F	ΔF	B
Smell of vegetables	0.674	0.454	0.454	432.760**	432.760**	0.472
Taste of vegetables	0.745	0.555	0.101	323.087**	116.932**	0.463

* $p < 0.05$; ** $p < 0.01$

4. CONCLUSION AND SUGGESTIONS

The results of this study show that the smell and taste of vegetables are highly positively correlated with the acceptance and intake of vegetables, indicating that if school children like the smell and taste of vegetables, both the acceptance of vegetables will be high and they will take in more of vegetables. In the stepwise multiple regression analysis, we find that we find that both the smell and taste in the sensory experience of vegetables can effectively predict vegetable intake and account for 55.5% of the variance. Besides, the accountability of “smell” is slightly higher than that of taste. Therefore, the following suggestions are put forward according to the results of this study:

1. In the open-ended questionnaire of this study, school children say that “strange taste” and unpleasant “smell” of vegetables are the major causes of their dislike of vegetables. Recent researches in taste genetics suggest that the individual difference in the ability to taste certain compounds may be one of the determinants that cause a person to reject food. For a long time, we have understood that the ability to taste the bitter compounds of 6-n-propyl-thiouracil and phenylthiocarbamide is a dominant genetic trait. These compounds are very bitter for some

people but they are virtually tasteless for other people [15~16]. Children have more sensitive sense of taste than adults, so cooking skills are needed to remove or reduce the bitter taste or strange taste in order to develop a habit of taking in more vegetables in school children.

- 2.Children's favorite flavor can be blended in the vegetable with unpleasant smell to reduce the unpleasant smell or other ingredients can be added to the vegetable to improve its taste. For example, school children do not like peppery taste, but they like curry. Therefore, a menu containing food with peppery taste is not applicable to nutritious lunches at elementary schools.
- 3.Dietitians of schools should choose as fresh food materials as possible and pay attention to the change and matching in the design of menus. Cooks should control the cooking time in the process of cooking to get rid of the unpleasant smell for children. The adjustment of cooking skills is very important to the balance of school children's diet. As it is difficult to find cooking methods for different food materials, many attempts and experiments are needed.
- 4.It is urgent to research and develop more menus for group dining that are suitable for children's intake of vegetables and research cuisine to help children love nutritious lunches and establish a good habit of taking in vegetables.
- 5.Samples are taken from only two days' sensory experience of vegetables. If the number of experience days is increased, more objective and penetrating results of the sensory experience of vegetables can be obtained.

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THE STUDY OF CURRICULUM DESIGN IN THE INTERNATIONAL CONVENTION BANQUET

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Abstract

The issue of exhibition banquet service is currently the essential development for the advanced countries. The majority of the global convention and exhibition industry is its potential customers; therefore, preparing professional staff of exhibition catering services becomes important. They must not only interact with the relevant activities of the exhibition, but also providing high-quality service for guests and committee members. Accordingly, the characteristic of service and the principles of management are somewhat different from general industries. As a result, it is necessary to design a series of training course for equipping servers of exhibition catering services. The purpose of this study is to design a series of training course for servers who work in the International Convention Banquet by in-depth interview research method. The researcher will interview the senior managers and the staff who organize the exhibition in order to understand their needs of training courses. The researcher will also design the practical textbook based up the result of interview for those who participate the training courses. The courses will be included four parts: 1. The Introduction of convention Industry, 2. Understanding customer needs of exhibition catering

services, 3. The stages of exhibition catering services, and 4. The quality control of service management in exhibition catering services. Finally, the content of training courses will be analyzed and examined with authentic corporation by case study. The implication of this study will provide practical knowledge in exhibition catering services for both servers and managers.

Key words: CONVENTION, BANQUET, CURRICULUM

1. INTRODUCTION

International Exhibition Industry trends show stable development in recent years. The data from International Congress and Convention Association (ICCA) showed that approximately 400,000 global meetings and exhibitions have been held annually with a total cost of about \$ 280 billion U.S. dollars. The International Association of Exhibition Industry (UFI) also indicated that the annual output value of the MICE industry has up to 1 trillion 160 billion U.S. dollars, which provide considerable economic benefits for the organizers and cities (Department of Investment Services, Ministry of Economic Affairs, 2008). International conferences have been held 131 sessions in Taiwan in 2011 and it has been ranking 27th worldwide. The number has been growing up year by year. Taipei city has also been ranked number 20 in organizing international conferences (ICCA, 2013). Taiwan has been attracting 62,988 international tourists in 2012. It has been increasing 10,354 travelers compared with 2006 (Taiwan Tourism Bureau, 2013). Accordingly, the demand of meals and beverage in the international conferences has been increasing yearly. Ko (2007) indicated that the arrangement of a quality dining in the International Conference is an vital factor for the success of conference, and it can bring a wonderful memory for the

activity.

Hosting international conferences, not only bring the city considerable economic benefits for the host country, but also enhance the international visibility and the international image of the host country, or even bring vigorous development of related industries. In view of this, the Taiwanese government since 2005 has been initiating the exhibition industry as the "Challenge 2008 National Development Plan" program, which focuses on promoting "the general convention and exhibition services and Counseling Program" hoping to attract more international conferences and meetings in order to promoting Taiwan to the international arena.

Exhibition of activities involve in a wide range of food and beverage. Accordingly, it is vital to first clarify the key element of planning, execution, and control budget of exhibition catering. Then, manager will be able to manage the whole process based upon those key elements. Previous scholars only described the meeting food of the MICE industry. Therefore, this study will investigate the key elements of successful conference catering services and management in exhibition.

If Taiwan would like to get business opportunities in exhibition catering services, it is necessary to do the training of relevant personnel of MICE industry in order to make the exhibition industry booming quickly. In the initial stage of the exhibition industry, the training of professional exhibition catering personnel is demand in college education. Educators should understand what the essential elements in exhibition and catering management are, and then design the curriculum for training staff. This study will explore the critical factors of success exhibition catering services and management. From points of view of conference

organizing and suppliers, researchers attempt to discover the core elements in the exhibition catering, which need to be considered in the curriculum design of training courses in the exhibition catering services program.

2. METHODOLOGY

An exploratory case study research method is applied in this study. The aim of this study is to investigate what key factors will influence the success of the exhibition and catering management in the future MICE industry. In addition, the researchers will further explore how these key factors will facilitate managing the exhibition catering activities successfully. This study is designed primarily using qualitative research methods in multi-case study method, and a number of in-depth interviews will be conducted to collect the required information. The method of content analysis will be applied in data analysis. The results of in-depth qualitative analysis will provide the information of the relationship between the various factors related to the exhibition and catering management cases. The unit of analysis will be the organizing suppliers and related food suppliers who actually engaged in the process of organizing the exhibition activities. The participants of this study will be the exhibition organizers and the senior manager of food suppliers. Qualitative research design will be adopted an open and semi-open question items. The researcher will interview the interviewees based upon these design question items. In categories will be as the basic unit of content analysis. According to Budd, Thorp and Donohew (1967) pointed out that construction of categories must comply with the principle of heterogeneity and suitability in order to define the categories of this study. Categories defined in this study as shown in Table 1:

Table1 Exhibition Catering Management Categories

categories	Category Code	Explanation
Process Management	T	The food service program suitable arrangements in the entire exhibition activities; arrangements include the purpose of the exhibition, exhibition of subjects banquets, convention banquets time to prepare and guests are invited to arrange banquets activities.
Food Management	M	With exhibition planning and design characteristics of food content; dishes, drinks, nutritional assessment, portion, food sources, menu design, and special dietary needs consideration.
Budget Management	C	Assisting sponsor the effective control of food budgets, including budget constraints, cost analysis.
Workforce Management	H	Providing adequate personnel of food service and related training; including personnel selection, training courses, on-site manpower scheduling.
Service Management	S	Details of the service, including accessibility, reliability, convenience, quality and speed.
Venue Management	P	The venue offers catering services and functional hardware equipment; including site selection, venue layout, moving the line arrangement of space and atmosphere
Health and Safety (In advance)	HS	Food catering supplies, processing and supply of drinks and raw cooked meats health and safety conditions to protect the health and safety of

		customers.
Crisis Management (Afterwards)	D	The accident may occur during activities, should be contingency processes should be design to be the best immediate treatment and placement.

Content Encoding

The researchers will compose the basic unit (them) of analysis to the questionnaire, and invite two academic experts and one industry expert to quantify each category based upon the coding principles.

Reliability and Validity Analysis

The following is the formula of the reliability (three subjects participated the reliability in coding):

Mutual consent degree

$$= \frac{2M}{N1 + N2}$$

M : The number of articles two experts agree
N1 : First (A, B) the number of articles one experts agree
N2:Second (B, C) the number of articles one experts agree

The average of mutual consent degree = (the agreement of A & B + the agreement of A & C + the agreement of B & C) / 3

$$\text{Reliability} = \frac{N \times \text{mutual consent degree}}{1 + (N - 1) \times \text{mutual consent degree}}$$

N : participants of coding

The Result of the Test: the key success factor of the International Conference of Service Industry was selected for instructions and examples of them selected language

The theme of this study is selected by a professor and researchers who are in the field of culinary based on the categories defined in this study. They discussed and assessed about the statement and sentence structure of the three interviews questionnaires in order to increase the validity of the theme selection. After fully discussion, the researchers combined three interviews questionnaires into an expert questionnaire. Two academic experts and one industry expert are invited to be coders. If two of them had some coding, it would be valid. If three of coders had different selection of coding, the researchers made the final decision based on the context of the interview sentence.

3. RESULT AND DISCUSSION

Data Analysis of Industry

The researcher interviewed three senior executives who have been working more than 15 years with many experiences of organizing the exhibition and other important activities related to the industry. The information of interviewees is shown below in Table 2:

Table 2 Data respondents

Company Name and business sectors	Interviewees and position	Working years	Enterprise business years
A management consultant	Executive director	15 years	10 years
B International Co., Ltd.	Executive Vice President	15 years	15 years
C international consulting firm	General manager	16 years	10 years

Note: Respondents in this study represents the total years of relevant industry. The content of interviews had been transcript and chosen 168 words and phrases

based upon the purpose of this study and the theme of the key factors of exhibition.

Two professors of Culinary Arts management and an industry expert (background as shown in Table 3) are as coders to test the reliability.

Table 3 background of coders

Field	Industry	Position	Years
Academia	(A) International Group Hotels	Deputy General Manager	15 years
Academia	(B)Management Hospitality Management	Associate Professor	8 years
Industry	(C) Business Administration	Associate Professor	6 years

Mathematical formulas of the reliability test and the results are as follows(table 4):

Table 4 coders with the consent of the household

Code number (n) member	3
Analysis Unit (theme) N	168

Mutual consent of the			
	A	B	C
A			
B	0.791667		
C	0.809524	0.809524	
The average mutual consent degree (avg_agree)			0.803571

$$\text{Reliability} = 3 \times 0.803571 / [1 + (3-1) * 0.803571] = 0.925$$

The Result of the Test: The key factors affecting the management of food and beverage exhibition, as shown in Table 4-3. The first tester to the second tester by the degree of mutual consent was 79.1%. The first tester to the third tester by the degree of mutual consent was 81.0%. The second tester to the third tester by the degree of mutual consent was 81.0%. An average degree of three mutual consents was 80.3%. The Cronbach alpha coefficient was 92.5%, which was exceeding the reliability required level; therefore, this study has good reliability.

The Analysis of Key Issues in Catering Management

The results of data analysis are classified as shown in Table 5. The results show that the key factors in the management of food and beverage exhibition can be divided into eight dimensions of the measurement. The percentage of each domain was: 13.1% management, 45.2% food content management, 8.9% budget management 4.8% human resource management, 3.6% service management, 14.9% venue management, 6.5% health and safety, 3.0% crisis management. The first major element are catering design and planning, followed by site selection, decoration and atmosphere, and the last one is the process of management.

Table 5 Key Issues of Catering Management Conference

Question Type	Issue contents	Subtotal	Percentage
1. Process Management	The confirmation of the purpose of the exhibition / conference subject confirmation /time table of conference banquets /the cooperation between catering and exhibition activities	22	13.1%
2. Catering Management	Design and Evaluation	76	45.2%

	dishes /drinks design and evaluation /nutrition assessment / portion assessment / menu design /practical convenience Design /Other special dining considerations (ex: environmental, cultural)		
1. Budget Management	Budget Assessments / budget control	15	8.9%
2. Workforce Management	Selection of excellent personnel / communication ability of service personnel / personnel training / human quality training / arrangement of staff	8	4.8%
3. Service Management	Service delivery / service quality / speed of service /service reliability proximity	6	3.6%
4. Venue management	Site selection / venue layout software and hardware / moving line arrangement / space planning / create atmosphere	25	14.9%
5. Health and Safety	Food security / meals hygiene /food safety of participants	11	6.5%
6. Crisis Management	The control before accidents /processing accident / incident promptly remedy	5	3.0%

Curriculum Design

It is essential to explore the demands of international exhibition catering services, and then to construct the condition of planning an international conference catering services. These two issues can be the reference materials in launching international conference catering services. The result of the in-depth qualitative analysis could identify the relationship of each factor in the exhibition and catering management. The results of this study indicate the planner of exhibition catering service must focus on eight key issues: process management, catering content management, budget management, human resource management, service management, place management, health and safety, crisis management. If these management issues could be well planned, the exhibition catering activities can be succeeded (table 6). The results of this study can also be applied to compile the textbook and curriculum design for theory and practice. The curriculum contents include four parts: 1. Understanding exhibition industry, 2. understand the customers' needs in the process of conference catering services, 3. the important stages of conference catering services, 4. The quality management of conference catering services.

Table 6 Curriculum Design for International Conference catering training courses

Course Name	Course content	Course Outline
International Conference catering training courses	Understanding the exhibition industry	Conference-related industries
	Understanding the customers' needs during the process of	Food prohibition in race, religion, and culture differences

	<p>conference catering services</p>	<p>Strengthen the effectiveness of catering services The form of banquet activities</p>
	<p>The important stages of learning catering services</p>	<p>Understand the participants' background and cultural information related to food The differentiation of food service in special populations Planning a memorial and cultural characteristics of the host country catering services Process management, catering content management, budget management, human resource management, service management, site management, health</p>

		and safety, crisis management
	Implementation of quality management conference catering services	Establish a complete catering service standards process Quality Management Conference catering services

4. CONCLUSION AND RECOMMENDATION

The benefits of exhibition industry include economic and social benefits. Economic benefits conclude: high investment, high return, high growth potential, high value-added, high innovation. Social (non-economic) benefits include: a large value, extended industrial related, job creation, offering marketing sales for other industries, increase city's image and reputation, social cohesion and solidarity, and promote urban infrastructure, information exchange.

Exhibition catering services arrangements are the vital factor for the success of the international conference. The function of conference catering is not only for the participants' diet demand, but it must follow the specifications agenda and extend social relation. The demands of exhibition catering services include: (1) physiological needs: food calories, nutrition and delicious, (2) Safety needs: places, equipment, and food safety and hygiene, (3) Social needs: the environment of cuisine should provide participants comfortable surroundings, (4) the needs of respect: cultivate staff cultural knowledge and respect for national food culture (5) economic needs: The estimated number of meals, and under the premise of not exceeding the budget to meet the requirements of food safety, social, and respect. If the gap between the estimated and actual number of persons

is too large, or it adopts an open approach admission meal to become too many crowds, the probability of failure of its food service will be increased.

One of the advantages of Taiwan's development of the exhibition industry is catering. "Tasty food" is the major incentive to attract foreigners coming Taiwan. The issues of organizing catering services in international conference: 1. the process management: determining the purpose of conference catering, banquet participants, time schedule, the model of meal service, catering activities, and guests' arrangement. 2. Content of conference catering include: dishes evaluation, nutrition assessments, portion estimation, aesthetics dishes, vegetables card design, and beverage arrangement. 3. The analysis of conference catering: the number and types of food should be in accordance with the demand for a cost estimate, in addition to the normal meal prices, the need to double confirm whether the extra watery liquor, and other related service fees are cost another fee in forecast projects. 4. Conference catering service management: different catering services between Chinese and Western food, shall depending on the type of meal, and the use of different modes of services. 5. The management of catering venues: banquet venues designed should combine with the exhibition theme, the location choice, to create an atmosphere, and chair height, seating arrangements, banquets activities and meals moving line arrangement. 6. Conference catering personnel management: the quality of service staff and the attitude of chefs will impact participants' perception toward the conference catering, service. Therefore, it is important of the selection of personnel, training and manpower planning. 7. Food safety and crisis management: prevention of food poisoning, health management and crisis management, and implementation steps. In the overall conference catering management activities, if organizers can consider the above issues into the planning project and as the basis for an international conference catering services, the exhibition catering activities could be successful implemented. Based on the finding of this study, the textbook can be designed for

studying the theory and practice of teaching, course contents include four parts: "Understanding the MICE industry," "Understanding customer needs in the process of exhibition catering ", "The important stage of exhibition catering services "and "Quality Management of Exhibition catering services". Finally, the case study will be investigated by cooperating curriculum design and industry practice, hoping to bring the latest and practical knowledge of service management for educators and industry.

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AUGMENTING KNOWING WITH WIKINIZER™ RESEARCH

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Abstract

Information technology helps us extend, deepen, and share our knowledge. We claim that visual tools not only enhance our capacity to formulate and share our explicit knowledge, they also help us to activate and transfer our tacit knowledge. Graph based visual structures enable knowledge workers to generate “associate complexes” which can be “bootstrapped” into networked learning environments that document and enhance knowledge building. [WikiNizer™Research](#) creates graph based visual structures that articulate the structures and relationships which exist within knowledge domains, and help the emergence of concepts as visual networks trace interpersonal knowledge trails. Although it is only one of the tools in the [WikiNizer™](#) box [[wikinizer.com](#)], [WikiNizer™Research](#), by enabling its users to visualise meta-structures and conceptual relationships, facilitates interpretations through emerging and co-evolving meta-levels. Because it combines Wiki-like organization with semantic structures, the externalization of our concept structures relates their content to other research, and makes interpretations explicitly comparable at the meta level. It exhibits their semantic patterns and gives us a tool which helps us track meaning construction. In short, [WikiNizer™ Research](#) helps us to articulate, organize, and document our ideas, and empower tacit dimensions of our personal knowledge.

1. OUTLINE

In this paper we outline our understanding of Personal Knowledge Management, and propose a solution for its *augmentation*. Focusing on the relationship between *personal knowledge* and *computer conceptualization*, we supply a brief description of our product - [WikiNizer™Research](#). Since Cunningham invented the Wiki many Knowledge Management developers have ventured down the Wiki way. In this respect we are no different. We share the belief that *Wiki-like organization* can enhance conceptualization processes, and after giving an update on our current work, we briefly discuss related work. We conclude by noting that we are heading towards the goal of implementing a collaborative knowledge building model (which is described in earlier papers) called *Conceptipedia*. [1, 2]

2. THE NEED FOR PERSONAL KNOWLEDGE MANAGEMENT

Although Knowledge Architectures are usually constructed with collaboration in mind, they all rely on our personal knowledge, which relies on our tacit awareness. [3, 4] When surfing the net with smart phones or video conferencing via cloud services “Big Data Brother is Watching You” [5]. A Personal Knowledge Management tool however not only gives us an island of privacy, it also supplies us with a *digital archive* with which to track our discovery of connections between the constituents of our knowledge, rendering our insights explicit, and helping us make our conceptualization effective. Today Personal Knowledge Management is no longer a ‘nice to have’ it is a ‘need to have.’ A personal digital archive that is capable of knowledge organization, in combination with a multimodal learning environment, gives us an escape route from *infoxication*.

3. THE WIKINIZER RESEARCH™ WAY IN PERSONAL KNOWLEDGE ORGANIZATION

Networked learning is a process of exploration, elaboration, experiment, and discovery supported by a record of these processes. Because we “know more than we can tell” a cognitive model of our interest which helps us mobilize and share our tacit knowledge also helps us find solutions. This is because *conceptualizing* problems helps us to discover their solutions. Douglas Engelbart in his “Mother of all Demos” at Stanford University in 1968 described knowledge as a connected graph of concepts which (when it’s contents are combined with a personal history of meaning construction) “show rather than tell”¹ what is meaningful to the user. [6] In accordance with Engelbart we adopt a co-evolutionary augmentation research approach [7, 8]. We use “co-evolutionary” in the Engelbartian sense of problem solving which goes hand in hand with the development of tools that enhance knowledge work effectiveness in a variety of different contexts. [9, 10, 11, 12]

WikiNizer™ is a Knowledge Augmentation Engine [13] built on top of a Visual Semantic Wiki. The WikiNizer Kernel is the simplest possible execution framework that can support a Knowledge Augmentation Engine. *WikiNizer Research* adds new capabilities to the Kernel which can then bootstrap the next set of capabilities that are built into the system. Bootstrapping [14] allows the capabilities which are built over the earlier Kernel to be reconstructed in a new higher level Kernel. Implementing this process with your Internet browsing history *WikiNizer™ Research* automatically creates a Personal Knowledge graph of your interests, in a form that can then be adjusted and refined by the creation of new topic nodes, and semantically marking up the relations between the nodes. It not only enables us to have a coherent

¹ <http://sloan.stanford.edu/mousesite/1968Demo.html> Clip 2: Doug introduction (Accessed.: 02. 24, 2014.)

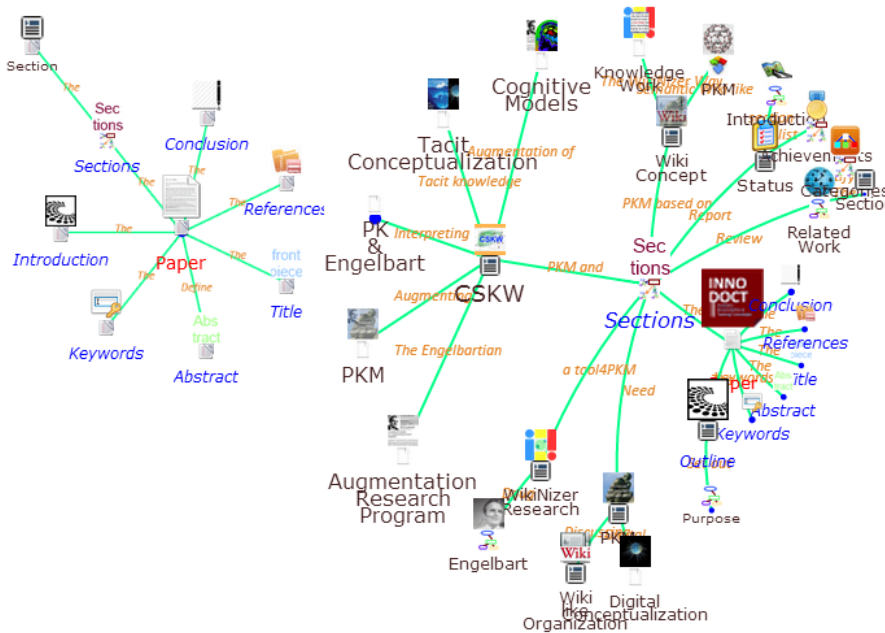


Figure 1. The structure of this paper in WikiNizer™ Research and its meta-level template (depth 3 view)

view of our topics, it also enables us to represent their *growth*. These knowledge trails can be shared in a variety of formats, whether it be linear printable documents, Google Docs exported from WikiNizer™ Research and imported back, or hyperdocuments in user defined graph formats. We envisage that collaboration will not only occur at the level of topics of interest, but also at the meta-level, until agreed conceptual structures and interpretative patterns dominate. [1]

4. PERSONAL KNOWLEDGE AND COMPUTER SUPPORTED KNOWLEDGE WORK (CSKW)

The Engbartian Augmentation Research Program

Doug Engelbart is widely (and rightly) credited with inventing the mouse. He also however invented digital media and computer supported knowledge work. As Bret Victor points out, praising Engelbart for inventing the computer mouse is a bit like identifying the person who invented writing, and then praising them for inventing the

pencil. [15] Engelbart's Augmentation Research program pursues the end of building computer systems which enhance our problem solving, and then using them to make further advances in computer support for human endeavors, including the problems that arise when constructing the system itself. When augmenting conceptualization and enhancing our problem solving capabilities, it is not only the content that evolves but also the *means* by which we manipulate it. If our exposition has meta-reflective content, bootstrapping becomes possible, that is, new "executable" problem solving patterns and re-usable forms of knowledge organization emerge which are externalized in a computational environment. [14]

Engelbart contrasted his approach [16, 20] with what some describe as the "man computer symbiosis" strategy [17], by noting that if we ask where our intelligence is embodied we find that "it is elusively distributed throughout a hierarchy of functional processes – a hierarchy whose foundation extends down into natural processes below the depth of our comprehension. If there is any one thing upon which this 'intelligence' depends, it would seem to be *organization*." [16, p.18] The past 50 years has proved that his strategy of focusing on the needs of "humans first and machines second" [18] was correct. Artificial Intelligence and Office Automation strategies have not delivered on their promises. Engelbart sets out Human Computer Interaction (HCI) in the following terms: he declares that for a human knower to assume "that the computer ought to adapt to the human...and not require the human to change..[is]..like making everything look like a clay tablet so you don't have to learn to use paper."² [19]

Engelbart's "bootstrapping approach" [16, p.24. ff.] aims to supply frameworks for the organization and reorganization of personal knowledge which also help with the development of "tools and methods"; on the grounds that "[n]o human being can hold very many concepts in his head at one time. If he is dealing with more than a few, he must have some way to store and order these in some external medium, preferably a medium that can provide him with spatial patterns to associate with the ordering [...]. Beyond a certain number and complexity of interrelationships, he cannot depend upon spatial-pattern help alone and seeks other more abstract associations and linkages." [21, p. 122] Both everyday experience, and empirical evidence from the cognitive sciences however, shows us that we can hold many concepts in our heads. [22, 23] What we find difficult is simultaneously recalling "very many of them" and bringing them to the forefront of our awareness. Nor are we very good at elucidating their connections. The reason why (without the help of a language) we are not very good at reflecting on our concepts is not only because we lack a way of visualizing their rela-

² For clay tablet read: "What You See is What You Get" (WYSIWYG) word processing, or as Engelbart put it; "Yeah but that's all that you get".[55] What the semantic web, problem solving, and knowledge work and learning require is "What You See is What You Mean" in as many forms as are needed. This points to the need for a cultural change [47] in which we would do away with what are now obsolete and inadequate forms of communicating ideas, such as writing papers in a format that is only suitable for a medium of dead wood (paper).

tionships, but also because we lack a means of rendering manifest our dependence on the architectures of our learning experiences.

Interpreting Personal Knowledge in the Engelbartian Context

The sublingual realm of our knowing is not concept free, it is the realm, as Engelbart put it, in which we “develop general concepts from specific instances, predict specific instances from general concepts, associate concepts, remember them, etc.” (16, pp. 21-22). It is a terrain of personal experience that we store/record in ‘analogue’ (i.e., non-symbolic) collections of concepts and memories. This terrain is mute. How can we augment our intellect by giving it tools which facilitate the articulation of this tacit dimension? Although Engelbart does not make use of Polanyi’s terms “focal” and “subsidiary awareness” [24] he describes how his research program could arrive at augmented “structural representations”³ of “conceptually implicit data” [16, p.113] and the procedural experience that is implicit in our way of doing things, the designing (and redesigning) processes and “hierarchies of capabilities” which serve problem solving. (*Ibid.* pp. 5, 14-18, 29ff.) Engelbart refers to the *evolutionary* role which “Concept Manipulation”, “Symbol Manipulation” and “Manual, External, Symbol Manipulation” have played in the development of our intellectual capabilities [16, pp.21-23] when he formulates what he calls his “Neo-whorfian hypothesis”. “Both the language used by a culture, and the capability for effective intellectual activity are directly affected during their evolution by the means by which individuals control the external manipulation of symbols.” [*Ibid.* p. 24] But Engelbart probes deeper into the issue of the *genesis* and *externalization* of conceptual structures, and the individual “repertoire” of thought processing: “What happens, then, is that each individual develops a certain repertoire of process capabilities from which he selects and adapts those that will compose the processes that he executes. This repertoire is like a tool kit, and just as the mechanic must know what his tools can do and how to use them, so the intellectual worker must know the capabilities of his tools and have good methods, strategies, and rules of thumb for making use of them. All of the process capabilities in the individuals’ repertoire rest ultimately upon basic capabilities within him or his artifacts, and the entire repertoire represents an inter-knit, hierarchical structure (which we often call the repertoire hierarchy).” [16, p. 11]

This quotation helps us to interpret Polanyi’s conception [3] of *personal knowledge* [24] within the Engelbartian context. Our tacit awareness is a rich landscape of

³ “[I]nside this instrument (the computer) there is an internal-image, computer-symbol structure whose convolutions and multi-dimensionality we can learn to shape to represent to hitherto unattainable accuracy the concept structure we might be building or working with. This internal structure may have a form that is nearly incomprehensible to the direct inspection of a human (except in minute chunks).” [16, p. 37] “No longer does the human work on stiff and limited symbol structures, where much of the conceptual content can only be implicitly designated in an indirect and distributed fashion. These new ways of working are basically available with today’s technology—we have but to free ourselves from some of our limiting views and begin experimenting with compatible sets of structure forms and processes for human concepts, human symbols, and machine symbols.” (*Ibid.*)

connections and meanings which is the deposit of our personal experiences. Although our tacit awareness is silent, we claim that its meaning generation and inter-relations can be evoked and modeled by graph-based visualizations, and expressed (which is to say externalized) by computerized tools of augmentation. Instead of recording and fixing public/colloquial meanings in supplied ontologies, we need tools that are as neutral as a pen and paper, and which are at least as powerful and flexible in expressing our tacit awareness as our logographic, syllabic, and segmental writing can be in linguistic articulation. These tools are needed because despite a long and impressive history of improvement, the linguistic and supra-linguistic (computational) articulation of various problem spaces have failed to give us an account (model) of the complexities of our tacit knowledge, and its impact on how we think and act..

Tacit Knowledge and the Problems of Conceptualization

The recognition that how we conceptualize a problem determines its solution has occurred within various different approaches, from Scientific Discovery to Personal Conflict Resolution. It is rooted in case studies from the History and Philosophy of Science, and can also draw upon a rich literature from within the Cognitive and Learning Sciences. [25, 26, 27] The classic examples of simultaneous discoveries of the ideas which founded entire fields, such as the Calculus by Newton and Leibniz or creative strategies for problem resolution, all show however our dependence on tools and methods which explicate (organize, manipulate, and visualize) implicit knowledge. [28, 39] Since the 1958 publication of Polanyi's *Personal Knowledge* the slogan that "we can know more than we can tell" has been applied in knowledge management, especially in Nonaka and Takeuchi [30], but the demarcation between explicit and tacit knowledge is rarely been seen as clear cut, and it is often noted that a dynamic "interaction between these two modes of knowing is vital for the creation of new knowledge" [31] For Polanyi "meanings are the informal product of a tacit integration in which an embodied point of view attends from subsidiary clues to a focal whole". [32, p. 146] He "reject[ed] a disembodied account of what it is to be a mind." [*Ibid.* p. 148] and argued that "A symbol becomes meaningful when it is used within the context of a tacit awareness. The informal dimension that supplements the operations of the formal system instantiated by [computers representable as] a Turing machine is brought to it by its user. A symbol is a tool for deploying a tacit awareness." [*Ibid.* p. 145] Nonaka and Takeuchi largely focus on the transfers of tacit knowledge that take place in personal learning experiences, and the cultural context within which they occur. Far less attention is paid to the fact that every culture has developed tools which *externalize* personally structured contents, activity based associations, and individual process structures. It is hard to tell how far Engelbart would have gone in accepting a Polanyian account of meaning, or in viewing computational augmentation as an externalization of tacit knowledge, but

both are keen to situate cognitive model building process within the context supplied by the agency of the knower.⁴

The Augmentation of Cognitive Models

Evidence is increasingly accumulating that perceptual representations are organized by cognitive models which are then structured by the semantic representations unique to a linguistic system. If we accept that both systems can be augmented by computational media, then Engelbart's conception of bootstrapping the 'Turing Galaxy' [35] into an augmented problem solving media (an 'Engelbart Galaxy') also supports externalized non-linguistic cognitive models, and their transition into lexical conceptualizations of information. The augmented problem solving media provides experimental tools for the exploration of cognitive processes which lead from embodied cognition to lexical representation through semantic composition, as described by Evans' Theory of Lexical Concepts and Cognitive Models. [36] Extending intellect augmentation to the organization of our sub-lingual personal knowledge enables "associative complexes" [2] to be expressed in graph-based visual structures, whose forms enhance the transfer of knowledge that relies on the tacit dimension of our problem solving. The dynamic patterns which emerge within these graph structures not only show aspects of our personal knowledge that we cannot tell, they also provide the basis for higher level Knowledge Organization. The ability to both create and share live graph structures of personal cognitive models within interpersonal structures not only enables us to record unorganized personal learning experiences, and render annotation possible, they also give us the ability to express cross lingual semantic relatedness in dynamic re-enactable and explorable structures and "trails". By exploiting interconnections within the graph knowledge base, cognitive models can be restructured and organized further into higher level visualizations of the interrelations within various problem domains, enabling us to form non-verbal visual/spatial data structures both below and above the language level, giving rise to new experiences. Recording changes within graph structures augments the visualization of "process structures" [16, pp. 11, 38] which manipulate the connections between concepts and their refactorings at the emergent meta levels.⁵ This enables us to represent personal learning paths, and the addition of a temporal dimension to these trails enables us to document the evolution of both personal and collaborative knowledge. Examples of an evolution recorded in the

⁴ The impact of Polanyi on Engelbart's thoughts needs further study; we note here however that Polanyi gave the McEnerney Lectures at the University of California in February, 1962. *The Daily Californian*, a newspaper which gives details of campus events at Engelbart's home university, the University of California, Berkeley, reported the lectures. [33, 34]

⁵ "It makes no difference to the computer whether the symbols involved in the re-structuring represent part of the computer program or part of the information upon which the program is operating. The ability to have the computer modify its own process structure (program) has been a very important factor in the development of its power." [16, p. 4]

form of activity sequences is linearized textual exports of walks in the conceptual graph, or higher level changes in the graph structure and their interpretation.

Personal Knowledge Management based on the Wiki Conception

Exploring the technical feasibility of integrating Personal Knowledge Organization with Collaborative Knowledge Work, we piloted the construction of a web scale Knowledge Graph based on the “semantic wiki” conception. When we categorize WikiNizer™ as a kind of Semantic Wiki, it is not the ontology based conception of “Semantic” of the “Semantic Web” or even the “Semantic” in “Semantic Wikis” we have in mind, but a Wiki designed to provide the platform for constructing and evolving situated *conceptual structures* and *interpretations*, at all requisite, emergent, co-evolving meta levels, and integrated together into a wiki-like Visual Knowledge Organization environment.

The WikiNizer Way of Knowledge Work

Ward Cunningham invented the Wiki while trying to figure out what HyperCard wanted to be, and ended up creating the simplest possible irregular semi-structured database that could possibly work. When we were figuring out what Wiki wanted to be we discovered that the creation of a new page is a crucial Knowledge Organization step, and we set out to provide facilities which indicated the intent behind what sort of page it should be, and do this without interrupting the flow of current work, keeping the meta information we supply in our “subsidiary awareness” so that a knowledge worker can keep their focus on their original intent, and reflect and be explicit about the kind of things they think they are doing.

Using the graph structures in which we write WikiNizer invites us to reflect on our concepts and their qualified connections and related contents and interpretations. In a different session we are able to organize these connections and indicate concept categories at the meta level. We are gradually able to elaborate not only that which is in our focal awareness, but also all the meta level organizing concepts that we can identify, and organize them into a personal ontology of intents and sorts. Moreover, when a new page is linked to the existing body of pages, the user can indicate the type of relation that should be created in a similar way. The result is not only a web of non-linear linked graph of “typed” pages, but those pages get semantically marked up together with the links which establish explicitly named connections, which because they can be characterized at the meta level by meta level sorts opens up the possibility of further interpretations. The result is a richer body of semantic records, a knowledge graph, with meta-level hooks upon which later interpretations can be elaborated, injecting end user definable functionalities.

Novel Semantic Wiki-like features for Personal Knowledge Management (PKM)

WikiNizer Research’s (WNR) features set does not contain those features of standard Wikis which support collaboration for the sake of producing hypertext systems as read-write web-sites with versioning and rollback, however, we consider functions such as instant saving, which most wikis do not contain, as essential for web research and networked learning. Keeping an eye on the educational potential of Wikis and its preconditions such as Reflexivity, Processability, and P2P Collaboration, [38] we concentrated on further developing the feature set of semantic Wikis [Cf. 39 and 40 and the [Wiki Feature Matrix](#) of [semanticweb.org](#).] to make better web/cloud based Knowledge Organization tools for networked learning and knowledge work. Since WNR’s main goal was to enhance PKM with end user definable functionalities, we reconsidered the Semantic Wiki conception in order to adopt/adapt the essentials of the Augmentation Research Program to current PKM needs.

Feature category	Description	SMW	Ki Wi	Gno-ledge	Onto-wiki	Codex	WNR
Everything is a node	Pages are nodes in a graph and are atomic			X		X	X
Kernel Based	Composability and modularity		X	X		X	X
Meta-reflective	Capabilities are represented in the wake itself					X	X
Meta-circularity	Bootstrappable						X
Personalizable	Capabilities are Personalizable through Meta-Reflection		X		X	X	X
User-Extensible	Meta-design of semantics based navigation aid, and more				X	X	X
Higher Semantic Layers	Templates and meta-data for meta-data all the way up					X	X
Typed	Nodes and connections	X	X	X	X	X	X
Keeps Layout & Logic apart	Nodes can be assigned cascading interpretations			X			X
Situated	Keep track of context, situations, replayable					X	X
Knowledge Maturing	Marrying Informal and Formal Meta-Data						X
Cloning	Nodes can appear in a variety of context	X			X		X
Support Learning Trails	Specify trails of nodes with user defined interpretations			X	X	X	X
Editable Interfaces	Direct manipulable live morphic Structured Editors		X		X		X

Table 1. Comparison of the novel PKM features of WikiNizer Research™ (WNR) with other solutions (Research Challenges in coloured rows)

Table 1 above contains the novel features of WNR when viewed as a Semantic Wiki. It compares WNR with other Semantic Wikis that share some of its features relative to the [Semantic Media Wiki](#) (SMW) [40] which is based on a widely known Wiki. The colored rows show a remarkable overlap with the current Research Challenges of [39] Personal Knowledge Management.

5. STATUS REPORT

We explored the technical feasibility of integrating Personal with Collaborative Knowledge Work, and piloted the construction of a web scale Knowledge Graph

based on the Semantic Wiki conception. After completing an end to end pilot of the design intended for collaborative knowledge work, we turned to the development of the WikiNizer Kernel for Personal Work. Based on our first web scale pilot, we completed an initial Kernel which supported Note pages that were organizable into an outline, which could be visualized in a variety of forms, including HyperTree, Space Tree, presentation, and article. We then added capabilities such as search, cloning, the ability to create connections, meta level templates, and archiving using cloud storage providers such as Google Drive. We integrated WikiNizer with Google Docs, so that any subtree page can be exported to Google Docs, edited there collaboratively, and then re-imported back into WikiNizer.

To organize notes into a paper first create pages which correspond with your intent, that it is an abstract, a section, references, and so forth. From this a paper Template is generated, as a set of WikiNizer Meta pages, which define the structural elements of a paper. We supply interpreters for this structure, which enable you to map instances of it into HTML, in a form that can be converted into Google docs and then back to WikiNizer node updates. You then create a node as an instance of that paper template, and move or clone pages within the structure of the paper. The final structure is displayed in a HyperTree, with the focus on the various Sections node. [Cf. Fig. 1] The paper template illustrated here is a simple example of a meta structure from everyday life. A similar process could also create learning paths, or other organized content for sharing. The key capabilities delivered by the WikiNizer Way of organizing knowledge processes is 1. demonstrating that similar (intent dependent) structures can be built at every level that represents the “articulation” (delimiting, intention, clustering, etc.) of content, and 2. showing that from all content levels meta level “abstractions” of concept nets, sort types, and link-structures can be constructed and handled in their “own right” as conceptual/cognitive models of the organization of the intent/content; and 3. because our efforts take place in time, track our evolving learning and problem solving activity patterns by focusing on our conceptualization process. Instead of pre-established templates, WNR supports *creative writing* (conceptual composition, if started within WNR) and using the reverse route, *textual analysis*, if we have a given text which has to be conceptually reconstructed, or analyzed for hermeneutic interpretations. The differences within the latter can actually be “grasped and graphed” within the various graph forms, conceptual components, intents, and link structure (contextual connections) of the meta level “templates” of the interpretation. The interconnectedness that emerges within our interpreted domains and meta-levels is elaborated and manipulated using the very same methodology and capabilities as our domain level structures and interpretations. Unlike logical hierarchies our approach keeps open the possibility of meta structures being treated as a domain of further exploration, as in the case of everyday language.

6. RELATED WORK

Various researchers in both the Ontology Authoring and the Semantic Wiki literature have criticized the Semantic Web concept. With regard to Ontology Authoring we formulated the criticism that it tends to “separate the conceptual level from the content, and the context of logical understanding from the intent laden use of concepts.” [41] Pike [42] identifies the need to go “Beyond Ontologies” as the desire for *situated, goal directed, cooperative* knowledge exploration, with a *dialogical* and *interactive emergent semantics* reliant on “self-supporting” bootstrappable ontology authoring environments [43, 44] in which semantic representation and the discovery of proper interpretations go hand in hand. [45]. Most Semantic Wiki efforts assume the Semantic Web's God's eye view conception of Ontologies, applying the power of the Wiki to ontology authoring, and supplying collaborative environments for so called “Semantic Applications”. [Cf. 41.]

We agree with the detractors of the Semantic Web (such as Clay Shirky, and the [microformats](#) community - whose tagline sums it all up; “humans first, machines second” [46]) that the “Machine's First” Semantic Web approach, which aspires to unify individual contributions within a ubiquitous global representation, is a repeat of the same mistaken assumptions which led to the marginalization of Englebart's “Human's First” approach. [47] We reject the quest to create a God's eye view for machines, and pursue instead a “Human's First” approach, which via augmentation lets “each man says what he deems to be true and let truth itself be condemned onto God.” [48] In which machines augment our capacity to ‘show more then we can tell’.

Knowledge does not grow in isolation; it grows as a result of collaborative efforts which share re-usable conceptualization paths. To facilitate both the social and the cognitive aspects of “*in situ*” knowledge work we need a Wiki like tool which is able to render co-evolving direct manipulable elaboration and visualization of concepts as learning objects possible, at both the object and meta-level. We have discovered that systems like [Codex](#) [42], [KiWi](#) [49] and Gnowsys based [Gnowledge](#) [50, 51] best match the key features of WNR in Table 1. The system closest in its conception to our approach is the ‘node based’ [Gnowsys](#). [52] We share the “epistemological standpoint” of its author that the “[m]eaning of any concept that we harbor or any activity that we do as cognitive agents is generated out of links between other concepts or activities” [53]. Co-evolving structures and interpretations that are able to encompass every emergent semantic level in WNR open the way to extends *neighborhood semantics* in ways which facilitate the transition from personal conceptualizations that are only meaningful to humans to “effective concepts” [54] which can be executed by machines. In case of Codex, without further technical information, we wonder whether it can, and how it actually would, apply the interpretative functions of neighborhood semantics. Discussing the similarities and differences between our approach and Gnowsys, and Codex is a paper in itself, but both aim to contribute to the development of some kind of *Exploratory Epistemolo-*

gy, and this is our main concern. [1, p.117] We are at one with Nagarjuna, the author of Gnowsys, in “venturing to develop a computing solution to solve the problem of modeling conceptual dynamics in the context of learning and discovery” [52], but we extend this approach to model the *dynamics* of our conceptualizations *meta-reflectively*. Our approach is an *experimental* one. For some it may be too philosophical, and for others too practical. We claim however that WikiNizer can transform epistemological speculation on meaning construction into empirical questions. Within an augmented knowledge discovery context we can compare the “efficacy” of the overlapping approaches set out in the above feature chart. When WikiNizer Research adopts the Wolfram [Computable Document Format](#) as its raw knowledge exchange format this will enable *Conceptipedia*, a clearing house of collaborative conceptualizations, to be launched more quickly than we originally anticipated.⁶

7. CONCLUSION

In our earlier papers we described our roadmap as “From Personal to Collaborative Concept Organization” and we situated our ‘WikiNizer™ technology’ within Doug Engelbart’s Vision. In this paper we spell out how the first module of a Personal Knowledge Augmentation Engine, WikiNizer Research™ augments personal knowledge building by implementing WikiNizer™ Kernel and a Visual Semantic Wiki-like environment. This environment enables us to organize our personal Knowledge Architectures into visual Knowledge Graphs. We compare the features of our personal knowledge management solution with other Semantic Wikis, and suggest that flexible content-dependent graph structures on all levels, enable us to represent and model *both* symbolic (lexical and higher) and sub-lingual “cognitive structures”⁷ and processes. We link Polanyi’s *personal knowledge* conception with Engelbart’s conception of *augmented* knowledge organization. We conclude that personal knowledge management is enhanced by *externalizing* our cognitive models and mental structures, and that bootstrappable visual tools are able to mobilize the sub-lingual cognitive structures which enhance the efficacy of problem solving. Our WikiNizer™ technology renders this assertion empirically testable, and it therefore can be considered a benchmark of our experimental epistemology. WikiNizer™

⁶ “Launched by the Wolfram Group, the CDF standard is a computation-powered knowledge container—as everyday as a document, but as interactive as an app. Adopting CDF gives ideas a broad communication pipeline—accelerating research, education, technical development, and progress.” (<http://www.wolfram.com/cdf/>, accessed: 20. 02, 2014.) CDF has the potential to bring about the technological revolution which is a precondition of a much needed cultural change in the way knowledge is produced, collaborated upon, and disseminated.

⁷ “There is a term used in psychology, “cognitive structure,” which so far seems to represent just what we want for our concept of mental structure, but we will not adopt it until we become more sure of what the accepted psychological meaning is and of what we want for our conceptual framework” (16, p. 32) It may be noted here that Novak’s Concept Maps were also initially developed for the purpose of articulating children’s understanding of science concepts in the spirit of Ausubelian learning theory. (Cf. [56] and see also Engelbert’s foreword in [37] on Conceptual Maps.)

built Knowledge Graphs supply us with the underpinnings of a more comprehensive e-didactic approach to conceptualization, and our technology gives us an augmented Exploratory Epistemology which enhances both personal knowledge building and networked learning.

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THE STRATEGIC DESIGN OF DISTANCE VOCATIONAL TRAINING: LITERATURE REVIEW.

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In the last decade a significant effort was made in Europe, to encourage the use of technological resources for vocational training, following Qualification and Lifelong Learning policies. However the success of distance education in this area has been poorly documented, in terms of academic research, which has focused primarily in scholar contexts.

Achieving levels of quality, efficiency and productivity to ensure the competitiveness of organizations had lead companies to increasingly focus their attention on continuing vocational training. The use of network technology is the latest trend in training and professional development sector, supporting the call “e-learning revolution” and more recently the Massive Open Online Course (MOOC) phenomena.

Our study focuses on developing an instrument to evaluate the quality and maturity of distance education practices in vocational training. In order to achieve our goals we sustain our investigation formerly on a literature review, then on the construction of a framework and its validation by experts and, subsequently, through a case study involving i) institutions of higher education, ii) specialized companies in training and, iii) internal training departments of large companies. What limits and advantages on distance education models in vocational training can be listed bases of different institutional strategies? What is the future of vocational training?

In this presentation we will focus our attention on the literature review in order to reveal important evidences of Portuguese context on this domain, clarifying ideas about future trends on distance vocational training.

Author Keywords: Distance Learning, Vocational Training, Lifelong Learning, Literature Review.

SCIENCE EDUCATION AND SCIENCE COMMUNICATION BY ONLINE INTERACTION.

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Science Education and Science Communication to the general public have been internationally recognized as mandatory measures, in order to promote the scientific literacy of society in general. Indeed, the sustainability of our planet relies on the responsible behaviors and wise decisions of informed citizens.

In the particular case of this work, the authors are concerned with the promotion of scientific literacy in Portugal and use different strategies, from face to face events to online interactions. In this particular case, the projects involve the coordination of structured web pages, as well as the administration of pages on Facebook. In each case the visiting public, the time dispensed on searching and the deepness of the response expected, mirrors different public expectations.

One of the projects is “Ciencia com Todos” (CcT) (Science with everyone) that, although mainly directed for a younger public attending the different education levels, allows any citizen to clarify its doubts on scientific contents, either related to everyday life or to more deep subjects.

In fact, all questions are answered by a scientific commission comprising 202 elements that cover all areas, from natural sciences (biology, chemistry, geology, physics and mathematics) to the medicine and even social sciences and humanities (psychology, archeology, sociology, history, geography, mathematics education, history and philosophy of sciences). Moreover, the web site has another section where science articles written by the collaborators and scientific commission are published regularly. No matter the format (answers or texts), there is always the concern of using an easy and understandable language, accessible to the general public, without losing scientific rigor and accuracy. Another project is “Science Through Our Lives” (STOL) with a wide vision of

science and art, that has a page on Facebook with an average of 3.000 visits per week and that publishes posts on science *senso lato*, on a regular basis.

Author Keywords: Science communication, Non-formal and informal science education, Online Interaction, Information technology

FORMACIÓN CONTINUA PARA EL NUEVO ENTORNO: CREAT-INN-PACT E INNODOCT

F. GARRIGOS¹, Y. NARANGAJAVANA²

Resumen:

La formación continua en los últimos años está experimentando una transformación importante. Ello es consecuencia de los nuevos cambios normativos, del desarrollo de las nuevas tecnologías de información, y de los cambios en la concepción del trabajo y la necesidad de continua actualización de las capacidades, dadas las continuas evoluciones y creciente dinamicidad del entorno actual. Este artículo analiza y reflexiona sobre estos aspectos, incidiendo en la transformación de la educación, y la necesidad de observar nuevos conceptos de aprendizaje. El trabajo remarca a su vez la importancia de abordar nuevas concepciones y métodos de educación, estrechamente relacionados con la educación continua. Dado ello, el estudio explica y analiza dos iniciativas pioneras que hemos desarrollado en los últimos tiempos, y que se enmarcan en estas nuevas acciones: la creación de la cátedra UNESCO CREAT-INN-PACT, y la creación de esta propia conferencia internacional, INNODOCT. Finalmente, el capítulo enfatiza en la necesidad de cambio de paradigma educativo en el nuevo marco de referencia que impone la sociedad actual. A su vez, remarca la necesidad de observar y desarrollar nuevos conceptos de aprendizajes que tomen como base y como centro de desarrollo la formación continua, que apuesten por la co-creación y co-diseño de la formación e incida en las demandas educativas, y que innoven en la educación de forma sostenible a través de la democratización y la apertura de la innovación educativa, y a través de la mejora de la calidad.

Palabras Clave: Formación continua, innovación, apertura.

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1. INTRODUCCIÓN: FORMACIÓN CONTINUA EN EL NUEVO ENTORNO

El nuevo entorno, y la transformación de la sociedad, derivada de las nuevas innovaciones tecnológicas y de las nuevas formas de actuación, están implicando la creación de nuevas concepciones educativas, y nuevas formas de abordar el proceso de aprendizaje. El entorno social y educativo de los últimos años ha experimentando cambios dramáticos [1]. Las nuevas transformaciones educativas están derivadas fundamentalmente de los constantes y dinámicos cambios en el entorno, el desarrollo y evolución de las tecnologías de información y comunicaciones, y a las metamorfosis y mutaciones que están experimentando las estructuras sociales y profesionales. Estos hechos advierten de la necesidad de observar nuevos retos que puedan abordar las nuevas innovaciones en diversos aspectos que demanda la sociedad.

Un aspecto primordial a afrontar en el nuevo marco de referencia, es la transformación y la pérdida de peso de la tradicional formación reglada, frente a nuevas formas y conceptos e educación. En este sentido, el espacio tradicional de los denominados grados académicos y la educación reglada tradicional que se ha producido clásicamente con anterioridad a la inmersión laboral, está perdiendo peso frente a una educación continua muy necesaria, y que pueda acometer el continuo reciclaje formativo que la sociedad demanda para hacer frente a las nuevas transformaciones sociales y a las nuevas formas de hacer negocio.

Observado que las personas permanece en el mundo laboral durante un periodo más prolongado de tiempo, que este desarrollo implica etapas distintas y puestos de trabajo distintos (tanto por las posibles progresiones en la vida laboral como por la necesaria flexibilidad para proceder a cambios de trabajo por parte de los individuos) y que el actual mundo laboral experimenta, en periodos cada vez más cortos, profundas mutaciones incluso en trabajos más o menos homogéneos, ello implica una insuficiencia manifiesta de los tradicionales sistemas educativos dirigidos fundamentalmente a la formación pre-laboral, y por lo tanto una mayor necesidad de un desarrollo continuo a lo largo del desarrollo profesional individual. Obviamente, en este espacio, la incidencia en la formación continua observa un papel primordial.

A su vez, y dando un paso más, en nuestra visión, la propia formación continua consideramos que debe a su vez experimentar transformaciones profundas, que vayan más allá de meros cursos teóricos desarrollados a cabo de ciertos años, y al

desarrollo de acciones en el aula. En nuestra perspectiva, la educación continua debe también evolucionar con versatilidad hacia nuevos conceptos educativos y de aprendizaje, que complementen y desarrollen capacidades necesarias a nivel profesional para hacer frente a los nuevos retos que impone el entorno.

Especialmente consideramos necesaria una renovación metodológica por parte de la formación continua, que enfatice tanto en el desarrollo y aplicación de nuevos métodos y procedimientos didácticos utilizados en el proceso de enseñanza-aprendizaje, como a su vez en continuas revisiones de la propia concepción de tales procesos. Tal y como remarcan Estellés et al [2], en el nuevo marco no son las instituciones académicas las que deben ofrecer lo que ellos creen necesario en aspectos conceptualmente globales, sino que en el nuevo contexto debe ser el propio estudiante el protagonista de dicho proceso, para optimizar al máximo el tiempo y el aprendizaje de los estudiantes. En este marco, el estudiante será el centro de atención, y más que protagonista de los procesos de enseñanza, debe y en el fondo es el impulsor y el que diseñe tales procesos.

Inmersos en esta perspectiva, este artículo analiza dos casos o iniciativas pioneras para hacer frente a estas nuevas transformaciones. En primer lugar analizamos la relación de la reciente cátedra UNESCO CREAT-INN-PACT con el desarrollo de nuevas concepciones de educación continua. En segundo lugar, incidimos en la importancia del desarrollo de conferencias especializadas para la potenciación de la formación continua, observando en este caso el ejemplo de esta propia conferencia internacional INNODOCT.

2. CREAT-INN-PACT: LA IMPORTANCIA DE LA CO-CREACIÓN Y EL CO-DISEÑO

La transformación de los entornos hoy en día está produciendo una continua metamorfosis de las distintas economías, fruto de la rápida evolución de las tecnologías, las continuas innovaciones, y la transformación de la propia sociedad, tal y como resaltamos previamente. Ante este entorno, las diversas organizaciones, o incluso las diversas sociedades deben adaptarse a los nuevos cambios, incluso en aquellos casos más tradicionales.

Las formas de hacer negocio están cambiando. Las propias organizaciones virtuales clásicas, centradas en sus competencias y capacidades, están mutando a nuevas

formas abiertas a la sociedad, en donde el fomento de la participación de los consumidores y otros agentes externos debe concebirse como la clave y los motores de cambio de las propias empresas. Ello no solo debe observarse en el mundo empresarial, sino también en el gubernamental, y para ello hace falta nuevas concepciones y nuevos modelos de liderazgo, y con ello nuevas formas de educar a sus líderes y actores principales.

A ello se suman los cambios en los mercados. De modelos organizativos centrados en la producción y mejora de eficiencia, a nuevos modelos centrados y guiados por el marketing y las necesidades de los clientes, quienes deben marcar no solo lo que es “calidad”, sino también quienes son los que deciden qué producir.

Ante esto, todas las organizaciones, incluyendo las organizaciones educativas, deben reconsiderar sus actuaciones, jugando un papel clave en este proceso la educación continua, guiada por el propio estudiante-profesional, tal y como observamos previamente.

Dadas estas premisas, la creación de la Cátedra UNESCO CREAT-INN-PACT, se ha concebido como un intento de dar respuesta a estas demandas, centrándose en la necesaria incidencia en el desarrollo de nuevos líderes que atiendan a los nuevos paradigmas que requiera la sociedad. Líderes a los que no solo se forme para implementar las transformaciones en sus organizaciones o territorios, sino además nuevos líderes a los que se pueda acompañar para estar en la brecha de los nuevos cambios, y con los que se pueda interactuar para poder dinámicamente construir el futuro de las organizaciones.

Dicha Cátedra considera vital una educación continua, en la generación y desarrollo continuo y constante de nuevos líderes que creen las nuevas formas de hacer negocio y puedan proporcionar el empleo que necesitan sus sociedades. No obstante, desde la Cátedra se es consciente que la formación debe ser bidireccional, siendo además estos líderes los que puedan ayudar a descubrir cómo cambian las necesidades y los mercados, para poder crecer siempre con ellos y mejorar la formación continua a través de ellos. La perspectiva de la Cátedra observa a su vez como clave la perspectiva ética del líder social, basada como fuente fundamental en la sostenibilidad, la ética, y los valores fundamentales que deben guiar la acción humana.

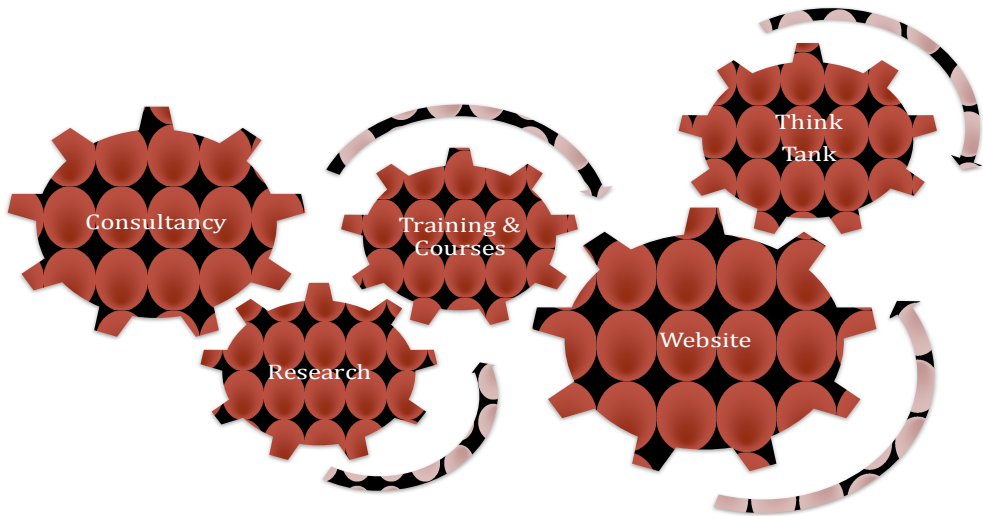


Figura I. Esquema de desarrollo de la cátedra UNESCO CREAT-INN-PACT. Fuente. Elaboración propia

Estas perspectivas se plantean desarrollar con la cátedra UNESCO CREAT-INN-PACT, la cual intenta combinar la acción y experiencia de distintos organismos (y obviamente el saber de todos sus miembros), aunando experiencias y conocimientos de tres agentes: La Universitat Politècnica de València, la Red de Educación Continua de Latinoamérica y Europa (RECLA) y sus universidades asociadas, y UNESCO

En primer lugar, la Cátedra pretende conjugar las aportaciones de la Universitat Politècnica de València y el mundo académico, por los desarrollos y aportaciones que se pueden añadir en el campo del conocimiento. En segundo lugar, considera fundamental la aplicación del conocimiento, y cree que en este aspecto el acuerdo con RECLA puede proporcionarnos el saber hacer y el conocimiento específico de sus instituciones de cada uno de los entornos en los que debe guiar su actuación. Considera, que hoy en día no es recomendable ni factible el desarrollo exclusivo de un conocimiento sólo teórico, y la aplicación práctica y particular del conocimiento a los territorios puede ser apoyada por RECLA y sus miembros a través de su conocimiento específico y las redes de sus miembros en diversos entornos a los que dirigir nuestras acciones. Finalmente, y obviamente, los miembros de la Cátedra consideramos también imprescindible la inclusión de las aportaciones del CLUB

UNESCO para la Protección del Patrimonio Inmaterial, por su experiencia práctica y su capacidad para proporcionarnos diversas y variadas herramientas imprescindibles para un desarrollo sostenible.

Observando como objeto de todo la mejora del desarrollo sostenible y la creación de empleo, con la combinación de mecanismos como el desarrollo de nuevas perspectivas de formación continua, la perspectiva de la Cátedra intenta combinar los aspectos de liderazgo y creatividad, innovación y nuevas formas de hacer negocio, y el impacto en los nuevos mercados y la atención a estos nuevos mercados. Sin embargo, la Cátedra incide en que estos aspectos no pueden ni deben crearse de forma individuo o unilateral por las organizaciones, dado que en un mundo donde los equipos y las redes son más importantes, es necesaria la co-creación, el co-liderazgo y el co-diseño articulado de una forma coherente y aplicado en cada territorio.

Tal y como señalan Garrigós et al [3], el valor en las organizaciones debe ser co-creado por una combinación de jugadores en sus redes con otros organismos. El aspecto de la combinación de diversos jugadores está en la línea de la creciente importancia del trabajo en grupo. Atendiendo a Barberá et al [4], el trabajo en equipo es una competencia esencial y cada vez más demandada por la industria, y en el ámbito organizacional, el mismo se impone sobre el trabajo individual en tareas o actividades complejas

La experiencia para el desarrollo de estos aspectos comenzó con la creación de un acuerdo de colaboración y un acuerdo marco entre los tres organismos. A partir de ahí, en la cátedra se está considerando la realización de algunas actividades, como cursos, aunque la propuesta es el ir más lejos, con la consultoría, creación de un Think-tank o la creación de un sitio web que lleve a coordinar todos estos proyectos para producir unos mecanismos que conduzcan a desarrollar nuevos líderes, y a desarrollar nuevos e innovadores modelos de negocio. Incidiendo en el hecho de que lo importante no es solo crear, sino también co-crear y el desarrollar futuro, en la cátedra se considera vital no proceder tanto a intentar crear o comenzar el desarrollo de cuestiones nuevas, sino el intentar más ir de la mano de las personas con las que se va a trabajar para desarrollar una riqueza sostenible. La propuesta del proyecto es en primer lugar el apoyo a los líderes del futuro, para atender a los nuevos mercados y para crear nuevos e innovadores modelos de negocio que nos ayuden a la creación de una riqueza sostenible.

El ecosistema gira alrededor de muchas áreas. Los docentes desde la universidad desarrollamos el aspecto de la investigación, pero consideramos que ésta debe de girar y aplicarse a través de trabajos de consultoría y a través de cursos y acciones de formación que vengan coordinadas mediante la página web y mediante la creación de un modelo de pensamiento en grupo.

El primer paso de la acción comenzó con la creación y lanzamiento del “Diploma de extensión universitaria en liderazgo, toma de decisiones estratégicas y mercados emergentes”, diploma cuya primera edición ya se ha realizado, de forma virtual, y que fue propiciado desde la Universitat Politècnica de Valencia, al considerarlo esta como un título propio de la misma. Este curso se centra en tres aspectos del liderazgo: el saber ser líder, el saber liderar, y el saber hacer de líder. A partir de aquí, y como paso siguiente la Cátedra se propone sobretodo crear entornos movilizados de nuevas habilidades y nuevas capacidades y de nuevas ideas sobre cómo evoluciona el nuevo mercado, cómo tienen que desarrollarse los nuevos modelos, o cómo aplicar las tecnologías de la información, y la ética a estas organizaciones, dado que la generación de riqueza y empleo y la transmisión de ello son pilares básicos.

3. INNODOCT: APERTURA E INNOVACIÓN EN LA EDUCACIÓN

En la universidad intentamos inculcar repetidamente a los alumnos acciones y valores, e incluso iniciativas. Uno de los aspectos en los que se incide últimamente de forma reiterada es en la importancia de la promoción del emprendedurismo. Con el caso de INNODOCT, sus promotores hemos querido desarrollar también ese espíritu que queremos inculcar en los demás en el aula.

Al principio de este capítulo hemos incidido en la importancia y la promoción de la formación continua. Observando un paso más en este desarrollo, y además de la integración de diversos agentes en esta formación continua, como postulábamos anteriormente cuando desarrollábamos la idea de creación de la Cátedra UNESCO CREAT-INN-PACT, queremos remarcar que la formación continua no debe limitar su actuación la incidir en la creación de cursos. Consideramos vital que a su vez, la formación continua estudie y analice cómo mejorar la realización de los cursos y cómo innovar en metodologías docentes y de educación. Dado ello, es vital incidir en la innovación educativa.

Un importante problema de la innovación educativa es la existencia de múltiples barreras a la transmisión de las mejoras educativas. Los libros sobre innovación educativa están muy sesgados, las conferencias a veces son caras, y acceder a las nuevas innovaciones educativas muchas veces no está al alcance de todo el mundo. A su vez, la mejora educativa, incluida la educación continua, necesita de conferencias accesibles, para mejorar su transmisión.

Para hacer frente a todo ello, en 2013 un grupo de docentes del departamento de Organización de Empresas de la Universitat Politècnica de Valencia lanzamos INNODOCT como un paso en el camino para hacer frente a estas problemáticas. La conferencia internacional INNODOCT fue un hecho pionero, que al principio recibió innumerables críticas por diversos motivos. En primer lugar porque iba a ser una conferencia sobre educación (sobre cómo mejorar las técnicas de educación, cómo mejorar las técnicas o tecnologías en educación) y se creaba por docentes expertos en organización de empresas. En segundo lugar porque se planteaba por primera vez, una nueva conferencia, dirigida a un público muy amplio, y que fuera sólo virtual. Y finalmente porque se consideraba que era excesivamente barata.

Diversas evaluaciones criticaban nuestro modelo, reprobando desde la posibilidad de su creación, a la utilidad de la misma, al hecho de ser virtual y no tener presencia física (planteando la inexistencia del networking...). Sin embargo nuestro planteamiento incidía en la necesidad de dar nuevas respuestas a las demandas del entorno. Queríamos a su vez democratizar y abrir la innovación docente para que pudiera llegar a público muy diverso, de diferentes culturas, y que sirviese nuestra idea como punto de encuentro para la difusión de nuestros desarrollos. Los hechos nos dieron la razón, y en el primer año nuestro proyecto contó con la participación de profesionales de más de 30 países de los 5 continentes (obviamente, en la segunda edición los datos se superaron).

En el año 2014 INNODOCT ya insertó un modelo de traducción simultánea de los comentarios de los participantes a múltiples lenguas, (a la vez que inserto la comunicación en video, y comunicación privada entre los diversos miembros para permitirles el networking) y sus miembros promovimos y desarrollamos el cómo lanzarla en otros idiomas, con el intento de obviar la barrera idiomática y conseguir mejorar la innovación y democratizar la misma. A su vez, si bien en el primer año la conferencia se realizó en Inglés y Español, en 2014 se realizó también una edición en portugués, la cual contó con una nutrida participación, fundamentalmente de profesionales de Portugal y Brasil. (En un futuro próximo los miembros de INNODOCT

nos planteamos además versiones en otros idiomas, para lo cual estamos trabajando seriamente).

Nuestros objetivos son parecidos al caso de CREAT-INN-PACT. En primer lugar creemos que es necesaria una transformación en los mecanismos de enseñanzas, y además de los cursos tradicionales. Es necesaria la creación de nuevas concepciones, como pueden ser en este caso las conferencias virtuales, como una extensión de las comunidades virtuales, que ayuden a crear plataformas de creación y difusión del conocimiento especializada. En nuestro caso hablamos de conocimiento y experiencias en el campo docente, pero obviamente eso se extiende, o debería extenderse, a múltiples y muy diversas áreas. En segundo lugar, nuestro objetivo es innovar y emprender, en el sentido en el que impulsamos que lo hagan nuestros alumnos. Esta cuestión no es solo una cuestión de valores, sino que además se plantea como una cuestión de pura necesidad en un horizonte cercano. Los docentes tenemos muy poco futuro si no atendemos a las demandas que la sociedad nos plantea, y obviamente no tendremos futuro si no aprendemos las lecciones que promulgamos en el aula, y seguimos con métodos estancados tanto en la concepción como en el desarrollo de la docencia. Igual que es necesaria la innovación en el mundo organizativo, las organizaciones educativas también necesita de esta innovación. Dado que es necesario el emprendedurismo y el intraemprendedurismo para el desarrollo de nuestras organizaciones y nuestra sociedad en general, las organizaciones educativas no pueden quedar al margen de esta situación. Finalmente, nuestro objetivo pretende también la sostenibilidad. Sostenibilidad que solo puede alcanzarse, en nuestra perspectiva, por dos vías. A este respecto es necesario enfatizar en la importancia de la calidad, y por ello INNODOCT intenta mejorar el proceso de revisión de los trabajos presentados, con objeto de mejorar la calidad de los trabajos y evitar “perdidas de tiempo” de los participantes en las continuas ediciones. Además, nuestro proyecto quiere incidir en la importancia de contar con el mayor número de innovaciones posibles, y que estas lleguen al mayor número de personas posibles, con lo que intentamos reducir el precio para cubrir simplemente costes e intentar la democratización de las innovaciones.

4. CONCLUSIÓN

En este artículo hemos tratado de observar algunos de los cambios profundos que se están produciendo en el marco educativo, y que inciden en la relevancia creciente de la educación continua como mecanismo fundamental para el desarrollo profesional de los individuos, y como elemento esencial en el desarrollo de las diversas sociedades. A su vez, el artículo ha analizado la relevancia del enfatizar los aspectos

de co-creación, co-diseño y co-liderazgo para enfocar tanto la instauración, como la propia delineación e implementación de los programas de formación continua.

A través del análisis de los objetivos y el proceso de creación de la cátedra CREAT-INN-PACT, y de la propia conferencia INNODOCT, el artículo aboga y explica la necesidad de cambiar el paradigma educativo en el nuevo marco, y la necesidad de incidir en un nuevo concepto de aprendizaje centrado en el desarrollo, y que observe como piedra angular la potenciación de la formación continua, y como elemento clave de esta, el profesional o individuo demandante de la misma. A su vez, el trabajo incide en la importancia y necesidad de “democratizar” la innovación educativa, y de abrir los nuevos conocimientos y nuevos enfoques para el beneficio tanto de los demandantes como para la propia sostenibilidad de los nuevos enfoques educativos.

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CSCL: LOS GUIONES DE COLABORACIÓN Y LA REDACCIÓN DE LOS ACUERDOS GRUPALES COMO INSTRUMENTOS PARA ESTRUCTURAR LA INTERACCIÓN

N. HERNÁNDEZ-SELLÉS, P.C. MUÑOZ-CARRIL y M. GONZÁLEZ-SANMAMED

Resumen.

Son amplios y diversos los estudios que recogen las ventajas del CSCL (Computer Supported Collaborative Learning) para el aprendizaje, relacionándolas con el desarrollo cognitivo, así como con la adquisición de competencias transversales vinculadas con el trabajo en equipo y con la dimensión social que incorpora. Para que el CSCL favorezca este tipo de aprendizajes parece necesario elaborar un diseño que trate de estructurar la interacción en tres niveles; el cognitivo, el organizativo y el social. De este modo se atenderá igualmente a la dimensión del aprendizaje, a los aspectos organizativos que asienten las bases de una cohesión interna en el grupo y a los aspectos personales que intervienen en un proceso de intercambio grupal. En este sentido, los autores que abordan el CSCL destacan el interés de generar Guiones de Colaboración que comuniquen a los alumnos el modelo de colaboración, informando de las fases de trabajo y los objetivos pedagógicos y facilitando unas directrices acerca de la formación, interacción y colaboración del grupo en torno a la tarea. Para atender los aspectos organizativos que asienten unas bases para la interacción, parece importante proponer a los grupos que concreten unos acuerdos en los que se establezca un reparto de roles, se defina el sistema de intercambio y la frecuencia de contacto y se ajuste una planificación que contemple el contraste intergrupal. El propósito de este estudio es analizar la importancia de estructurar el CSCL mediante Guiones de Colaboración, examinando la utilidad de los acuerdos grupales en la creación y funcionamiento de los grupos. Para ello se llevó a cabo una investigación con una metodología cuantitativa de carácter no experimental de tipo encuesta en la que participaron 106 estudiantes de grado de cinco asignaturas que implementaron CSCL. Los resultados obtenidos ponen el énfasis en la utilidad del Guión de Colaboración así como la importancia de la redacción de acuerdos grupales y su incidencia en la creación y funcionamiento del grupo. En base a esta experiencia se propone un modelo para el diseño de Guiones de Colaboración.

1. LA INTERACCIÓN EN EL APRENDIZAJE COLABORATIVO

Diversos expertos en el ámbito del trabajo colaborativo coinciden en señalar las ventajas del CSCL (Computer Supported Collaborative Learning) para el aprendizaje, relacionándolas con el desarrollo cognitivo, así como con la adquisición de competencias transversales vinculadas con el trabajo en equipo y con la dimensión social que incorpora [1], [2], [3], [4].

Para que el CSCL favorezca este tipo de aprendizajes parece necesario elaborar un diseño que trate de estructurar la interacción en tres niveles; el cognitivo, el organizativo y el social. De este modo se atenderá igualmente a la dimensión del aprendizaje, a los aspectos organizativos que asienten las bases de una cohesión interna en el grupo y a los aspectos personales que intervienen en un proceso de intercambio grupal.



Figura 1. Niveles de Interacción en el CSCL. Fuente: Elaboración propia.

En el nivel cognitivo, el modelado del proceso de interacción puede favorecer las interacciones significativas que conducirán al aprendizaje, las cuales dependen de la calidad de la argumentación y la regulación mutua del proceso cognitivo entre los miembros de un grupo [5], [6].

En el nivel organizativo, parece necesario guiar a los alumnos a desarrollar una planificación que facilite la organización interna del grupo, asentando así las bases para la interacción posterior [4].

En el nivel social parece necesario atender los aspectos socio-emocionales relativos a la formación de los grupos, así como las dinámicas que se establecen en el proce-

so de interacción para favorecer un compromiso de los miembros con las relaciones sociales, el desarrollo de la confianza y generar un sentimiento de pertenencia y comunidad [7].

2. LOS GUIONES DE COLABORACIÓN

Para abordar los tres niveles de interacción cognitiva, organizativa y social, distintos autores [6], [8], [9], [10] destacan el interés de generar Guiones de Colaboración que comuniquen a los alumnos el modelo de colaboración, informando de las fases de trabajo y los objetivos pedagógicos y facilitando unas directrices acerca de la formación, interacción y colaboración del grupo en torno a la tarea.

Tal y como señala [11] la importancia de estructurar y regular la interacción en los grupos colaborativos se convierte en un hecho fundamental para inducir los procesos cognitivos adecuados a su tarea de aprendizaje. Esta estructuración, cimentada en el diseño de la experiencia, guiará a los alumnos a asumir determinados roles, a seguir una secuencia prescrita de actividades e incluso a desarrollar unos patrones de interacción determinados de modo que se consiga generar experiencias que favorezcan el flujo de interacciones significativas de forma directa o indirecta [6].

Dillenbourg [2] define los guiones de colaboración (collaboration scripts) como un conjunto de instrucciones que prescriben cómo los alumnos deben formar los grupos, cómo deben interactuar y colaborar y cómo deben resolver las tareas. Formula una secuencia de fases con 5 atributos en los guiones:

- Tipo de tarea que se debe completar
- Formación y composición del grupo
- Distribución de la tarea en el grupo y entre los grupos
- Tipo y modo de interacción
- Temporización de la fase

El atributo Distribución de la tarea en el grupo conlleva la distribución de roles y tareas, así como la elección de recursos o herramientas. Dillenbourg y Hong [6] consideran que la asignación de roles constituye un componente clave de los mecanismos de los Guiones, en relación con los aspectos de organización y con el compromiso que desarrollen los individuos del grupo. Por otro lado, [2] señala la necesidad de incidir en los hitos y la temporización de la colaboración dado que en la formación virtual los alumnos a menudo pierden las referencias temporales habituales en la formación presencial.

King [11] define la guionización de la colaboración (scripting collaboration) como un medio para estructurar y regular la interacción en el aprendizaje colaborativo y con el fin de promover los procesos cognitivos, metacognitivos y sociocognitivos, asegurando con ello el aprendizaje. Esta autora identifica tres elementos en la elaboración de los guiones:

- Rol de los participantes
- Acciones en las que se involucra a los alumnos
- Secuencia de los eventos

Algunos autores [12] proponen un guión que describa: grupos, participantes, roles, tareas y recursos. Los mecanismos de guionización determinan cómo se distribuyen los roles y los recursos, el modo de agrupar los equipos y la distribución temporal del trabajo, poniendo en relación la tarea y los flujos de interacción.

Es recomendable sistematizar un modelo de guiones que comunique a los alumnos el tipo de interacción esperada y que clarifique la relación entre el resultado de la tarea y la interacción grupal, con el objetivo de favorecer una interacción significativa [5].

3. LOS ACUERDOS GRUPALES

Para atender los aspectos organizativos que asienten unas bases para la interacción, parece importante proponer a los grupos que concreten unos acuerdos en los que se establezca un reparto de roles, se defina el sistema de intercambio y la frecuencia de contacto y se ajuste una planificación que contemple el contraste intergrupal [3], [13]. La redacción de los acuerdos asienta unas bases organizativas, consensuadas por los miembros de los grupos, que configurarán unas bases para la relación posterior. Con el objetivo de garantizar el éxito del proceso de interacción es posible acompañar a los grupos en el proceso de redacción y prever un tiempo para revisar los acuerdos, facilitando unos comentarios a los alumnos que inicien un contacto con el docente, atendiendo a la dimensión social y que contengan comentarios acerca de los aspectos organizativos plasmados en los acuerdos.

4. PROPUESTA DE ESTRUCTURACIÓN DE UN GUIÓN DE COLABORACIÓN

De acuerdo con la revisión de la literatura, a continuación se propone una estructura de guión que trata de recoger los distintos aportes de los autores.

- Descripción de la tarea
- Tipo de interacción esperada (presentar los objetivos de desarrollar el proceso de colaboración)

- Principales hitos de trabajo (entre los que se incorporan la creación de los grupos, redacción de los acuerdos, desarrollo de la tarea, entrega y contraste de resultados en el aula)
- Herramientas (que se facilitan o recomiendan al servicio del proceso de interacción)
- Propuesta de redacción de los acuerdos grupales (que incorporen unos criterios para la formación de los grupos). A continuación se incorpora una propuesta de apartados en base a la revisión de la literatura:

1 Nombre del grupo.

2 Nombre de los miembros del grupo

3 Frecuencia de conexión entre los miembros del grupo.

4 Estrategias previstas cuando un miembro del grupo no responde.

5 Establecimiento de canales de comunicación.

6 Reparto de roles

7 Planificación de la actividad grupal:

1. Definición de tareas.
2. Distribución del trabajo individual (si es posible o se considera interesante distribuir parte del trabajo).
3. Establecimiento de momentos para el contraste intergrupal (puesta en común de los aportes individuales, feedback del grupo, reflexión y aportes, concreción de la propuesta grupal).

- Tipos de aprendizaje que se promueven mediante la tarea desarrollada en colaboración (en relación con el desarrollo cognitivo, metacognitivo y sociocognitivo).

En relación con el apartado “Medidas a tomar cuando un miembro del grupo no responde”, [14] indican que uno de los aspectos que los alumnos perciben más negativos de la experiencia de trabajo en el grupo se relaciona con la falta de compromiso por parte de algún miembro del grupo, hecho que parece afectar tanto al proceso como al resultado del aprendizaje. En un estudio con 4.349 participantes que habían experimentado aprendizaje colaborativo, [15] hallaron que los alumnos valoraron de forma muy positiva la oportunidad de omitir en las entregas a los alumnos que no participaron en las tareas.

5. METODOLOGÍA Y RESULTADOS

Se llevó a cabo una investigación con una metodología cuantitativa de carácter no experimental de tipo encuesta en la que participaron 106 estudiantes de grado de maestro/a en Infantil y Primaria, agrupados en cinco asignaturas que implementaron CSCL en el Centro Superior de Estudios La Salle.

La encuesta elaborada estaba formada por un total de 139 ítems que seguían una escala Likert de 5 puntos. No obstante, en la presente comunicación nos centraremos en analizar aquellos ítems específicamente relacionados con la percepción de los estudiantes respecto a la utilidad de los guiones de colaboración y aquellos elementos a tener en cuenta de cara a la redacción de los acuerdos grupales.

Respecto a la valoración del alumnado sobre la utilidad de la información del documento Guía para el Trabajo Colaborativo, los ítems analizados han sido:

- Para entender en qué consistirá el trabajo colaborativo en el entorno virtual.
- Para asentar unas bases para trabajar en equipo de forma eficaz.
- Para conocer las actitudes que facilitan el trabajo en equipo en un entorno virtual (compromiso, transparencia, constancia, respeto, ayuda a los compañeros/as).

En cuanto a la valoración por parte de los estudiantes de la utilidad de redacción de acuerdos grupales, se han tomado como base diversos ítems ya analizados por los autores en otro trabajo [16], tales como la frecuencia de conexión, las estrategias cuando un miembro no responde, los canales de comunicación empleados, el reparto de roles entre los miembros del equipo, la planificación a través de un calendario de trabajo, el reparto de funciones y tareas entre los alumnos que forman el grupo y la valoración/autoanálisis (momentos para el debate y contraste intergrupales).

Como se puede observar en el gráfico 1, y a tenor de las puntuaciones medias obtenidas, los estudiantes valoran positivamente la utilidad de la información del documento guía para el trabajo colaborativo que se les facilita durante el proceso de trabajo en equipo. En concreto, el alumnado señala la utilidad de la información que esta guía les aporta en torno a conocer y entender en qué va a consistir el trabajo colaborativo en un entorno virtual (media de 3,84), así como conocer las bases a partir de las cuales trabajar en equipo de forma eficaz (media de 3,98). Igualmente, los estudiantes valoran muy positivamente (media de 3,92) el hecho de conocer las actitudes que facilitan el trabajo en equipo en un entorno virtual.

Otro aspecto que resultaba de interés en el estudio realizado era conocer si existía algún tipo de diferencia significativa entre aquellos alumnos que previamente habían tenido algún tipo de experiencia de trabajo colaborativo presencial. La prueba no paramétrica U-Mann Whitney que se utilizó (ver tabla 1) puso de manifiesto que los estudiantes que con anterioridad habían desarrollado acciones colaborativas de forma presencial eran los que otorgaban un mayor grado de utilidad a la información del documento Guía para el Trabajo Colaborativo, frente a aquellos otros alumnos sin experiencia presencial en trabajo en equipo.

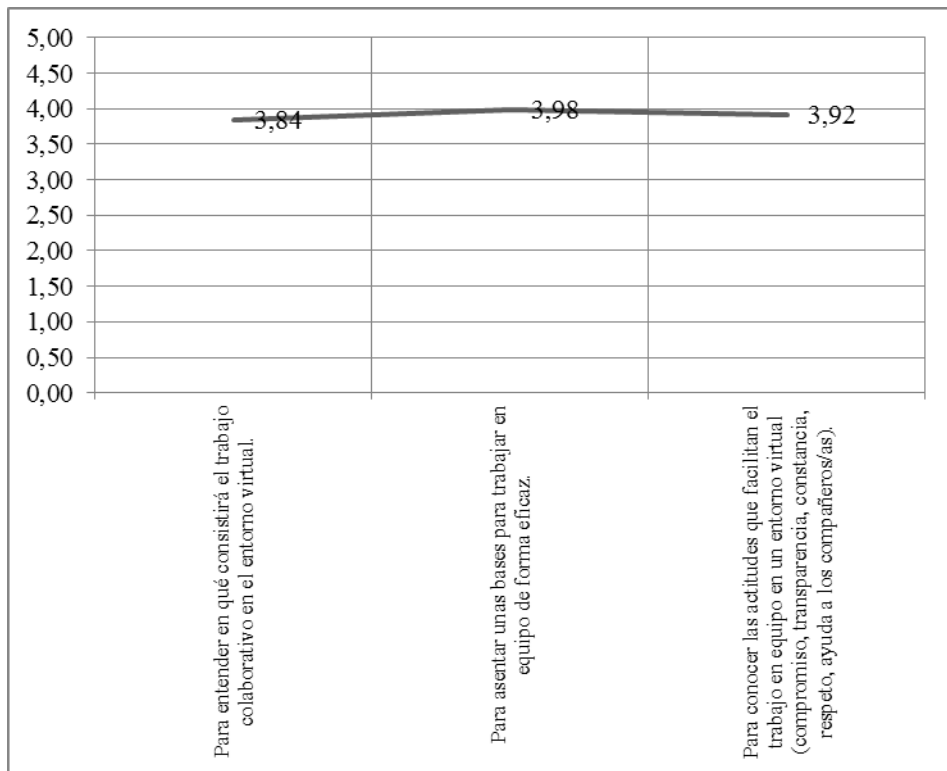


Gráfico 1. Puntuaciones medias de los diversos ítems analizados sobre la utilidad de la información del documento Guía para el Trabajo Colaborativo.

<i>Variables a contrastar</i>	<i>Experiencia colaborativa presencial</i>	<i>N</i>	<i>Rango promedio</i>	<i>Estadísticos de contraste</i>
Para entender en qué consistirá el trabajo colaborativo en el entorno virtual.	Sí	84	56,57	U de Mann-Whitney W de Wilcoxon Z Sig. asintót. (bilateral)
	No	22	41,77	
	Total	106		
Para asentar unas bases para trabajar en equipo de forma eficaz.	Sí	84	57,04	U de Mann-Whitney W de Wilcoxon Z Sig. asintót. (bilateral)
	No	22	40,00	
	Total	106		
Para conocer las actitudes que facilitan el trabajo en equipo en un entorno virtual (compromiso, transparencia, constancia, respeto, ayuda a los compañeros/as).	Sí	84	56,90	U de Mann-Whitney W de Wilcoxon Z Sig. asintót. (bilateral)
	No	22	40,50	
	Total	106		

Tabla 1. Diferencias significativas a través de la prueba U-Mann Whitney. Variable de agrupación: experiencia colaborativa presencial

6. CONCLUSIONES

Como conclusión se puede señalar que en la experiencia desarrollada los resultados obtenidos muestran la utilidad de definir claramente aquellos aspectos que forman parte del guión de colaboración, así como la relevancia y especial cuidado que hay que prestar a la propuesta de redacción de los acuerdos grupales. En relación con el Guión, los alumnos lo consideran de gran utilidad para conocer y entender en qué va a consistir el trabajo colaborativo en un entorno virtual así como para conocer las bases a partir de las cuales trabajar en equipo de forma eficaz. Como ya se ha señalado, cabe destacar que han sido los alumnos con experiencia previa de trabajo

colaborativo en el ámbito presencial los que otorgaban más utilidad a la información del documento Guía para el Trabajo Colaborativo.

En cuanto a los acuerdos grupales, tal y como se ha podido constatar en otros trabajos [16], los alumnos valoran de forma muy positiva, entre otros aspectos, acordar los canales de comunicación que se van a emplear en el entorno virtual, así como establecer el sistema de reparto de tareas entre los miembros del grupo.

Para que el CSCL desarrolle su potencial es importante partir de una planificación que estructure los procesos de interacción en los niveles cognitivo, organizativo y social. Los Guiones de colaboración pueden articular estos procesos en la medida en que comunican a los alumnos el modelo de colaboración, informando de las fases de trabajo y los objetivos pedagógicos y facilitando unas directrices acerca de la formación, interacción y colaboración del grupo en torno a la tarea. Por otro lado, la redacción de los acuerdos asentará los cimientos organizativos, consensuados por los miembros del grupo, que configurarán unas bases para la relación posterior.

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RESULTADOS DE UNA INTERVENCION PARA AMINORAR LAS BRECHAS DIGITALES EN EL SISTEMA EDUCATIVO DE TAMAULIPAS, MEXICO.

J.R. BACA, L. VARELA, G. HACES, A ECHAVARRIA y A. HERNÁNDEZ.

Resumen.

Esta propuesta describe la estrategia de intervención según recomendaciones generadas por la investigación titulada "Un estudio de la brecha digital en el sistema educativo de Tamaulipas", estudio llevado a cabo con financiamiento externo del Consejo Nacional para la Ciencia y Tecnología.

1. MARCO TEÓRICO

Las recomendaciones y estrategias de intervención que se presentan en este informe se originaron en el "Estudio de la brecha digital en los sistemas educativos del estado de Tamaulipas, México" CONACYT-FOMIX, clave M0021-2010-27, un esfuerzo que realiza el gobierno y la academia para identificar y analizar la brecha digital en el proceso educativo del estado de Tamaulipas, México.

La brecha digital se ha estudiado en varias partes del mundo para hacer evidentes las diferencias entre los que tienen acceso a los beneficios representados por las Tecnologías de la Información y las Comunicaciones (TIC) y los que permanecen en una situación de desventaja comparativa en todas las actividades humanas, especialmente la educación [1].

Las TIC son la base de la economía global de la información y el factor clave para la Sociedad de la Información. La diferencia en el acceso a las TIC entre los países desarrollados y en desarrollo, se denomina "brecha digital" [2].

La brecha digital se basa no sólo en los aspectos de acceso, sino también en el uso adecuado de las TIC. Los países en desarrollo persiguen la eficacia de sus sistemas educativos, y una clave para el logro de este objetivo es asegurar el acceso, conocimiento y uso adecuado de las TIC, con el fin de garantizar un capital humano capaz y competitivo, para afrontar el reto de la globalización [2].

Este estudio descriptivo exploratorio investigó la brecha digital en el sistema educativo del estado de Tamaulipas, México [3], para lo cual se realizó el estudio a través de tres factores: la infraestructura presente en las instituciones educativas, la capacitación de los profesores y estudiantes acerca de sus habilidades y destrezas en las TIC, y el uso específico que los estudiantes y los profesores dan a las TIC [4].

Se utilizó un cuestionario diseñado por la UNCTAD (UNCTAD/SDTE/ECB/2007/2) para explorar la brecha digital presente en el sector productivo, en algunos

países de América Latina, adaptado a las instituciones educativas [5]. Para este proyecto, hubo una financiación externa a través de Consejo Nacional de Ciencia y Tecnología [6].

La aplicación del cuestionario se llevó a cabo en formatos electrónicos [7] y convencionales, para recopilar información de las instituciones educativas en toda la geografía del estado de Tamaulipas. El estudio abarca los 43 municipios del estado, los cuales cuentan con una población de 3,268, 554 habitantes.

2. MÉTODO

Para obtener las muestras de estudio fueron seleccionados para todos los niveles, los actores fundamentales en el proceso de enseñanza-aprendizaje: Directores, Profesores, Estudiantes. Las encuestas se aplicaron a los actores y se recogieron datos para explorar e identificar las brechas digitales presentes a través de preguntas abiertas y cerradas que evaluaron 3 factores: Infraestructura, Capacitación y Uso.

Para conseguir la muestra general, el método estratificado [8], se utilizó para cada nivel a fin de garantizar el análisis de acuerdo con sus características y garantizar muestras representativas de la enseñanza preescolar, primaria, secundaria, media superior y superior.

Para Preescolar se obtuvo una muestra de: 79 estudiantes, 78 maestros y 81 directivos; para primaria: 213 estudiantes, 151 maestros y 103 directivos; para secundaria: 105 estudiantes, 124 maestros y 70 directivos; para preparatoria: 131 estudiantes, 120 maestros y 70 directivos; para educación superior: 132 estudiantes, 127 maestros y 80 directivos.

Se crearon 15 tipos de cuestionarios dirigidos a los 3 actores en cada grado: Preescolar Directivo, Alumno y Maestro, Primaria Directivo, Alumno y Maestro, Secundaria Directivo, Alumno y Maestro, Media Superior Directivo, Maestro y Alumno, Superior Directivo, Maestro y Alumno.

3. RECOMENDACIONES Y ESTRATEGIA DE INTERVENCIÓN PARA ABORDAR LA BRECHA DIGITAL EN EL SISTEMA EDUCATIVO DE TAMAULIPAS, MÉXICO

DIRECTIVO PREESCOLAR - RECOMENDACIONES

Infraestructura: Dar mayor cobertura a la utilización de TIC, así como obtener nuevos equipos. Se recomienda la renovación de equipos y programas en todas las instituciones de enseñanza preescolar.

Capacitación: Una campaña de certificación de maestros de preescolar en software general que se utilizan más en su enseñanza. Iniciar un programa más intenso de capacitación en el uso de las TIC.

Uso: Hacer un sitio web de las escuelas para mejorar el servicio prestado a los estudiantes y padres de familia.

PROFESOR PREESCOLAR - RECOMENDACIONES

Infraestructura: Renovar equipos y software en todas las instituciones de educación preescolar.

Capacitación: Habilitar cursos para manejar las aplicaciones en general, en el 88 por ciento que no lo utilizan, para que los profesores sean más productivos, así como reforzar las habilidades en Internet para que las materias que se imparten. Capacitar a más de la mitad de los profesores que no dominan las herramientas de software para presentaciones multimedia.

Uso: Se recomienda la asistencia regular de los alumnos al centro de cómputo, para contrarrestar el 58 por ciento que no lo usan. Involucrar a los docentes que utilizan la tecnología en el proceso de toma de decisiones, para la capacitación de sus alumnos.

ALUMNO- PREESCOLAR - RECOMENDACIONES

Infraestructura: Estandarizar el acceso a las TIC, en el 38 por ciento de los planteles de educación preescolar que no tiene. Aumentar el número de las computadoras, para contrarrestar el indicador de 38 estudiantes por máquina.

Capacitación: Impartir conocimiento en el manejo del ordenador y de Internet para niños en edad preescolar. Mejorar los programas de inglés.

Uso: Establecer políticas de acceso y de uso frecuente del centro de computación a través de cursos de capacitación para profesores y estudiantes.

En resumen se obtuvieron 16 recomendaciones en Infraestructura, 18 recomendaciones en Capacitación y 13 recomendaciones en Uso.

DIRECTIVO PRIMARIA - RECOMENDACIONES

Infraestructura: Aumentar el número de ordenadores en las escuelas con el propósito de una mayor cobertura en el uso de las TIC. Obtener nuevos equipos.

Capacitación: Crear un programa de entrenamiento intensivo en el uso de las TIC que puede erradicar la brecha digital, que dificulta la calidad del proceso de enseñanza-aprendizaje. Que las autoridades educativas tomen cartas en el asunto en términos de capacitación.

Uso: Crear un sitio web de las escuelas.

MAESTRO PRIMARIA - RECOMENDACIONES

Infraestructura: Promover las aulas con equipamiento de computadoras para mejorar la calidad de la enseñanza en las escuelas primarias. Poner a disposición de los maestros el acceso a los equipos TIC actualizado y conectado a Internet.

Capacitación: Promover cursos de capacitación en manejo de software. Formar a los profesores en la búsqueda de contenido en línea.

Uso: Promover cursos de capacitación sobre el uso de computadoras de manera productiva para el rendimiento académico y el aprendizaje de calidad.

ALUMNO PRIMARIA - RECOMENDACIONES

Infraestructura: Se sugiere, a través de más equipo, estandarizar el acceso a la educación de las TIC en las escuelas primarias, para que más estudiantes puedan acceder a las tecnologías. Aumentar el número de equipos a los efectos de una mayor cobertura en el uso de las TIC.

Capacitación: Es aconsejable disponer de capacitación en el manejo de una computadora.

Uso: Promover el uso de la computadora para búsqueda de contenidos en internet.

En resumen se obtuvieron 15 recomendaciones en Infraestructura, 17 recomendaciones en Capacitación y 12 recomendaciones en Uso.

DIRECTIVO SECUNDARIA - RECOMENDACIONES

Infraestructura: Aumentar la infraestructura, para que más estudiantes puedan aprender el uso de las TIC.

Capacitación: Certificar a los docentes en las aplicaciones informáticas que se utilizan más en su desempeño docente. Capacitación más intensiva en el uso de las TIC para reducir la brecha digital.

Uso: Crear un sitio web de la escuela.

MAESTRO SECUNDARIA - RECOMENDACIONES

Infraestructura: Aumentar el número de equipos instalados en las aulas. Dotar a las escuelas que no cuentan con las herramientas tecnológicas para explotar las ventajas competitivas que se pueden obtener con su uso.

Capacitación: Cursos de capacitación dirigidos a la adquisición de habilidades en TIC. Aumentar el número de cursos enfocados a la navegación por Internet proporcionada a los maestros.

Uso: Aplicar políticas de planificación para los profesores que asistirán con sus alumnos a las aulas de informática. Uso de software de propósito general.

ALUMNO SECUNDARIA - RECOMENDACIONES

Infraestructura: Aumentar el número de computadoras con fines de una mayor cobertura en el uso de las TIC. Se recomienda una mejor conectividad de equipos de Internet.

Capacitación: Cursos de capacitación para los estudiantes en el uso de las TIC. Aumentar la capacitación orientada a la navegación por Internet.

Uso: Establecer horas para el uso de las computadoras y crear políticas para los profesores que utilizan estas herramientas en las materias que enseñan.

En resumen se obtuvieron 10 recomendaciones en Infraestructura, 16 recomendaciones en Capacitación y 12 recomendaciones en Uso.

DIRECTIVO MEDIA SUPERIOR - RECOMENDACIONES

Infraestructura: Aumentar la infraestructura para una mayor cobertura de las TIC. Comprar nuevos equipos para proporcionar los beneficios del nuevo.

Capacitación: Certificar a los maestros de educación media superior en las aplicaciones informáticas que se utilizan más en su desempeño docente. Capacitación en el uso de las TIC en las escuelas secundarias superiores para reducir la brecha digital.

Uso: Aplicar *blended learning* en la educación en los programas de los estudiantes. Uso de materiales en línea en combinación con materiales convencionales o tradicionales de las escuelas secundarias.

MAESTRO MEDIA SUPERIOR-RECOMENDACIONES

Infraestructura: Equipar las aulas con equipo de cómputo y comunicaciones para mejorar la calidad de la enseñanza. Construcción de un aula de informática para el 4 por ciento de las instituciones de nivel secundario superior que no tienen.

Capacitación: Cursos para garantizar las habilidades y la mejora académica de los docentes, capacitación para la búsqueda de contenidos en línea, para enriquecer los programas que enseñan. Certificación de las TIC en el procesamiento de textos.

Uso: Política de planificación para que los estudiantes tengan acceso frecuente a estas nuevas tecnologías. Uso de la Internet en las creaciones y diseños de consultoría wikis, para mejorar las perspectivas de los estudiantes en la clase.

ALUMNO MEDIA SUPERIOR-RECOMENDACIONES

Infraestructura: Mayor infraestructura para un mayor acceso a la tecnología. Diseño de un centro de cómputo para las escuelas que no cuentan con uno.

Capacitación: Cursos de capacitación para el 33 por ciento de los estudiantes que no habían tomado cursos dentro de su institución.

Uso: Uso del diseño, la consultoría y la creación de animaciones wikis como parte de las materias del currículo. Uso de blogs, vídeos y cursos académicos en línea dentro del currículo académico para aumentar el nivel de conocimiento.

En resumen se obtuvieron 16 recomendaciones en Infraestructura, 21 recomendaciones en Capacitación y 28 recomendaciones en Uso.

DIRECTIVO SUPERIOR - RECOMENDACIONES

Infraestructura: Una mayor conectividad de los equipos informáticos a través de una red que permita el acceso a las ventajas de la utilización de los recursos y la comunicación eficaz. Actualización de equipos a las instituciones que tienen equipos obsoletos para aumentar su infraestructura.

Capacitación: Cursos orientados al uso de las computadoras y el Internet para igualar la ventaja tecnológica entre las instituciones. Certificación generalizada de las aplicaciones informáticas más utilizadas en su desempeño docente.

Uso: Promover la participación de los estudiantes en teleconferencias o cursos en línea. Implementar el uso de plataformas LMS como herramienta de apoyo en la educación, así como para facilitar la interacción y la comunicación entre los estudiantes y sus profesores.

MAESTRO SUPERIOR - RECOMENDACIONES

Infraestructura: Equipar más aulas con equipo de cómputo e internet para fortalecer el trabajo académico de los docentes. Mejorar los equipos que ya están obsoletos, para permitir un mejor uso y aplicación.

Capacitación: Promover cursos en línea y programas de certificación que ofrecen capacitación y desarrollo de habilidades de enseñanza. Aumentar la capacitación orientada a las TIC.

Uso: Promover el uso óptimo de la información encontrada en Internet. Uso del correo electrónico entre los estudiantes y profesores para consulta o asesoramiento en cuestiones académicas.

ALUMNO SUPERIOR - RECOMENDACIONES

Infraestructura: Adquirir equipos TIC a estas instituciones con el fin de mejorar la calidad de la educación de los estudiantes de nivel superior.

Capacitación: Proporcionar a los estudiantes cursos de capacitación dirigidos a mejorar las habilidades de navegación en Internet. Proporcionar más capacitación sobre las aplicaciones de software generales.

Uso: Promover el uso de las redes sociales en la educación, mediante la creación de grupos de estudio y el intercambio de información entre estudiantes y profesores. Aumentar la interacción con algún tipo de LMS (*Learning Management System*).

En resumen se obtuvieron 8 recomendaciones en Infraestructura, 14 recomendaciones en Capacitación y 21 recomendaciones en Uso.

4. ESTRATEGIA DE INTERVENCIÓN.

Para llevar a cabo esta tarea se seleccionó una submuestra de escuelas que voluntariamente se unieron al proceso de intervención para implementar y ejecutar las medidas y acciones de acuerdo a las recomendaciones. Fueron 16 escuelas de educación básica, 4 preparatorias y 4 instituciones de educación superior, las que participaron en la intervención.

Con el fin de registrar las actividades relacionadas con la aplicación de las recomendaciones y medir e inducir la mejora de los factores analizados en el proyecto (infraestructura, capacitación y uso), se diseñó un conjunto de formatos, los cuales fueron adaptados a cada nivel del sistema educativo de Tamaulipas. Los formatos que se entregaron a las escuelas participantes, fueron contestados por sus directivos y docentes que trabajan en frente de un grupo, el proceso se inició el 24 de septiembre de 2012 y terminó el 30 de junio de 2013.

Los formatos fueron desarrollados teniendo en cuenta el contexto de cada nivel educativo, pero tienen en común el propósito de medir la INFRAESTRUCTURA, la CAPACITACIÓN y el uso de las TIC en distintas escuelas del sistema.

Formatos para medir e inducir un mejor uso.

El formato "C" mide el uso, representado por la frecuencia de las actividades que se pueden desarrollar dentro de un laboratorio de computación en cada uno de los niveles educativos en un período semanal; su propósito es inducir y aumentar la frecuencia con la que los estudiantes están expuestos a las TIC, ya que las recomendaciones generadas consistieron en aumentar el número de visitas al laboratorio para reforzar el conocimiento y la práctica de los estudiantes.

Formatos para medir y promover la capacitación.

Los formatos "A" y "B", se utilizan para registrar la asistencia y participación en cursos de gestión de las computadoras, sus elementos, sus sistemas operativos y herramientas de software de uso común en los profesores y los estudiantes y el formato "D" evalúa el desempeño de los docentes y los estudiantes una vez que terminan el curso.

Formatos para medir los avances en infraestructura o actualizar los dispositivos TIC para ampliar la capacidad de atención a los estudiantes.

Para medir el nivel de infraestructura: el formato "E", registra la infraestructura que la escuela tiene al iniciar el proceso de intervención y el formato "F" se utiliza para registrar los logros obtenidos en la infraestructura de las TIC basadas en los logros sobre esta materia, de acuerdo con las recomendaciones del proyecto.

Las escuelas seleccionadas comenzaron a registrar los formatos, que miden el grado en que las recomendaciones son hechas por las escuelas seleccionadas. El registro de los incidentes fue semanal y los formatos fueron sellados y firmados por el director de la escuela.

Evaluación de la capacitación y la promoción de la capacitación profesional TIC dirigida al proceso de enseñanza-aprendizaje a través del Proyecto de Intervención.

De acuerdo con las recomendaciones generadas por el diagnóstico de la brecha digital en el factor de capacitación, el tipo predominante de recomendación fue capacitar a los maestros en el uso de aplicaciones de software de propósito general para mejorar sus destrezas de enseñanza y asimismo consolidar sus habilidades de uso de Internet.

En el primer trimestre de la intervención se advirtieron que las actividades de entrenamiento y capacitación eran deficientes en la mayoría de las escuelas, en este sentido, se decidió que el intervalo de tiempo de observación podría no ser suficiente para reflejar las actividades de capacitación espontánea dentro de las escuelas participantes. En consecuencia, se decidió que el proyecto de investigación intentaría inducir algún tipo de capacitación para capacitar en aplicaciones de las TIC que se consideran más útiles para los profesores en la enseñanza y el aprendizaje.

En este proceso, los jefes de proyecto y los colaboradores que participan en el trabajo conjunto con los directores de algunas instituciones, acordaron participar en la organización de una serie de cursos, que se llevaron a cabo con el propósito de capacitar a los docentes en el uso adecuado de las TIC para el desarrollo de materiales de capacitación y entrenamiento en el uso de plataformas LMS para enriquecer el formato de la enseñanza tradicional en el aula con el método de "aprendizaje mixto", que evoluciona la forma clásica del aprendizaje.

Los cursos realizados por el Proyecto de Brechas Digitales, se enumeran a continuación:

- Dos Cursos de Desarrollo de Competencias en Tecnologías de la información aplicadas a la educación básica; el primero llevado a cabo en la Facultad de

Comercio y Administración, con sede en Ciudad Victoria. El segundo, realizado en "UNAED" con sede en Tula, Tamaulipas.

- Dos Cursos de Normas para la preparación de materiales de Microsoft PowerPoint llevados a cabo en la escuela secundaria "Dr. Jaime Torres Bodet " y en la escuela primaria "Edmundo Castro Núñez", en Ciudad Victoria, Tamaulipas.
- Curso sobre plataforma Moodle LMS en "Escuela de Negocio y Administración" de la Universidad Autónoma de Tamaulipas, en Ciudad Victoria, Tamaulipas.
- Curso de Habilidades Digitales en la plataforma LMS Chamilo celebrada en el "Centro de Estudios Universitarios" Campus Ciudad Victoria.

Evaluación de la infraestructura y la inducción de su crecimiento a través del Proyecto de Intervención.

Las recomendaciones para el factor infraestructura consistían sugerencias para la mejora o la compra de nuevos equipos, para las escuelas que no tenían equipo.

Tres meses de intervención pasaron sin ningún registro de eventos con resultados visibles del aumento o mejora en el factor de infraestructura. Esta situación era comprensible, teniendo en cuenta que las escuelas tienen graves déficits de financiación y se integran en la organización del gobierno, de acuerdo a su nivel en el Departamento de Educación del Estado, situación que producen respuestas lentas a la demanda de más recursos.

Los directores señalaron que a pesar de sus esfuerzos e intentos de conseguir nuevos dispositivos y equipos informáticos por parte del Gobierno, no había ninguna posibilidad de una respuesta afirmativa a su solicitud durante el breve lapso de tiempo en el que se realizó la intervención.

En esta situación, se decidió el apoyo a través de esfuerzos adicionales con algunas organizaciones que fueron capaces de proporcionar equipo de cómputo donado o prestado a fin de enseñar a un mayor número de estudiantes a través de las herramientas TIC.

En este sentido, se ha gestionado y llevado a cabo acciones con los directivos con el fin de inducir un aumento de la infraestructura en las escuelas, durante el intervalo de tiempo de la intervención. Se concretaron acuerdos con la Fundación Telmex y la Universidad Autónoma de Tamaulipas.

Fundación Telmex es una división de la compañía de medios de comunicación en México que realiza labor altruista a favor de la educación. Al exponer las intenciones y objetivos del proyecto coincidió con un programa específico denominado "aula digital", que incluye la provisión de computadoras portátiles a las

personas u organizaciones que demuestren solvencia, el compromiso y la honestidad para cuidar y hacer buen uso de los equipos.

Con este apoyo se logró beneficio de 8 profesores de varias instituciones de nivel básico, a través del préstamo de equipos de computación portátil del "Aula Digital" Fundación Telmex [9].

Por otra parte, la Universidad Autónoma de Tamaulipas [10] acordó apoyar el proceso de intervención a través de la canalización de una serie de equipos de computación como una donación por ser desplazados y reemplazados por nuevos equipos de vanguardia. El equipo donado, está en condiciones de trabajo aceptables, y será entregado a las escuelas primarias en las zonas rurales que mostraron la mayor brecha digital.

Con una solicitud oficial y la documentación de identidad, la universidad admitió un total de 10 escuelas rurales a las que se donará de 3 a 5 computadoras para incorporar en sus laboratorios o aulas.

A través de los cursos que inducen la capacitación especializada y los esfuerzos de cabildeo con las instituciones altruistas y filantrópicas se pudo demostrar que se logró a través del proceso de intervención que hay maneras para fortalecer la infraestructura y la capacitación y, por tanto, fomentar el uso adecuado de las TIC , cuando la estructura de la organización o de los recursos económicos escasos evita el desarrollo las escuelas en términos de tecnología de la información y las comunicaciones.

En este objetivo fundamental para la capacitación de capital humano, las acciones ejecutadas representan un mecanismo que se originó en las actividades inducidas por el proceso de intervención, lo que podría servir de base para el diseño de un modelo para el seguimiento y la evaluación de los tres factores que definen el alcance y la profundidad de la brecha digital en nuestras escuelas.

En este proceso el conjunto de acciones que se hicieron para hacer frente a la brecha digital en las escuelas participantes, se podría utilizar para replicar una propuesta de modelo que podría convocar a los tres niveles de gobierno, la academia, el sector productivo y la sociedad civil, para enfrentar este reto de cerrar la brecha digital en la educación y enfrentar el desafío de la globalización y la competitividad internacional en el siglo XXI.

La evidencia presentada servirá para diseñar programas y políticas gubernamentales con el fin de disminuir la brecha digital en el sistema educativo.

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LA CREACIÓN DE VALOR COMPARTIDO Y LA INNOVACIÓN SOCIAL COMO HERRAMIENTAS ESTRATÉGICAS EN LA RELACIÓN ENTRE UNIVERSIDAD Y EMPRESA.

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Resumen

El escenario socio-económico actual demanda de soluciones creativas sustentadas en un trabajo colaborativo genuino entre las empresas e instituciones de educación superior, con una visión compartida de generar mejores condiciones de vida y prosperidad para la sociedad en su conjunto. A su vez exige a las instituciones de educación superior de los países en desarrollo enfrentarse a los retos que plantea la sociedad del conocimiento y adquirir la capacidad de participar activa y críticamente en la creación y gestión de conocimientos así como de tecnologías que resulten útiles y transferibles. Los conceptos de creación de valor compartido e innovación social son planteados como herramientas que pueden ser claves para alcanzar una mejor relación entre universidad y empresa, aportando elementos que permitan revalorar y dimensionar los beneficios de la actividad económica y la generación y aplicación de conocimiento en beneficio del ser humano y del mundo que habita. A partir de esos dos conceptos se elabora un modelo conceptual para facilitar la asimilación y utilidad de los mismos en el afán de construir un puente efectivo para la colaboración entre los diferentes actores del ámbito empresarial y educativo. Para lo anterior se hace énfasis en el desarrollo de habilidades tales como: creatividad, capacidad de adaptación, negociación e inteligencia emocional y comunicación entre los actores implicados. El trabajo tiene el objetivo de explicar un modelo conceptual que integra el enfoque de Creación de Valor Compartido y de Innovación Social como herramientas clave en la generación de sinergia entre Empresas y la Academia. Se considera que este trabajo es importante y de utilidad para los diferentes grupos de interés que debaten en México, cómo las empresas e instituciones pueden contribuir para activar el crecimiento en economía, en sostenibilidad, prosperidad y desarrollo humano.

Palabras clave: Valor Compartido, Innovación Social, Estrategia, Relación Universidad-Empresa.

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1. INTRODUCCIÓN

La relación universidad-sector productivo está cambiando de manera significativa a las instituciones académicas en todo el mundo. Por lo que las universidades están obligadas a adaptar y adoptar nuevas prácticas innovadoras que le permitan mantener un nivel competitivo dentro de la sociedad, sobre todo en la función de investigación, ya que es la que permite generar y aplicar nuevos conocimientos.

De acuerdo a estudios de la Comisión Económica para América Latina y el Caribe (CEPAL), las empresas de la región latinoamericana que han logrado integrarse a las cadenas de producción internacionales se posicionan en los niveles jerárquicos más bajos de ellas y se ocupan de actividades de baja tecnología, como procesamiento de materias primas o actividades de montaje. Son las empresas transnacionales las que mantienen el liderazgo en las redes de producción y se apropian de los beneficios que se derivan de la acumulación tecnológica y de la innovación, pero sin traspasar el conocimiento y experiencias al interior de los países donde se encuentran instaladas [1]. Como resultado de esta dinámica, las asimetrías tecnológicas se fortalecen, dado que los agentes nacionales participan como actores marginales en la globalización de las actividades científicas y tecnológicas. Lo anterior da cuenta de la débil vinculación y trabajo colaborativo que existe entre las empresas y las universidades en los países latinoamericanos.

La traducción de necesidades en demanda de innovación presenta dificultades en el ámbito productivo, por lo que se requiere de instrumentos de apoyo, así como la participación conjunta de investigadores, agentes sociales y de mediadores especializados para incentivar procesos de aprendizaje enmarcados dentro de una estrategia general de conocimiento endógeno, dando como resultado proyectos de alto impacto social y de mejora de la competitividad empresarial. En la última década se han realizado varios estudios, análisis y reflexiones relacionados al tema de colaboración Universidad-Industria, tanto en países desarrollados como en vías de desarrollo, destacando los de Etzkowitz [2]. El conocimiento y reconocimiento de la realidad y del contexto de cada región debe ser un trabajo caracterizado por un esfuerzo continuo y sistemático, en el cual, desde nuestra perspectiva, las universidades juegan un rol de suma importancia, ya que el capital humano que las integra posee la formación y conocimientos especializados necesarios, es decir, un amplio soporte de información, resultado de la investigación que realizan en diversas ramas del conocimiento.

El presente trabajo tiene como objetivo plantear un modelo conceptual que integra el enfoque de Creación de Valor Compartido y el de Innovación Social como elementos clave para la generación de sinergia entre empresas y la academia para el desarrollo económico y social orientados al bien común. La metodología empleada

para elaborar el modelo visual es de corte cualitativo, se utilizó la revisión documental y como apoyo se empleó la técnica de análisis de contenido. Para el diseño del modelo visual, se utilizaron las propuestas de Novak y Gowin [3] para hacer mapas conceptuales y de Buzan [4] para realizar mapas mentales. El método general de diseño empleado consiste en cuatro fases: a) Identificación de las ideas principales; b) Construcción del bosquejo de ideas; c) Integración de los bosquejos de ideas; y d) Trazo final del modelo visual.

2. LA RELACIÓN UNIVERSIDAD-SECTOR PRODUCTIVO, UNA DEBILIDAD QUE PREVALECE

En México, Bazdresch y Romo [5] realizaron una discusión sobre la importancia de las actividades científicas y tecnológicas para el desarrollo de México y el impacto de las mismas en la competitividad del país y sus empresas, y exploraron el tema utilizando el concepto de sistema nacional de innovación (SNI), empleado por varios países y organismos internacionales y retomando estudios hechos por Alcorta y Peres [6] y Cimoli [7] que dan cuenta de algunas deficiencias tales como: los esfuerzos de los actores involucrados se encuentran aislados y no han articulado una verdadera red de apoyo al desarrollo tecnológico; existen débiles eslabonamientos y flujos de conocimiento; falta de entendimiento de las necesidades del sector productivo; escasa colaboración entre firmas y falta de cooperación inter-institucional; estructura fragmentada y el aislamiento, falta de información, y duplicidad de esfuerzos. Además de los problemas citados, las Instituciones de Educación Superior (IES) representan el eslabón más débil del Sistema Nacional de Innovación de México, al carecer de políticas de largo plazo, del marco jurídico adecuado e incentivos permanentes para su vinculación con el sector productivo, para responder con mayor claridad y certeza a las demandas del mercado y a las necesidades productivas y competitivas del país. [8].

Hay aspectos importantes a considerar en la mejora de la relación entre empresa y universidad, como es el hecho que señala Fajnzylber, de que los procesos de aprendizaje, generación y difusión de capacidades tecnológicas endógenas son elementos claves para un crecimiento sostenido con inclusión social y una distribución del ingreso más equitativa, en una economía global donde el conocimiento es uno de los principales activos. Este autor señala que la competitividad, sostenibilidad ambiental y equidad son tres factores que pueden y deben reforzarse mutuamente, teniendo a la innovación como instrumento que permita avanzar simultáneamente en todos ellos [9].

3. LA CREACIÓN DE VALOR COMPARTIDO Y LA INNOVACIÓN SOCIAL, BINOMIO PARA EL DESARROLLO

En los últimos años los conceptos de Creación de Valor Compartido y de Innovación Social han tomado fuerza y captado la atención de los grupos de interés relacionados con las políticas sociales, la sostenibilidad, la Responsabilidad Social Corporativa (CSR) y la competitividad, pertenecientes a instituciones públicas y organizaciones privadas de países desarrollados del mundo [10].

Creación de Valor Compartido

La Creación del Valor Compartido (CVC) es una propuesta difundida por Michael Porter y Mark R. Kramer, mediante la cual se busca incentivar al mundo empresarial para que genere innovaciones en sus procesos y actividades de negocios, tomando en cuenta el entorno social en el que se desenvuelve y con el que mantiene una intensa interacción. La aplicación de valores de solidaridad y subsidiaridad en una organización deben ser orientados hacia todos los elementos que la integran para que aprendan a desenvolverse libre y razonadamente por una escala de valores compartidos y una actuación ética que los regule. Para Porter y Kramer [11], la Creación de Valor Compartido (CVC), puede ser una estrategia efectiva para las empresas que buscan mantener su ventaja competitiva y desempeño exitoso en un mundo globalizado, a través de desarrollar la capacidad de aprender a valorar con el uso de la razón y la voluntad, las acciones que buscan lo bueno, justo, noble y valioso, para el binomio Sociedad-Empresa.

El concepto de creación de valor compartido puede ser definido como la práctica de políticas y operaciones que incrementan la competitividad de las empresas mientras de manera simultánea avanzan y mejoran las condiciones económicas y sociales en las comunidades en las cuales operan. También se refiere a expandir la fuente de ingresos de la economía y el valor social [12]. Se puede conceptualizar también como la relación entre la práctica social y el desarrollo económico, en consideración de los temas sociales no como un costo, sino como una oportunidad para generar nuevas tecnologías o formas de producción con el fin de incrementar la productividad. Estos autores plantean que hay tres formas diferentes con las cuales las empresas pueden crear valor social:

a) *Por la reconceptualización de productos/servicios y mercados.*- Las necesidades de la sociedad son muchas (salud, mejor vivienda, nutrición, seguridad financiera, menor daño ambiental) por lo que las empresas deben entender las señales que indiquen si los productos son realmente buenos para los clientes (identificar las necesidades, beneficios buscados y daños que pueden tener los productos); proveer productos útiles a grupos de población de bajos ingresos y con desventajas; y rediseñar productos o métodos de distribución.

b) *Redefiniendo la productividad en la cadena de valor.*- Manteniendo congruencia entre el progreso social y la productividad en la cadena de valor, lo cual implica no solo ejercer prácticas ambientalmente amigables (ahorro de energía y logística), sino procurar compras a pequeñas empresas o firmas locales, así como utilizar nuevos modelos de distribución, mejorar la capacitación del personal y su desempeño e implementar programas de salud ocupacional.

c) *Desarrollando industrias de soporte en los clusters locales.*- El éxito de una empresa depende de las compañías y la infraestructura (carreteras, aeropuertos, hospitales) que está a su alrededor. Los clusters están compuestos por empresas, organizaciones de comercio, universidades, centros de investigación, que junto con leyes de competencia justa y transparencia en los mercados posibilitan prosperidad económica.

Innovación Social

El enfoque del Centro para la Innovación Social de la Escuela de Negocios de Stanford, propuesto por Phills, Deiglmeier y Miller [13], plantea una definición de la innovación social como una solución nueva a un problema social de manera más eficaz, eficiente, sostenible o simplemente mejor que las soluciones existentes y para los cuales el valor generado se acumula principalmente en la sociedad en su conjunto y no en los particulares. Para estos autores, una innovación social puede ser un producto, proceso de producción, o tecnología (como la innovación en general), pero también puede ser un principio, una idea, una ley, un movimiento social, una intervención o una combinación de ellos, ya que muchas de las mejores innovaciones sociales reconocidas, como las microfinanzas, son combinaciones de varios de estos elementos. También sugieren la necesidad de establecer un diálogo entre los sectores privados y públicos de la sociedad, para obtener las innovaciones sociales.

En este trabajo, el modelo que se propone toma como referente conceptual y teórico la propuesta de los académicos de Stanford, ya que hacen énfasis en que cada vez más, surgen innovaciones en situaciones del mundo real donde los sectores convergen y que en estas intersecciones, los intercambios de ideas y valores, los cambios en los roles y relaciones, y la integración de capital privado con el apoyo de recursos públicos y de fondos provenientes de la filantropía generan nuevos y mejores enfoques para la creación de valor social. Para apoyar las colaboraciones intersectoriales se tienen que examinar las políticas y prácticas que impiden el flujo de ideas, valores, capital y talento a través de las fronteras de los sectores y que limitan las funciones y las relaciones entre los mismos. De manera general la innovación social tiene como fuente tres aspectos: a) Atención a necesidades sociales no satisfechas y mejorar la vida de las personas, b) Emprendimiento social, y c) Mejora en políticas públicas y gestión gubernamental.

4. MODELO CONCEPTUAL PARA GENERAR SINERGIA ENTRE EMPRESAS Y LA ACADEMIA

El modelo propuesto se conceptualiza teniendo también como referente la propuesta teórica de la socioeconomía de Amitai Etzioni [14], que se sustenta en la aplicación de los valores éticos en la relación entre individuos. Etzioni plantea una organización de los entes sociales basada en las redes de comunicación, en la cultura en red, mediante múltiples estructuras independientes, con identidad propia, enlazadas entre sí en un proyecto con conciencia comunitarista [15]. Esta forma de organización e interacción requiere que las relaciones no se basen tanto en una jerarquización de poderes, sino en un consenso basado en la información y el conocimiento, el aprendizaje y la ayuda del conjunto. El comunitarismo sociológico promovido por Etzioni, persigue un pacto social ético, capaz de favorecer el progreso de la sociedad sin anular la dimensión individual [16]. El modelo conceptual propuesto que incluye los conceptos y elementos que se describirán a continuación, se representa de forma completa en la figura 1.

En el componente *Empresas* (elipse del lado izquierdo), el modelo contempla que las organizaciones deben generar procesos internos que le permitan establecer mejoras continuas en los siguientes aspectos: *Productividad, Estabilidad laboral, Remuneración equitativa, Equidad de género, Capacitación y actualización, Equilibrio entre vida laboral y privada, Responsabilidad Social Empresarial, y Capacidades Internas de I+D*. Si la empresa logra cubrir satisfactoriamente estos aspectos, alentará y facilitará que el personal se sienta más identificado, comprometido y con sentido de pertenencia con la misma, fomentando un clima laboral más adecuado para la innovación y la creación de valor.

En el componente *Universidades* (elipse del lado derecho), el modelo considera que éstas deben generar procesos internos que le permitan establecer mejoras continuas en los siguientes aspectos: *Recursos humanos y materiales para la I+D, Generación, uso, aplicación y explotación del conocimiento, Diseño de posgrados enfocados a sectores específicos, Generación de nuevas tecnologías, Diseño de programas de educación continua, y Servicios y asesoría científica-técnica*. El acercamiento entre los dos componentes (Empresas-Universidades) se gesta en la

aplicación de iniciativas que se sustenten en la creación de valor compartido y de innovación social respectivamente y que fueron descritas en el apartado 3. Estos conceptos se ubican en la parte central del modelo visual representados como dos elipses unidas.

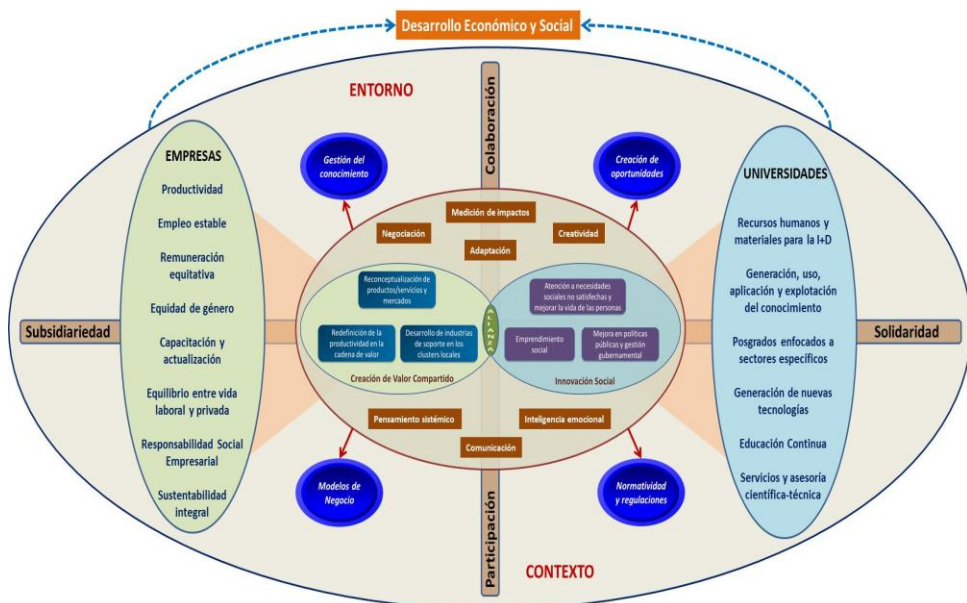


Fig. 1 Modelo conceptual para generar sinergia entre empresas y la academia basado en la Creación de Valor Compartido e Innovación Social.

Fuente: Elaboración propia.

En torno a los conceptos de creación de valor compartido y de innovación social se ubican siete conceptos que se consideran claves para potenciar y enriquecer las iniciativas de proyectos, estos son: *Pensamiento sistémico*, *Comunicación*, *Inteligencia emocional*, *Creatividad*, *Adaptación*, *Negociación*, y *Medición de impactos*. Se considera que el desarrollo de habilidades y capacidades en estos aspectos, per-

mitirán a las empresas y universidades generar de manera más natural y consensada cuatro productos que dinamicen el círculo virtuoso del desarrollo. Estos son: *Gestión del conocimiento*, *Creación de oportunidades de negocio* (emprendimientos), *Modelos de negocio* y *Normatividad y regulaciones* que incidan en protección de la propiedad intelectual, transferencia de tecnología y en la confidencialidad de ciertos procesos internos de las empresas. Estos conceptos se ubican en las esferas que circundan a la elipse central del modelo.

Consideramos que la presencia de cuatro principios es necesaria para articular la operación del modelo y fungir como ejes rectores de la actuación de los entes involucrados (Empresas-Universidades). Estos son: *colaboración*, *participación*, *solidaridad* y *subsidiariedad*. La *colaboración* es básica para interactuar y realizar contribuciones que permitan generar conjuntamente proyectos de alto impacto socioeconómico. Actualmente las nuevas relaciones que se están creando entre las personas, y entre las personas y las empresas, posibilita y obliga además, a contar con herramientas e instrumentos de colaboración para conocer las tendencias del mercado y las necesidades sociales. La colaboración permite reconocer que una buena parte de la ventaja competitiva está fuera del ambiente interno de las empresas.

La *participación* entendida como la actitud de intervenir en pro de la mejora de las condiciones existentes, parte de la idea de que las personas deben ser empoderadas si se busca que presenten una participación activa en las tareas de innovación.

El término *solidaridad* proviene del latín sólidun que quiere decir sólido, fuerte, compacto. La solidaridad se da en torno a un fin común, completo y objetivo. De modo que las personas vinculadas a una tarea, deben aportar, en la medida de sus posibilidades, lo necesario para el bien común [17]. La solidaridad exige una enorme coherencia y generosidad, por lo que encuentra campo fértil en una sociedad basada no sólo en conocimientos, sino en valores y virtudes. Poner en práctica la solidaridad requiere de un ambiente cordial, tranquilo y donde prevalezca el respeto entre las partes, en donde se promueve el diálogo acerca de los puntos de vista de los demás y los temas de interés. También se necesita reconocer que cada uno tiene algo invaluable que dar a los demás y aprender a compartir en vez de competir.

De acuerdo a Mendoza, la *subsidiariedad* describe un principio político y de ética social referente a establecer límites de competencia en las relaciones entre la persona humana y las sociedades de las que forma parte, proyectando así dos concepciones: a) interpretación ascendente, que refiere a la formación y organización de individuos y sociedades menores para que sean capaces de solucionar en forma autónoma sus propios intereses, y b) interpretación descendente, que se enfoca en la organización multijurisdiccional del Estado, la protección y la conservación de las atribuciones locales para promover su propio potencial [18]. La *subsidiariedad* rige la relación entre menores y mayores, porque implica el derecho de los entes indivi-

duales o colectivos menores a ser respetados por los mayores para poder alcanzar su plenitud y la obligación de los menores de hacer lo más posible por alcanzar esa plenitud.

En el núcleo del modelo se considera a las *Alianzas* como el concepto y medio unificador que conduzca a establecer los acuerdos sobre puntos mínimos comunes para trabajar en la búsqueda de proyectos y programas basados en creación de valor compartido e innovación social. Las alianzas permiten establecer redes de colaboración fuertes. El modelo se enfoca a generar puntos de encuentro y conciliación de intereses entre empresas y universidades, que a su vez permita a los académicos, investigadores, empresarios, profesionales independientes, y emprendedores, compartir ideas y formular proyectos conjuntos para enriquecerlos y poder llevarlos a cabo.

5. CONCLUSIONES

Finalmente, el modelo considera como conceptos inherentes al *Entorno* y al *Contexto*. Dado que desde nuestra perspectiva, las empresas y universidades de los países desarrollados coexisten en un entorno y contexto con características muy propias y particulares de acuerdo a la región geográfica. Es pues, sumamente crítico entender el contexto, ya que si este cambia, cambia todo. El cambio de contexto puede hacer que un elemento que es pertinente en un tiempo y espacio dado, sea impertinente en otras circunstancias. Lo anterior, forzosamente trastoca un tema delicado, el de la economía informal que existe en países como México y que se nutre de un flagelo mayor, el de la corrupción. La economía informal alienta la generación de actividades al margen de la legalidad y desalienta la productividad. También incide en la exclusión social de los trabajadores en lo referente a programas educativos y de formación profesional y en la seguridad social. Dada la dimensión de este fenómeno en México, ya que se tienen 14 millones de personas ocupadas en el sector informal, que representa un 27.9% de la población ocupada, de acuerdo a cifras de la Encuesta Nacional de Ocupación y Empleo del INEGI, en el cuarto trimestre de 2013, es crucial su consideración dentro del análisis del contexto y la generación de propuestas de innovación social que incidan en su dinámica.

El desarrollo económico y social que se busca obtener con la aplicación de este modelo, se puede traducir en la búsqueda y promoción del bien común, entendido éste como la satisfacción de las necesidades e intereses de la sociedad, por encima de intereses particulares ajenos al bienestar de la colectividad.

Los hombres y mujeres de las empresas y de las universidades que aportan su tiempo, talento, conocimiento y energía, constituyen el activo más valioso para el desarrollo de los procesos que articulen los programas de acción derivados de las alianzas de intereses comunes entre empresas y universidades. De forma paralela con su

misión académica, las universidades públicas mexicanas tendrán que diseñar estrategias para consolidar las actividades de investigación que realizan, así como las líneas de investigación que cultivan, para así, gradualmente transitar a modelos de universidad emprendedora que ayude a que a través de acciones enfocadas de I+D+i en sectores estratégicos, los resultados de esas investigaciones se transformen en nuevos productos y servicios.

Se considera que los cuatro conceptos clave de los ejes horizontal y vertical del modelo (colaboración, participación, solidaridad y subsidiariedad) posibilitan y alientan a mantener a las universidades públicas y empresas en un diálogo constante entre ellas y con la sociedad. Este dialogo constituye un proceso básico y relevante para construir el futuro deseado de prosperidad y el bien común en cualquier realidad, sin perder de vista la sensibilidad y la adaptación a los diversos contextos que existen en las regiones de países en desarrollo como es el caso de México. En el contexto mexicano, dicho dialogo debe llevar a tomar conciencia de la necesidad urgente de ejecutar acciones que lleven a contrarrestar el enorme flagelo enraizado en nuestra sociedad, la economía informal. Esto último es importante, ya que por muchos años la sociedad se ha visto constantemente perturbada por la adopción de diferentes medidas y toma de decisiones que impiden el desarrollo económico sostenible y que han permitido el asentamiento del comercio informal, hecho que ha provocado una mediocridad económica que incide en el ánimo de la sociedad. El modelo propuesto puede generar mayor conciencia entre la sociedad a fin de romper con el círculo vicioso que provoca el comercio informal al no pagar sus impuestos, a efecto de que se realicen propuestas que faciliten y promuevan el tránsito hacia una economía formal y con ello incrementar la base tributaria que genere recursos destinados a contribuir al bien común.

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LA UNIVERSIDAD VIRTUAL EN EL ESPACIO EUROPEO DE EDUCACIÓN SUPERIOR: ANÁLISIS DE UNA EXPERIENCIA

C. HERNÁNDEZ RUBIO

Resumen.

El Espacio Europeo de Educación Superior ha exigido la adaptación de nuestros planes de estudio universitarios a los requisitos recogidos en la Declaración de Bolonia. Desde el curso académico 2009-2010, la Universidad Rey Juan Carlos imparte titulaciones de grado, y con el propósito de diversificar su oferta y adaptarse a nuevas demandas también titulaciones de Grado online.

La *Universidad Virtual* tiene ventajas que ofrecer: no exige presencialidad, profesor y alumno no tienen que coincidir ni en el espacio ni en el tiempo, empleo de las Tecnologías de la Información y la Comunicación (TIC's) como herramientas de aprendizaje y, en definitiva, posibilita que alumnos que no pueden asistir a una universidad presencial puedan seguir unos estudios universitarios.

También debemos señalar las limitaciones del elearning: tanto el alumno como el profesor se han de adaptar a nuevos métodos de aprendizaje para tratar de paliar el inconveniente fundamental de la educación no presencial, el abandono del alumno.

Nuestro objetivo es describir nuestra experiencia en la Universidad Rey Juan Carlos en el área de la enseñanza virtual y, concretamente, analizar los resultados obtenidos en la asignatura de "Economía Aplicada I" que se imparte en el Grado en Ciencias Políticas. Partimos de un ensayo anterior de enseñanza blended learning utilizado en una asignatura de características similares y que sirvió como antecedente de la que ahora se imparte de forma online.

Basándonos en el propio desempeño de nuestra labor docente, analizamos en este estudio los resultados obtenidos con el objetivo de valorar los éxitos del Programa y destacar aquellos puntos de especial dificultad para el desarrollo del aprendizaje virtual.

1- INTRODUCCIÓN

La Universidad Rey Juan Carlos imparte titulaciones online desde el curso 2008 hasta la actualidad. Con esta nueva modalidad de enseñanza, se ofrece al alumnado otra alternativa de formación. En general, los discentes que se decantan por ella suelen ser personas que por su dedicación laboral no pueden cumplir la presencia que exige la enseñanza tradicional, o que por otros motivos les resulta atractiva la idea de realizar unos estudios oficiales de Grado online.

Este es, por tanto, el sexto curso académico en que se imparte enseñanza no presencial, lo que nos permite hacer una serie de valoraciones sobre los resultados alcanzados y unas recomendaciones sobre la base de nuestra experiencia.

En concreto, y dentro del Grado en Ciencia Política y Gestión Pública, como profesora responsable de la asignatura “Economía Política I”, presentaré la experiencia práctica de la implementación de la materia en un entorno virtual, impartida de acuerdo a los criterios establecidos en el EEES, y una evaluación de los resultados obtenidos.

En primer lugar, quisiera describir la experiencia previa con la que se comenzó: en la Diplomatura en Gestión y Administración Pública, título que se impartía antes de la puesta en marcha de los estudios universitarios adaptados al Plan Bolonia y en la actualidad en proceso de extinción, se impartió esta misma asignatura, durante el curso 2007-2008, en un grupo de modalidad semipresencial. Dicho grupo estaba formado por un número reducido de alumnos que sólo tenían una hora semanal de clase presencial y que, por tanto, requería que una parte importante del trabajo del alumno tuviera que realizarse a través del campus virtual de la Universidad, donde estaban incluidos los materiales para el estudio y el seguimiento de la asignatura. La metodología utilizada supuso las bases de lo que posteriormente se ha configurado como una asignatura online. En cualquier caso, aunque tanto la metodología como los resultados obtenidos han variado de forma significativa, la semipresencialidad de la asignatura a la que nos estamos refiriendo permitió observar una experiencia que ha sido clave en la estructuración de la asignatura online.

Los resultados alcanzados en esta primera experiencia fueron muy satisfactorios. La respuesta de los alumnos al trabajo autónomo que debían realizar fue un éxito: las calificaciones obtenidas fueron muy altas y la tasa de abandono despreciable.

En el curso siguiente, 2008-2009, volvió a impartirse la diplomatura a la que nos hemos referido de forma exclusivamente online y, a partir del curso 2009-2010, se transformó el título, siguiendo el esquema de Bolonia, para convertirse en un Grado. En este trabajo, vamos a referirnos a la experiencia exclusivamente online de estos últimos años en los estudios de Grado y haremos una valoración de la misma que nos permitirá obtener algunas conclusiones.

2. METODOLOGÍA DEL CURSO

La enseñanza online exige un cambio de la metodología empleada, adaptándola a la utilización de Nuevas Tecnologías y otorgándole mayor importancia a la motivación del estudiante. En este sentido, e insistiremos en ello más adelante, el principal inconveniente que hemos observado es la falta de motivación de muchos estudiantes, que se matriculan en el título online e inmediatamente abandonan los estudios.

La plataforma tecnológica utilizada por la Universidad para la administración del curso, en un principio WebCT y en la actualidad Moodle, facilita su estructura y su diseño. El docente no necesita tener unos conocimientos informáticos muy avanzados y, en la medida de lo necesario, la Universidad ofrece al profesorado cursos de formación para adquirir las destrezas necesarias. En cualquier caso, la propia experiencia va mejorando sustancialmente el trabajo realizado por el profesor, siendo habitual que cada vez se decida por la utilización de un mayor número de herramientas de entre las múltiples que la plataforma ofrece.

Una de las ventajas más importantes de la enseñanza virtual es que el alumno tiene una flexibilidad casi total en su sistema de aprendizaje: flexibilidad de espacio, de tiempo y de ritmo de aprendizaje. Para ello, el campus virtual ha sido diseñado de forma que siempre está abierto. El alumno puede acceder al mismo en todo momento, donde dispone de materiales teóricos, ejercicios, lecturas, foros de debate, ejercicios de autoevaluación y resto de contenidos y herramientas que el profesor haya considerado convenientes para el seguimiento del curso.

The screenshot shows the Moodle course interface. At the top, it displays the University of Rey Juan Carlos logo and the course title. The main content area is titled 'Módulo I: INTRODUCCION AL ANALISIS ECONOMICO' and includes sections for 'Normas para la participación en los foros de debate', 'Guía de estudio de los contenidos', and 'Capítulo 1: Conceptos fundamentales'. The 'Capítulo 1' section lists 'Guía de estudios Capítulo 1', 'Contenido. Capítulo 1', 'CAPÍTULO 1. PROBLEMAS', and 'CAPÍTULO 1. PROBLEMAS-RESUELTOS'. On the left, there is a navigation menu with options like 'Navegación', 'Personas', 'Correo', and 'Ajustes'. On the right, there is a calendar for March 2014 and a 'Clave de eventos' section.

Figura 1: Página de organización del curso

La asignatura a la que nos estamos refiriendo corresponde al primer cuatrimestre del curso. Antes del comienzo de la misma, en el apartado “*Información general*” los alumnos disponen de la información que hace referencia a la metodología a seguir. Además de una presentación del profesor, cuenta con una planificación en detalle de la asignatura por semanas del curso, objetivos perseguidos, actividades evaluables en las que ha de participar y formas de evaluación. Asimismo, el profesor, en el apartado “*Profesores y Alumnos*” tiene a priori el listado de sus alumnos y la información personal que estos hayan considerado conveniente introducir.

Como se puede observar, se trata de una página de organización muy completa desde la que se accede a todos los contenidos y herramientas utilizadas.

Los contenidos, tanto teóricos como ejercicios, se han ido colgando a medida que el curso ha ido avanzando. De esa forma se intenta que el alumno tenga que planificar su estudio según el método organizado por el profesor, es decir, que se ha considerado conveniente la flexibilidad en cuanto al ritmo de trabajo por parte del estudiante pero siguiendo un calendario previamente establecido. Incluso se avisa, a través del icono “*Calendario*”, de los nuevos materiales colgados o actividades que se han de realizar cada semana. Aunque el alumno ya dispone de esa información desde el principio de curso, los avisos del calendario le proporcionan la seguridad de que su ritmo de trabajo es el adecuado y constituye un instrumento efectivo para ir motivando al alumno a lo largo del curso y que no se vaya quedando rezagado.

El icono “*Informes del Curso*” permite a los alumnos ver las distintas secciones del curso a las que han accedido y al profesor llevar un seguimiento detallado del trabajo que va realizando el alumno (puede observar el número de visitas que ha realizado a los distintos apartados, fechas de acceso y tiempo utilizado en cada una de ellas).

La evaluación continua de la asignatura se realiza a través de las pruebas online que el profesor va marcando durante el curso. La plataforma permite el diseño de diferentes tipos de pruebas: encuestas, exámenes, subida de archivos, etc. Y el profesor fija el momento para su realización, el tiempo del que dispondrá el alumno, la forma de calificación, etc.

Concretamente, en esta asignatura la ponderación de la evaluación continua ha sido del 40%, consistente en la realización de cuestionarios de respuesta múltiple que se fueron abriendo a lo largo del curso y para los que el profesor establecía una fecha y una hora en la que se permitía el acceso y el alumno disponía de un tiempo limitado para hacerlos. En un principio se establecieron dos pruebas, con una ponderación del 20% cada una. Una vez realizadas, los alumnos que no las hubieran superado tuvieron la posibilidad de realizar una segunda prueba de reevaluación. La finalidad perseguida fue la de no “expulsar” a los que no hubieran obtenido resultados satisfactorios debido a que la ponderación de cada una de ellas sobre la calificación final

era importante. Además, el 60% de la ponderación restante sería el resultado de una prueba final presencial, realizada en la Facultad, y para la que se exige una calificación mínima de aprobado. A pesar de ser una asignatura impartida en un título de Grado online, se consideró necesario hacer una última prueba final presencial como forma de evitar el posible fraude que pueda haber en lo relativo a la identidad de las personas que realizan pruebas de evaluación a través del campus virtual. Pero una vez establecida esta prueba presencial y para la que, insistiendo en el tema, se exigía un aprobado para mediar con la evaluación continua, se trató de corregir el desincentivo que podía originar en el alumno que las pruebas online no tuvieran un resultado satisfactorio. Se trataba con ello de motivar al alumno para que poco después de empezado el curso, si sus resultados no habían sido positivos, no abandonase.

El componente dinámico del curso, y que ha tenido una buena acogida, han sido los “*Foros*” abiertos a lo largo del curso. Esta actividad ha consistido en la apertura de un foro en cada uno de los temas que componen el programa, de tal forma que el alumno planteara sus dudas, tanto teóricas como de los ejercicios de cada capítulo. A las cuestiones planteadas en el foro podían dar respuesta todos los compañeros del curso, y el profesor iba interviniendo para moderar el debate, aclarar las dudas planteadas e incluso para rectificar respuestas y opiniones que no eran correctas. Debemos destacar que la participación era voluntaria y que tenía una repercusión notable en la calificación, tan sólo sería tenida en cuenta con el fin de mejorar la nota final obtenida. Pues bien, la participación en estos foros de debate fue la de los alumnos que, al mismo tiempo, obtenían las mejores calificaciones.

La comunicación profesor-alumnos se produce exclusivamente a través de este campus virtual. La plataforma permite el contacto a través de correos electrónicos, foros y charlas entre un alumno y el profesor, así como entre un grupo de alumnos y el profesor. Las charlas fueron una forma de comunicación más ocasional, puesto que aunque tiene grandes ventajas es más difícil de desarrollar al exigir la sincronía de los participantes. Los correos electrónicos fueron continuos a lo largo del curso.

3. PRINCIPALES VENTAJAS E INCONVENIENTES DE LA ENSEÑANZA VIRTUAL

Las ventajas e inconvenientes que han ido surgiendo con la impartición de esta asignatura online son, en líneas generales, las habituales en cualquier enseñanza online. No pretendemos hacer un análisis en profundidad de las mismas, sobre lo que ya existen diversos estudios en detalle, sino tan sólo destacar las que con más intensidad hemos apreciado en esta experiencia.

Principales ventajas

- La flexibilidad que se le ofrece al alumno, en cuanto a que le permite organizar su tiempo y su ritmo de trabajo.
- La deslocalización del conocimiento.
- Ahorro de costes y de tiempos de desplazamiento.
- Pone a disposición de los alumnos un amplio número de contenidos, elaborados expresamente para el estudio de la materia y en función del programa de la misma.
- Los contenidos se pueden actualizar en todo momento.
- Permite la realización de ejercicios y pruebas de autoevaluación con las que el alumno puede ir valorando los resultados de su aprendizaje.
- El profesor puede llevar un seguimiento personalizado de sus estudiantes.
- Facilita la comunicación, sincrónica y asincrónica, entre profesor y alumnos.

Principales inconvenientes

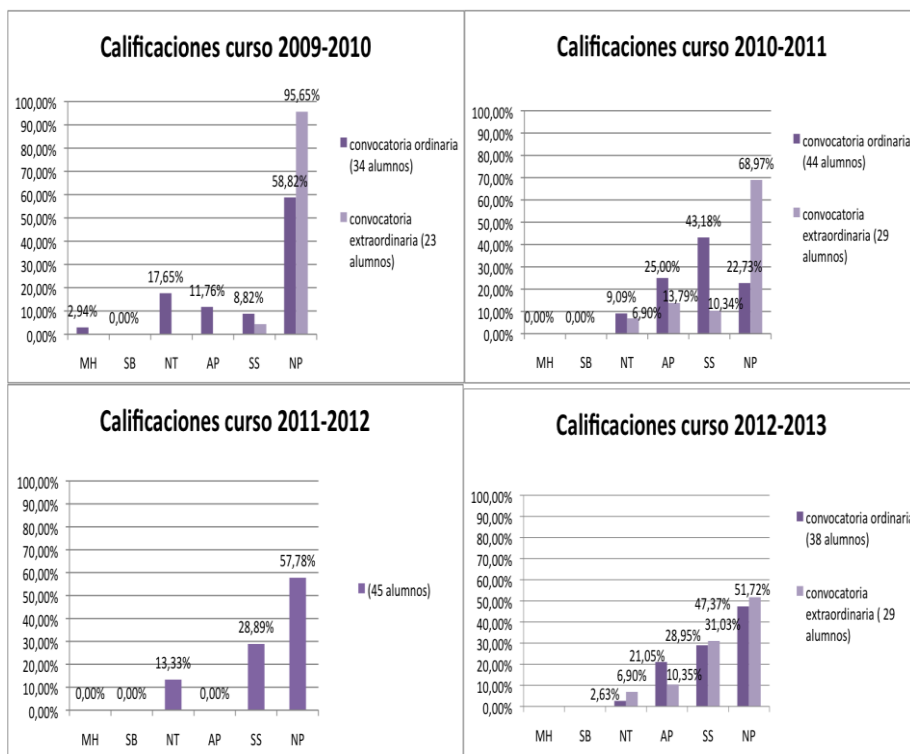
- Exige que los alumnos tengan habilidades para el desarrollo del trabajo autónomo, puesto que la enseñanza online puede dar lugar a la inconstancia en el estudio.
- Exige más trabajo que la enseñanza presencial, tanto para el alumno como para el profesor. En este sentido, es interesante destacar que si la ratio profesor-alumnos no es la adecuada, se pierde la ventaja de la enseñanza personalizada.
- El profesor tiene que elaborar unos materiales docentes adecuados para el estudio de la asignatura. Si no cuenta con un apoyo informático suficiente puede suceder que la utilización de ciertas herramientas (exámenes, autoevaluación, etc.) lleguen a plantear problemas en el momento de su uso.
- Hay una elevada proporción de alumnos que abandonan cuando no están suficientemente motivados, y la falta de motivación no puede ser corregida a través del contacto personal.
- La relación profesor-alumno se desarrolla en un ambiente frío que no ayuda al estímulo del alumno desanimado.
- La enseñanza virtual no es aplicable a todas las materias formativas ni a todos los perfiles de alumnos.

4. RESULTADOS OBTENIDOS

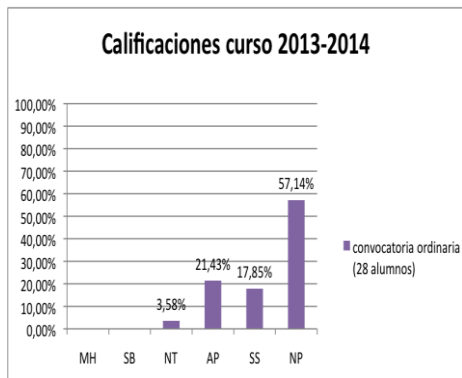
Antes de señalar los resultados alcanzados, creemos importante destacar que la experiencia que aquí analizamos se refiere a una asignatura con unas características diferenciales: se trata de una introducción a la economía para estudiantes de Ciencias Políticas, generalmente no habituados en el estudio de esta disciplina, y ello hace que les exija un mayor esfuerzo y que los resultados suelen ser, en líneas gene-

rales, menos satisfactorios comparados con otras materias que les acarrea una menor dificultad.

A continuación, presentamos unos cuadros con las calificaciones obtenidas por los alumnos desde el curso 2009-2010 hasta la actualidad¹.



¹ En el caso concreto del curso 2011-2012, únicamente presentamos los resultados del curso englobando la convocatoria ordinaria y la extraordinaria por carecer de la desagregación de los datos. Para el curso académico actual, 2013-2014, sólo presentamos los resultados de la convocatoria ordinaria pues a día de hoy no se ha realizado la convocatoria extraordinaria, que tendrá lugar en junio de 2014.



Como se desprende de los cuadros anteriores, en líneas generales las calificaciones obtenidas no son del todo satisfactorias. Además, comparativamente con los alumnos que reciben enseñanza presencial para esta misma asignatura, los resultados son sensiblemente peores.

Pero sobre todo, lo que se advierte claramente es la elevada proporción de alumnos que no se presentan a las pruebas de evaluación de la asignatura y son calificados como no presentados. Además, los que no superan la asignatura en la convocatoria ordinaria, prácticamente podemos afirmar que se autoexcluyen de la convocatoria extraordinaria: la proporción de no presentados para esta convocatoria es mayoritaria.

Analizando de forma más personalizada estos resultados, observamos que hay un número importante de alumnos que prácticamente dejan la asignatura desde el comienzo del curso. Muchos alumnos no se llegan a presentar a ninguna prueba y según los datos que quedan recogidos en el icono “Informes del curso” se trata de estudiantes que sólo acceden a los contenidos de la página de forma ocasional o tan sólo en el momento del inicio del curso. Destaca un segundo grupo que sigue la asignatura únicamente hasta que se realiza la primera prueba parcial online y, a partir de ahí, abandonan su estudio.

Por el contrario, los alumnos que obtienen los mejores resultados finales son a su vez estudiantes que se han mantenido muy activos desde el comienzo del curso y sin mostrar altibajos. Sus accesos a las páginas de contenidos, ejercicios de autoevaluación, correos electrónicos, foros de debate y resto de elementos que integran la plataforma son muy numerosos y continuos.

Por último, queremos destacar que antes de la finalización del curso se realizan encuestas de evaluación docente al alumnado a través del campus virtual. Presentamos un cuadro comparativo enseñanza online-enseñanza presencial de la participación de los alumnos en la elaboración de las encuestas (como porcentaje del total

matriculados). Únicamente presentamos este valor porque nos permite obtener conclusiones con las que afianzar los resultados anteriores.

	ONLINE	PRESENCIAL
Año académico	Participación del alumnado en las encuestas	Participación del alumnado en las encuestas
2009-2010	25%	81%
2010-2011	30,2%	69,3%
2011-2012	35,6%	61,9%
2012-2013	14,3%	45,2%

Como podemos observar, llama la atención que el grado de participación de los alumnos en la realización de las encuestas docentes es muy inferior en el caso de la enseñanza online, y es un hecho que se repite en los cuatro cursos para los que disponemos de datos. La participación en estas encuestas nos ofrece una aproximación del porcentaje de alumnos que cuando está finalizando el período lectivo, que es cuando se realizan las encuestas de valoración docente, aún continúan con el estudio de la asignatura.

5. CONCLUSIONES

La enseñanza de un título de Grado online ofrece numerosas ventajas, entre las que destacan que el aprendizaje se realice sin la necesidad de coincidencia profesor-alumno en el espacio y en el tiempo y el uso de las TIC como herramienta de aprendizaje.

Ahora bien, para que el sistema pueda cosechar un resultado de éxito parece necesario el cumplimiento de una serie de requisitos, entre los que vamos a destacar la

necesidad de que tanto el profesor como el alumno se adapten a nuevos métodos de aprendizaje.

Por el lado del docente, éste ha de recibir la formación adecuada, y no me refiero exclusivamente a adquirir destrezas tecnológicas sino a un cambio en profundidad de la metodología utilizada para la impartición de la docencia.

Por el lado del estudiante, el éxito de su aprendizaje depende de ciertas características que deben diferenciar al alumno de un espacio virtual: su motivación, su independencia y su propia actitud. Si el alumno no posee un nivel de madurez suficiente para la adquisición de destrezas, el éxito de la enseñanza online es cuestionable. El alumno queda sumergido en un entorno de trabajo autónomo para el que, en ocasiones, no está preparado. Según mi experiencia, este es el motivo fundamental de las altas tasas de abandono en este sistema de estudios y este es, a su vez, el problema principal de la enseñanza universitaria on line.

Cuando el problema surge por el lado del estudiante, la enseñanza semipresencial, en la que se combinan clases presenciales con el trabajo autónomo del alumno a través del campus virtual, puede ser una solución; se recogen las ventajas de la enseñanza online y pueden evitarse sus inconvenientes.

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EL CYBERBULLYING. CONOCER PARA ACTUAR

M. VIVES, L. SÁNCHEZ, C. ORTE and L. MACÍAS

Resumen.

Cierto es que las nuevas tecnologías forman parte de nuestras vidas, también de nuestros menores en todos sus ámbitos. En este sentido, debemos tener presente la importancia de estas así como el uso e impacto que tienen en las vidas de los alumnos.

Nuestra comunicación se basa en la importancia de la prevención, detección e intervención del cyberbullying, una forma de acoso escolar basado en las nuevas tecnologías que ha cobrado especial interés por la comunidad científica a partir del 2000. Yubero y Larrañaga (2012) confirman que se pasó de una prevalencia en los primeros estudios del 5% a un 50% de menores que informan de su participación en algún momento en alguna forma de acoso a través del móvil e Internet; a nivel internacional *National Crime Prevention Council National Crime* confirmó que un 43% de adolescentes son víctimas del cyberbullying.

En este sentido, debemos no sólo conocer con más detalle las características diferenciales del cyberbullying respecto al bullying, sino también las diferentes factores de riesgo y posibles factores de protección, los datos ofrecidos por diferentes investigaciones relacionadas con los tipos de víctima (Buelga y Pons, 2012), los efectos a corto, medio y largo plazo y las (posibles) diferencias entre sexos (López et al, 2012). El conocimiento detallado de estas variables nos permitirá trabajar desde microniveles a macroniveles: así, no sólo se deberán diseñar programas y protocolos de prevención y de actuación específicos sobre el cyberbullying, sino que, al mismo tiempo, deberían poder formar parte de los programas y proyectos de convivencia en general, de actividades transcurriculares, de su incorporación en las competencias básicas trabajadas a nivel escolar, de una respuesta efectiva y eficiente a las necesidades del entorno con la participación imprescindible de las familias y con un apoyo legislativo claro.

1. INTRODUCCIÓN

El uso de las nuevas tecnologías de la información y de la comunicación (TIC) se han convertido en un elemento más de nuestras vidas, convirtiéndose en un medio muy potente de comunicación entre las personas. Difícil es localizar a una persona sin un dispositivo móvil en nuestra sociedad.

Pero todas las ventajas que se asocian al uso de las nuevas tecnologías, como el acceso a la información y a la comunicación de una forma casi instantánea pueden convertirse en un elemento muy pernicioso para nuestras vidas cuando ello supone un mal uso intencionado y repetido de estas, provocando un desequilibrio de poder. Esta forma de maltrato, asociada a los menores de edad se conoce como cyberbullying.

Lejos de ser un fenómeno poco frecuente, autores como Calvete et al (2010)[1] o Tokunada (2010) [2] refieren una prevalencia de entre un 20 y un 40% (44,1% en Calvete et al, 2010); si bien siguiendo esta última obra, la prevalencia puede variar del 15% al 57% según la definición y variables que se utilizaron en las investigaciones revisados por ellos en U.S.

Frecuente, actual y progresivo. Yubero y Larrañaga (2012) [3] confirman que se pasó de una prevalencia en los primeros estudios del 5% a un 50% de menores que informan de su participación en algún momento en alguna forma de acoso a través del móvil e Internet; a nivel internacional *National Crime Prevention Council National Crime* confirmó que un 43% de adolescentes son víctimas del cyberbullying.

2. CARACTERÍSTICAS PRINCIPALES DEL CYBERBULLYING

La definición de cyberbullying se asocia a la acogida por la comunidad científica de Olweus (1993) [4] sobre el bullying, caracterizada por ser una forma de maltrato intencionado, perdurable en el tiempo y con un desequilibrio de poder entre el agresor y la víctima. Estas características se mantienen al hablar de cyberbullying, incorporando el anonimato, su establecimiento en las dimensiones públicas y privadas, ser un canal siempre abierto, que incluye perversión moral y con escaso feedback físico y social entre los participantes (Calamaestra, 2011). [5]

El hecho de realizarse a través de las TIC permite clasificarlo según diferentes canales, como son mails, sms, fotografías, vídeos, llamadas, mensajería instantánea, ... Willard (2007) [6] clasifica su tipología en : a) *Flaming* (discusión iniciada en internet y que se expande); b) *harassment* (hostigamiento a través de mensajes); c) *denigration* (a través de rumores en la web); d) *impersonation* (suplantación de la personalidad en la web para enviar mensajes ofensivos sobre terceros); e) *trickery* (difundir secretos a través de la web); f) exclusión (de grupos virtuales); h) *Cybers-talking* (acoso y denigración intenso y repetitivo) y i) *Cyberamenazas* (normalmente asociadas a las anteriores formas de acoso virtual).

Actualmente no existe consenso sobre las diferencias o no del cyberbullying referidas al sexo (Valera, 2012) [7], no obstante, sí parece haber un acuerdo en la edad, siendo el tramo entre los 12 y los 14 años (especialmente en los dos primeros cursos de E.S.O.) la etapa con mayor incidencia de victimización (Buelga y Pons, 2012)

[8]; en cambio, ser chica, tener disposición a encontrarse con extraños y ser ya víctima de cyberbullying se asocian a factores de riesgo del cybergrooming.

Respecto a los agresores, el trabajo de Aoyama (2010) [9] recoge como variables significativas como las tendencias a usar conductas agresivas, o la desinhibición que permite el anonimato de internet. Para estos autores, dos son los grupos de riesgo para convertirse en víctimas, uno, aquellos que intentan con grandes dificultades el integrarse en grupo de iguales y un segundo grupo de gays, lesbianas, bisexuales o transexuales.

Las consecuencias del cyberbullying no sólo son para las víctimas, que tienden a mostrar conductas depresivas, ansiedad, baja autoestima, problemas psicológicos, absentismo escolar o bajo rendimiento escolar (Aoyama, 2010) [9] sino que el hecho de que el acoso pueda ser en cualquier lugar y en cualquier momento hace que ansiedad, la depresión o la baja autoestima se acentúen; además de, en ocasiones, tener que cambiar o eliminar números de teléfono, cuentas de correo,... Es evidente que las consecuencias no sólo se limitan a las víctimas, sino también a los acosadores y a la denominada en bullying, mayoría silenciosa. De aquí que sea necesario poder conocer para prevenir y actuar.

3. INTERVENCIÓN EN CYBERBULLYING EN MENORES.

El abordaje de esta tipología de violencia no resulta fácil, al quedar ocultado, incluso por las víctimas que lo padecen. Juvonen y Gross (2008) en Snakenborg, Van Acker y Gable (2011) [10] informaron que el 90% de sus encuestados que habían sufrido acoso cibernético no se presentó a ningún adulto. Abunda la percepción de que al explicarlo a los padres o a los profesores, ponga en peligro su seguridad, empeorando la situación (Orte, M.C. y March, M.X., 1996) [11]. La sensibilización sobre la gravedad del problema se hace esencial, no únicamente, a nivel general, sino específicamente en cada uno de los centros educativos, es decir, los profesionales deben comprender que los niños son vulnerables a este tipo de agresiones, y que por lo tanto, deben mantenerse alertas ante posibles indicios de violencia.

La tipología de recursos actuales destinadas a la defensa y la protección de los menores ante el acoso en la web son numerosas y se enfocan desde diferentes niveles de actuación. Snakenborg, Van Acker y Gable (2011)[10] dividirían los tipos de actuaciones en tres categorías:

- a. Las leyes, reglas y políticas para regular el uso de los medios de comunicación, además de establecer un control en el uso abusivo de las tecnologías.
- b. Programas curriculares diseñados para educar a los niños y los jóvenes sobre la seguridad en Internet, profundizando en cómo evitar los abusos y cómo actuar si se producen.

- c. Establecer enfoques tecnológicos para prevenir o reducir al mínimo la posibilidad de cyberbullying.

Respecto a la primera categoría y teniendo en cuenta que los amigos, los padres y otros referentes como los profesores son agentes socializadores incidentes en la conducta de los niños y los jóvenes, se debe actuar sobre ellos si se quiere prevenir y disminuir el cyberbullying. Hinduja y Patchin (2013) [12] señalan, mediante una muestra de 4.400 niños de 33 escuelas del sur de Estados Unidos, que la conducta de cyberbullying se asocia a dos factores: la posibilidad de sanción por parte de los adultos y la percepción de que sus compañeros actúan de igual manera (acosando a otros niños). Los resultados expuestos por los autores indicaban que si los niños perciben mayores consecuencias de sus acosos cibernéticos, éstos se verían limitados. De igual manera, hasta un 62% de los que habían acosado cibernéticamente a otros niños exponían que sus amigos también lo habían hecho en los últimos 6 meses, por lo que, los datos señalaban que siempre que se percibiera que era un comportamiento frecuente entre sus iguales, se producía un incremento de estas actuaciones. En consecuencia, la primera pauta encaminada a mejorar la problemática expuesta consiste en fomentar la supervisión y vigilancia de los padres, tanto en acosadores como en víctimas. El fortalecimiento parental y la mejora en las pautas de crianza se convertirá en un factor de protección esencial en la disminución del cyberbullying. Estas hipótesis son apoyadas por la teoría del comportamiento social normativo, que indicará que las creencias están reguladas por tres factores llamados normativos: a. Las normas legales conocidas y que conllevan sanción, b. Las expectativas o la motivación que conduce una conducta y c. La identidad de grupo o la creencia de que un comportamiento compartido con un grupo justifica su actuación o lo legitima dicho comportamiento (Del Rey, Casas y Ortega, 2012) [13].

Se convierte, según Hinduja, y Patchin (2013) [12], en una pauta esencial que las escuelas desarrollen políticas contra el acoso entre los alumnos. Como se explicaba, una disciplina estricta influiría disminuyendo la probabilidad de desarrollo de estas conductas delictivas, y por lo tanto, además de la supervisión parental, se debe complementar con la actuación en el ámbito escolar. Por lo tanto, los autores indican la actuación conjunta de los padres y de los educadores (ámbito escolar) como necesaria y complementaria, no solo para evitar la conducta delictiva, sino también para combatirla.

A nivel estatal, se prevé que se incorporen en los Planes de Convivencia de las escuelas protocolos de actuación ante posibles casos de violencia. En estos planes se contemplan una serie de acciones caracterizadas por implementación de conciencia sobre el buen uso de las tecnologías, análisis de los teléfonos móviles o de las redes

sociales en caso de sospecha, comunicación directa con los padres, dotación de información legal a las familias, fomento de la actitud crítica ante las conductas violentas en la web y el impulso de programas que permitan la resolución de conflictos mediante conductas no violentas (del Rey, Flores, Garmendia, Martínez, Ortega y Tejerina, 2011) [14]. Actualmente, el protocolo establecido en las escuelas se basaría en 5 fases diferenciadas (Luengo, 2011)[6]:

Fase 1 – Detección y obtención de información preliminar.

La información debe ser puesta en conocimiento del Equipo Directivo, que deberá analizar la información y las pruebas aportadas, determinar a todos los alumnos implicados y valorar la necesidad de una reunión con el alumno víctima del ciberacoso.

Fase 2 – Valoración del caso

A partir de este momento, el Equipo Directivo deberá planificar un proceso de investigación, que conlleve la parada inmediata de la situación de acoso, si las pruebas evidencian que se está produciendo. Para que la investigación pueda ser valorada como eficaz debe contemplar el abordaje de la información desde diferentes puntos de vista: del agresor, de la víctima, de la familia de la víctima, de los compañeros y de los profesores. De la misma manera, las valoraciones finales y el dictamen ser desarrollado mediante el análisis de las características de las acciones cometidas y de los dispositivos tecnológicos utilizados, de la difusión de las acciones, de la dificultad para detener el ciberacoso, del tiempo de exposición de la víctima al ciberacoso, de la edad y las condiciones psicológicas de víctima y agresor, y por último, del impacto sobre la víctima. En caso de que la valoración sea positiva, apuntando a que se está produciendo un ciberacoso, se debe de poner esta información en conocimiento del Servicio de Inspección Educativa, además de valorar si se debe de denunciar ante el Ministerio Fiscal o los cuerpos de seguridad. En caso de que no se identifique como una situación de ciberacoso, se podrá pasar a la fase 5.

Fase 3 – Plan de actuación

Si se demuestra que se está produciendo una situación de ciberacoso, la actuación de la escuela debe ir encaminada a ofrecer apoyo emocional, tanto a víctima como a agresor, a mediar entre ellos si es posible y a derivar los casos a servicios externos si es necesario. Respecto a las familias, debe orientarlas sobre qué los indicadores de comportamiento y establecer pautas de apoyo y atención.

Fase 4 – Evaluación y seguimiento del plan.

Aspectos como los resultados finales que afecten al caso de cyberbullying identificado, el proceso de sensibilización del profesorado, las actuaciones en el centro escolar preventivas o las actuaciones de la Comisión de Convivencia del centro deben ser evaluados y tenidos en cuenta durante todo el proceso. El Plan de Convivencia, así como su memoria, resultarán claves.

Fase 5 – Información y sensibilización. La prevención

Se deberá establecer, como se indicaba anteriormente, un plan de sensibilización en la comunidad educativa, desarrollado desde el Equipo Directivo y la Comisión de Convivencia. En este caso, el proceso y las experiencias adquiridas en él, deben ser integradas en el plan desarrollado, así como pautas preventivas para que no se vuelvan a producir.

Autores como Snakenborg, Van Acker y Gable (2011) [10], señalan, que a pesar de la importancia de las normas escolares sobre el uso saludable de las tecnologías, su jurisdicción es limitada, no pudiendo alcanzar, en muchos casos, el abordaje fuera de sus muros. Por lo tanto, se recomendaría ir más allá de las normas escolares; mediante programas de prevención primaria, secundaria y terciaria, que hayan demostrado su eficacia. Del Rey, Casas y Ortega (2012) [13], mediante un programa denominado ConRed, cuyo objetivo es el buen uso de las TIC, explican la importancia del control parental. El programa se basará en el dominio de técnicas de seguridad y protección de los datos personales en Internet, el aprendizaje de un uso saludable y seguro de la Red, conocer la prevalencia del fenómeno de ciberacoso, prevenir la implicación como víctimas en acciones de cyberbullying, fomentar una actitud de afrontamiento y ayuda con las personas involucradas y prevenir un abuso de las TIC. Los resultados señalarán una disminución en la prevalencia de general de cyberbullying y una mayor concienciación sobre los efectos positivos del control y la privacidad de la información personal. Por lo tanto, los autores enfatizan en que una intervención ecológica sería suficiente para mejorar el problema actual, al dotar de conocimientos preventivos tanto a alumnos, como padres y profesores, incrementando los factores de protección y las fuentes de asesoramiento.

Programas como “*Fear Not!*”¹, aplicado en población alemana y del Reino Unido, exponen como se puede dotar de estrategias de afrontamiento a los menores víctimas de acoso al otorgarles un papel activo como defensores de personajes virtuales. Es decir, los menores se involucran en historias virtuales, en las que deben de aconsejar a los protagonistas sobre cómo sobrevivir a la situación aversiva que están experimentando, pero lo hacen como “amigos invisibles”, protegidos por las pantallas y pudiendo distanciarse de la historia cuando sea necesario. Al mismo tiempo, se conseguirá el incremento de la empatía de otros menores respecto al fenómeno de acoso, elevando su conciencia sobre el problema y fomentando la conducta proactiva ante este tipo de incidencias. Por lo tanto, y según los datos arrojados por los autores del programa “*Fear Not!*”, los medios tecnológicos podrían ser utilizados para combatir y prevenir el cyberbullying, desarrollando herramientas que les guiarán sobre cómo enfrentarse a la situación con la que se encuentran (Vannini, et al., 2010)[15].

Otros autores explican la eficacia de intervenciones como programas de cibermentores, donde niños que tuvieran un mayor dominio de las tecnologías enseñaran a las víctimas como evitar el ciberacoso (del Rey, Flores, Garmendia, Martínez, Ortega y Tejerina, 2011)[14]. O bien, el programa de alumnos ayudantes, cuyo objetivo es que grupos de alumnos previamente formados sobre la prevención del ciberacoso enseñen a grupos de niños menores, por ejemplo, estableciendo una asociación entre jóvenes de primaria y de secundaria (Luengo, 2011)[16]. Programas como *Internet Safety Program (iSAFE)*, *Cyberbullying: a prevention curriculum*, *Sticks and Stones: cyberbullying* y *Lets Fight it Together: What we all can do to prevent Cyberbullying* son programas guías que se establecen en colegios estadounidenses, que incluyen tanto charlas como páginas webs que instruyen a los estudiantes a qué hacer ante el acoso cibernético (Snakenborg, Van Acker y Gable, 2011)[10].

Especialmente en la adolescencia, la necesidad de pertenencia a un grupo social, el desarrollo de la identidad y la aceptación entre sus iguales, conllevará que la opinión de otros adolescentes cobre un importante peso en sus actuaciones. Por lo tanto, se aconseja la implementación de asesorías y de tutorías virtuales ejecutadas por otros adolescentes, que están siendo desarrolladas con éxitos en otros países, como Estados Unidos (Hinduja, y Patchin, 2013) [12]. Las actuaciones adquieren una mayor eficacia cuando son los adolescentes más aceptados o los que tienen un papel de mayor liderazgo, los que se encargan de este tipo de actuaciones.

Por último, también debe hacer mención a software que permiten a los padres o a las escuelas filtrar y bloquear contenidos que pueden resultar perjudiciales. La manera en que la mayoría de estos programas funcionan es mediante la búsqueda de palabras clave, direcciones de páginas webs y categorías concretas. Entre los software que están siendo más utilizados, Snakenborg, Van Acker y Gable (2011)[10] destacan *Cyber Bullying Prevention Engine* y *Child-Friendly Internet*, que pondrán en cuarentena aquellos correos o mensajes que contengan las palabras clave señaladas como ofensivas o perjudiciales. La mayor parte de estos software permiten al administrador de la cuenta, ya sea uno de los padres o responsables de la escuela, identificar al creador del mensaje sin necesidad de revisar todas las notificaciones electrónicas.

La rápida expansión de la tecnología en la juventud, junto el incremento de las oleadas de violencia, deben alertar a los profesionales sobre la necesidad de establecer políticas sancionadoras del uso abusivo de las tecnologías, además de incrementar la aplicación de software de control y restricción en la navegación en Internet. Pero, especialmente, se debe incidir en la necesidad de la coordinación de los centros escolares con las actuaciones parentales, no únicamente para detener un abuso, sino también para prevenirlos. La aplicación de programas eficaces se convierte en una pauta clave, que debe ser tenida en cuenta por las principales políticas de actuación socioeducativas.

4. CONCLUSIÓN

La comunicación que presentamos pretende ayudar a dar a conocer un fenómeno que actualmente está presente en las aulas, el cyberbullying. En este sentido, entendemos que las tecnologías de la comunicación y la información son un elemento básico en el desarrollo de nuestra vida diaria, también la de nuestros menores; no obstante, estas pueden convertirse en un elemento pernicioso cuando se utilizan, de forma intencionada, para causar daño a otras personas, creando una situación de desequilibrio de poder y progresiva en el tiempo.

Si bien es un hecho que ha sido estudiado recientemente, los datos confirman que el cyberbullying aparece en porcentajes muy elevados (sobre un 44% en algunos estudios citados en esta comunicación), por tanto, entendemos que es necesario conocer sus formas más habituales, aquellas variables que permiten que tenga este auge para poder prevenir futuras situaciones de cyberbullying así como intervenir en aquellas que detectemos.

El trabajo presentado intenta ser una aproximación a las líneas básicas de prevención e intervención, analizando algunos programas nacionales e internacionales que actualmente se llevan a cabo. En este sentido, creemos básico conocer aquellas

características diferenciales del bullying, los factores de riesgo pero también realizar una intervención coordinada no sólo con la comunidad educativa a diferentes niveles (grupo de iguales, familias y profesores) sino también en diferentes ámbitos: locales, a través de programas de prevención e intervención adaptados a cada realidad, nacionales, a través de programas marco y una legislación clara y a nivel internacional, dando visibilidad a este fenómeno y aportando las líneas marco que engloben el trabajo en los niveles anteriores.

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TRAS LA BONDAD COMPETENCIAL: LIDERAZGO Y TRABAJO EN EQUIPO, DOS COMPETENCIAS TRANSVERSALES.

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Resumen.

La presente crisis ha evidenciado el afloramiento del *dark leadership* (o liderazgo oscuro) constituido por un conjunto de tres constructos, a decir, maquiavelismo, psicopatía y narcisismo. El resurgimiento de este liderazgo y forma de entender el trabajo abre una necesaria reflexión al ámbito docente universitario. Este tipo de comportamientos, ¿nacen o se hacen? Si se hacen, ¿dónde comienzan? ¿Dónde deben evitarse? ¿Cuál es la misión de la universidad? ¿Sólo formar al profesional o también a la persona? ¿Acaso debe la universidad incorporar y evaluar comportamientos éticos?

Palabras clave: Evaluación de competencias, EEES, Dimensiones competenciales UPV, Trabajo en equipo, Liderazgo

1. INTRODUCCIÓN Y OBJETIVOS

La presente ponencia es consecuencia de un proyecto de innovación y mejora educativa con título “Desarrollo de metodologías de adquisición y evaluación de la competencia trabajo en equipo y liderazgo”, formado por un grupo de profesores de distintas disciplinas de la *Universitat Politècnica de València* (UPV).

Este proyecto pretende contribuir a responder a la demanda realizada desde el Espacio Europeo de Educación Superior (en adelante EEES) donde se emplaza a las universidades a ajustarse y adaptarse a las requerimientos actuales de la sociedad. La atención a esta demanda genera la necesidad de conjugar el aprendizaje por competencias con la promoción de cambios en las asignaturas. Consiste en alinear

la oferta docente e investigadora de la universidad con las necesidades sociales y del mercado laboral.

El EEES parece sugerir que la formación capacite para poder afrontar lo que se denomina “vida real”. Se trata de una realidad diaria que, entre otros, debe contemplar problemas éticos extrapolables a cualquier entorno: falta de tiempo, imposibilidad de hacer lo que se considera moralmente correcto, etc. [1]. En ese sentido deben enmarcarse las competencias ya que son las que proporcionar un entendimiento claro del trabajo y del contexto del mismo. Con ellas, es posible determinar no sólo lo que hay que hacer sino, también, cómo hay que hacerlo.

En este trabajo se pretende proporcionar antecedentes suficientes que sirvan de base para establecer y/o complementar rúbricas omni-abarcales de la competencia de “trabajo en equipo y liderazgo”. Este ejercicio se hará desde la fundamentación proporcionada por la distinción clásica griega de la acción y de dos áreas de conocimiento: la gestión (*management*) y la ética. Por una parte, se contemplará el punto de vista profesional centrado en las consecuencias externas del hacer, es decir, en la *poiasas*. Por otro, se evaluará conjuntamente la conformación de la persona, la *praxis*, que estudia la acción en referencia a las consecuencias que tiene en el sujeto actuante. Para evaluar la dimensión de la *hipótesis* –centrada en una perspectiva técnico-económica- se tomarán herramientas propias del área del *management* y respecto a la *praxis* –que analiza la bonanza o maldad de la acción- el área de referencia será la ética.

2. LA INCLUSIÓN DE LA ÉTICA COMO DIMENSIÓN ESENCIAL DE LAS COMPETENCIAS

Esta aproximación que distingue la acción entre hacer –*poiasas*- y hacerse –*praxis*- nos lleva a considerar las competencias como una “combinación de atributos (con respecto al conocimiento y sus aplicaciones, aptitudes, destrezas y responsabilidades) que describe el nivel o grado en que una persona es capaz de realizarlas” [2]. Así, los elementos esenciales competenciales son conocer y comprender –*knowing and understanding*-, saber actuar –*knowing how to act*– y saber cómo ser –*knowing how to be*- [3]. Es en este último elemento, el saber cómo ser y serlo, es donde se aprecia la necesidad de la ética, aquella disciplina que da sentido a la acción no sólo en vertiente del hacer –*poiasas*- sino, también, del hacerse –*praxis*-. Se trata del área de conocimiento que estudia la acción de la persona en cuanto buena o mala, desde su perspectiva cualitativa.

Es importante entender que la competencia ética no es estática sino dinámica puesto que su formación se genera en el contexto social. Por eso, se trata de una competencia que precisa de la creación de “arenas” capaz de generar una competencia ética colectiva para garantizar la sostenibilidad de un lugar de trabajo o de una profesión. Para eso se precisa tener un entendimiento claro no sólo de lo que se tiene que hacer

sino también del contexto en el que se tiene que hacer [4]. Pero, lo que es más importante, la ética es la que proporciona el sentido de la acción en la medida que da luz sobre los motivos de la acción, al ‘para qué’ y el ‘para quién’ se hacen las cosas. En ese sentido, la respuesta es siempre la misma: por, con y para personas.

Ese elemento contextual configura la competencia ética como “la capacidad de una persona, que se enfrenta a un problema moral, para pensar y actuar de una manera que no está limitado por las fijaciones morales o reacciones automáticas” [5]. No basta con saber ética, la ética es acción, se tiene y debe aplicar. Eso implica que la formación teórica de conocimientos éticos no es suficiente puesto que dicho entendimiento ético-teórico no implica, necesariamente, tener competencia ética. Es importante entender que “uno puede ser al mismo tiempo un excelente intérprete cognitivo (. . .) siendo a la vez muy pobre en el comportamiento ético” [6].

En definitiva, conseguir competencia ética en el trabajo consiste en entenderse a uno mismo como responsable de sus acciones siendo necesario conseguir la capacidad de integrar la percepción, la reflexión y la acción [7]. Esa capacidad integrada y ejercida regularmente hace que se pueda actuar moralmente de forma habitual generando hábitos buenos, virtudes, que son los que incide en la conformación de una personalidad con una dimensión moral.

Los aportes de dicha dimensión puede agruparse en cuatro categorías: **autonomía** – autoconocimiento; autorregulación- **diálogo** -capacidad para el diálogo; empatía; perspectiva social-, **comportamiento social** -habilidades sociales; habilidades interpersonales; capacidad para transformar el entorno-; **juicio moral** -comprensión crítica; razonamiento moral-[8]. La cuestión es, ¿debe esta dimensión incorporarse en las competencias genéricas que se enseñan en la universidad?

A la vista de lo dicho anteriormente, parece que sí. Sin embargo, es necesario apoyar esta respuesta con lo mucho que se ha dicho sobre las razones de proporcionar formación moral en la universidad. Se podría englobar lo dicho mayoritariamente en dos argumentos: los que provienen de demandas éticas y los que lo hacen de requerimientos estratégicos [9]. En ese sentido, las primeras responden a exigencias sociales que van desde la búsqueda de la felicidad [10], pasando por el entendimiento de la moral como parte de la educación [11] o la búsqueda de la dimensión humana moral [12]. Por su parte, los requerimientos estratégicos pretenden responder a problemas de naturaleza global –reducir las diferencias o entender el contexto-; los fines inherentes profesionales –conocer los medios y fines, reconocer fines internos profesionales-; y las demandas del presente mercado laboral –bien común, capital social, confianza-[13]. Parece que los requerimientos estratégicos son los argumentos que mejor se alinean con lo establecido por el EEES.

Partiendo, pues, de la necesidad de incluir la ética en el conjunto de competencias genéricas en las que debe incidir la universidad, este trabajo pretende hacerlo en

relación con otra competencia genérica, la competencia de “trabajo en equipo y liderazgo”.

3. DESARROLLO DE LA COMPETENCIA “TRABAJO EN EQUIPO Y LIDERAZGO” INTEGRANDO LA DIMENSIÓN ÉTICA.

Es obvio que la competencia de “trabajo en equipo y liderazgo” es necesaria para cualquier actividad puesto que, independientemente de que se trabaje o no en una organización, el liderazgo, entendido en su sentido clásico como *auctoritas* -saber socialmente reconocido [14]- es indispensable. Quizás no lo sea tanto la necesidad de incluir la ética en dicha competencia.

Sin embargo, conviene antes repasar las premisas del aprendizaje ético. Por una parte, arranca del respeto de la libertad e individualidad de las personas. Puede tomar como escenario de mínimos la Declaración Universal de Derechos Humanos y como escenario de máximos un entendimiento antropológico de la persona. Sea una u otra, se trata de referencias que sirven de base racional para realizar el análisis crítico de la realidad e iniciar el proceso de construcción o reconstrucción de esos valores sobre los que se basan. Por otra parte, se sirve del diálogo como instrumento, esto le conforma con una orientación claramente dinámica, ya que, su propia naturaleza está basada en el proceso de construcción del conocimiento en sí. Todo lo dicho le dota de un entendimiento de la resolución de los conflictos de acuerdo con parámetros de racionalidad y comunicación [15]. Estas premisas nos permiten mostrar las contribuciones de la incorporación de la dimensión ética, ver tabla I.

Básicamente, las contribuciones de la inclusión de la dimensión ética en las competencias genéricas resaltaría la importancia de respetar la libertad e individualidad de las personas. Por otro lado, enriquecería el entendimiento de la acción mostrando que no se trata de un hecho aislado sino que debe entenderse y hacerse desde su dinamismo. A su vez, proporcionaría escenarios (de máximos y/o mínimos) de referencia para poder fundamentar cualquier proceso de racionalización, dialógico y de resolución de conflictos, ver la tabla I.

Tabla I.- Premisas y contribuciones de la inclusión de la dimensión ética en las competencias genéricas

PREMISA PRINCIPAL		Respeto de la libertad e individualidad de las personas
NATURALEZA	DINÁMICA	Su propia naturaleza está basada en el proceso de construcción del conocimiento en sí.
ESCENARIOS	MÍNIMOS	Declaración Universal de Derechos Humanos
	MÁXIMOS	Búsqueda a partir de un entendimiento antropológico de la persona.
ELEMENTOS DE APOYO	RACIONALIDAD	Sea de máximos o de mínimos, los escenarios sirven de referencia racional para realizar el análisis crítico de la realidad e iniciar el proceso de construcción o reconstrucción de esos valores sobre los que se basan.
	DIÁLOGO	El diálogo es el instrumento de transmisión
	RESOLUCIÓN DE CONFLICTOS	Entendimiento de la resolución de los conflictos de acuerdo con parámetros de racionalidad y comunicación

Fuente: Elaboración propia a partir de Boni y Lozano (2007)

Estas premisas y contribuciones deben relacionarse con la competencia de “trabajo en equipo y liderazgo”. A los efectos de esta ponencia, tomaremos la definición de Villa y Poblete [16] que consideran que es aquella que genera la integración y colaboración de forma activa en la consecución de objetivos comunes con otras personas, áreas y organizaciones, influyendo sobre las personas y/o grupos, anticipándose al futuro y contribuyendo al desarrollo personal y profesional. De esta definición pueden extraerse sus elementos esenciales: pensamiento analítico y sistemático, administración del tiempo de trabajo, participación en la toma de decisiones y en la gestión de objetivos y en los proyectos. Se trata de un entendimiento de esta competencia que no incluye explícitamente la consideración ética. Pero ¿qué pasaría si se incluyese explícitamente la dimensión ética?

La respuesta puede verse reflejada en la tabla II.

Tabla II.- Implicaciones de la inclusión explícita de la dimensión ética en la competencia de “trabajo en equipo y liderazgo”

Competencia de “trabajo en equipo y liderazgo”	
Sin la consideración explícita de la dimensión ética	Potenciales contribuciones de la dimensión ética
Pensamiento analítico	Partiendo de un entendimiento esencial de las personas que obliga a respetar su libertad e individualidad
Pensamiento sistemático	
Administración del tiempo de trabajo	Desde un proceso de construcción del conocimiento dinámico que parte de un entendimiento holístico y contextual
Participación en la toma de decisiones	Basado en la racionalidad y articulado a través del diálogo
Participación en la gestión de objetivos	
Participación en la gestión de proyectos	
Resolución de los conflictos de acuerdo con los parámetros racionales y comunicativos	

Fuente: Elaboración propia a partir de Villa y Poblete (2007) y Boni y Lozano (2007)

La Tabla II da luz sobre las consecuencias que tendría la inclusión explícita de la dimensión ética en la competencia de “trabajo en equipo y liderazgo”. En primer lugar, el pensamiento analítico y sistémico debería partir y tener como límites el respeto de la individualidad y libertad de las personas. Por su parte, la administración del tiempo no podría hacerse desde una orientación centrada en la tarea sino que se incluiría un proceso de construcción del conocimiento dinámico que parte de un entendimiento holístico y contextual. Eso conduciría a un entendimiento de la participación -ya sea en la toma de decisiones, la gestión de objetivos y/o la gestión de proyectos- fundamentado en la racionalidad y articulado en torno al diálogo. De esa manera, se facilita la generación de un entorno basado en la generación de criterios y tendente a eludir escenarios especulativos o fundados en opiniones. La consecución de semejantes entornos minimizan los conflictos. Ante la imposibilidad de eliminar los conflictos, al incorporar explícitamente la dimensión ética su resolución se realizaría de acuerdo con los parámetros de la racionalidad y la comunicación.

4 EVALUACIÓN DE LA COMPETENCIA “TRABAJO EN EQUIPO Y LIDERAZGO”

La evaluación de esta competencia debe ser abordada con técnicas alternativas a las tradicionales debido a la imposibilidad de obtener evidencias directas del grado de implicación de cada uno de los alumnos en el desarrollo del trabajo en equipo, así

como las interacciones que se producen intra-grupo. La metodología por tanto se basa en la práctica de la autoevaluación y en la co-evaluación mediante rúbricas.

La rúbrica es una herramienta que facilita al mismo tiempo la orientación y la evaluación [17]. El docente no sólo especifica con antelación los criterios de evaluación sino que además establece niveles de consecución para cada uno de ellos. Existe un gradiente de calidad explícito que proporciona un entorno de evaluación de seguridad al alumno.

El uso de las rúbricas en la autoevaluación y en la co-evaluación consigue implicar a los alumnos y resulta un ejercicio de responsabilidad y auto-crítica que contribuye al crecimiento personal.

En la literatura existen numerosas rúbricas relativas al desempeño personal en trabajos en equipo, sin embargo destacamos la desarrollada por Chica [18] puesto que se basa en la contribución, la actitud, la responsabilidad, la asistencia y la actitud en la resolución de conflictos (ver tabla III). No obstante, el desarrollo de una rúbrica consensuada con los alumnos puede resultar motivador y potenciar la participación en la actividad.

Tabla III.- Rúbrica para evaluar el trabajo en equipo

Criterios	1- pobre	2- escaso	3-bueno	4- excelente
Contribución Participación	Nunca ofrece ideas para realizar el trabajo ni propone sugerencias para su mejora. En ocasiones dificulta las propuestas de otros para alcanzar los objetivos grupales	Algunas veces ofrece ideas para realizar el trabajo pero nunca propone sugerencias para su mejora. Acepta las propuestas de otros para alcanzar los objetivos del grupo	Ofrece ideas para realizar el trabajo aunque pocas veces propone sugerencias de mejora. Se esfuerza por alcanzar los objetivos del grupo	Siempre ofrece ideas para realizar el trabajo y propone sugerencias para su mejora. Se esfuerza para alcanzar los objetivos del grupo.
Actitud	Muy pocas veces escucha y comparte las ideas de sus compañeros. No ayuda a mantener la unidad en el grupo	A veces escucha las ideas de sus compañeros y acepta integrarlas. No le preocupa la unión en el grupo	Suele escuchar y compartir las ideas de sus compañeros pero no ofrece como integrarlas. Colabora en mantener la unión en el	Siempre escucha y comparte las ideas de sus compañeros e intenta integrarlas. Busca cómo mantener la unión en el grupo

			grupo	
Responsabilidad	Nunca entrega su trabajo a tiempo y el grupo debe modificar sus fechas o plazos	Muchas veces se retrasa en la entrega de su trabajo y el grupo tiene que modificar a veces sus fechas o plazos	En ocasiones se retrasa en la entrega de su trabajo, aunque el grupo no tiene que modificar a veces sus fechas o plazos	Siempre entrega su trabajo a tiempo y el grupo no tiene que modificar sus fechas o plazos.
Asistencia y puntualidad	Asistió como máximo al 60% de las reuniones y siempre llegó tarde	Asistió de un 61% a un 74% de las reuniones y no siempre fue puntual	Asistió de un 75% a un 90% de las reuniones y siempre fue puntual	Asistió siempre a las reuniones y fue puntual
Resolución de conflictos	En situaciones de conflicto o desacuerdo, no escucha otras opiniones o acepta sugerencias. No propone alternativas y le cuesta aceptar el consenso o la solución.	En situaciones de conflicto o desacuerdo, pocas veces escucha otras opiniones o acepta sugerencias. No propone alternativas para el consenso pero los acepta	En situaciones de conflicto o desacuerdo, casi siempre escucha otras opiniones o acepta sugerencias. A veces propone alternativas para el consenso pero los acepta	En situaciones de conflicto o desacuerdo, siempre escucha otras opiniones o acepta sugerencias. Siempre propone alternativas para el consenso pero los acepta

Fuente: Chica (2011).

5. CONCLUSIONES

El propósito de esta ponencia ha consistido en revisar el contenido de una competencia, “trabajo en equipo y liderazgo”, definida como “dimensión competencial” en la UPV y que se integrará también en la mayoría de los planes de estudio de las diversas titulaciones. Esta revisión se ha hecho desde el establecimiento de un diálogo profundo con las exigencias del EEES.

Oír las demandas del EEES implica estar atento a las presentes necesidades sociales y laborales. En ese sentido, si la labor de la universidad consiste en ofrecer una atención acorde con las demandas de la sociedad en general y la laboral en particular, la ética es su signatura pendiente.

A la vista de las circunstancias, este trabajo ha planteado la conveniencia y pertinencia de incluir explícitamente la ética en las dimensiones genéricas. Se trata de una propuesta encaminada a contribuir en la reversión de la desatención formativa que ha sufrido la ética en estos tiempos recientes. La propuesta ha consistido en revisar en las implicaciones de la incorporación de la dimensión competencial ética. Para ello, se ha profundizado en su contenido y alcance entendiendo que su naturaleza proporciona y da sentido al actuar. De esa manera, se ha tratado de reflejar las consecuencias de incluir la dimensión ética en una competencia. Así, se ha mostrado que con esta dimensión se va más allá del alcance directo que pueda tener la propia competencia contemplando también aquellos alcances indirectos o derivados.

Una vez fundamentada su inclusión en las competencias, se ha procedido a incorporar explícitamente la ética en una competencia genérica particular, el “trabajo en equipo y liderazgo”. Este ejercicio ha permitido comprobar de primera mano el tremendo enriquecimiento de hacerlo.

Gracias a la incorporación explícita de la dimensión ética en la competencia de “trabajo en equipo y liderazgo” se ha podido dar sentido al pensamiento analítico y sistémico de dicha competencia. Así, las personas y su esencialidad libre e individual se presentan como premisas de partida y de fin. Por otra parte, esta dimensión proporciona una dimensión de corte dinámico, de perspectiva holística y contextualizadora que ilumina en cuestiones como la administración del tiempo de trabajo. A su vez, su carácter racional y dialógico complementa y establece unos medios para la buena consecución de la participación en la toma de decisiones, la gestión de objetivos y/o la gestión de proyectos. Lo mismo se predica de la resolución de conflictos que, lejos de centrarse en la finalidad, también lo hace, gracias a la dimensión ética, en los medios empleados para hacerlo.

Finalmente, conscientes de la necesidad de evaluar la adquisición de las competencias, este trabajo ha incidido en la medición de dicha competencia. Se incluye una propuesta de rúbrica si bien el desarrollo de una rúbrica consensuada con los alumnos puede resultar motivador y potenciar la participación en la actividad.

Agradecimientos

Los autores del trabajo agradecen la ayuda prestada por los técnicos del ICE de la Universitat Politècnica de València (UPV). Este trabajo ha sido financiado por el Vicerrectorado de Estudios, Calidad y Acreditación y la Escuela Técnica Superior de Ingeniería Agronómica y del Medio Natural (ETSIAMN) a través de la convocatoria de ayudas para PIME 2013-2014 de la UPV, con el proyecto código B14/13.

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LA MÚSICA DE MOROS Y CRISTIANOS EN EL AULA DE SECUNDARIA. ESTUDIO DE SUS POSIBILIDADES DIDÁCTICAS

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Resumen.

La presente comunicación pretende, por una parte, dar a conocer la Música de Moros y Cristianos, un patrimonio artístico y cultural que se instaura como una de las tradiciones más importantes de toda la Comunidad Valenciana y por otra, comprobar si facilita el aprendizaje de los contenidos musicales en comparación con la música clásica. Constituye un material didáctico y curricular muy interesante para trabajar contenidos musicales de la misma manera que lo hacemos con la música culta. Existe un vacío curricular en torno a este tipo de música que se debe cubrir, así como una ausencia de materiales curriculares adaptados a los alumnos para trabajarla en el aula. En definitiva, se pretende que el alumno amplíe su universo musical a través de la valoración y el respeto por la Música Festeria propia y por la riqueza del folklore de la Comunidad Valenciana que, en último término, es parte del patrimonio musical y supone un aspecto fundamental en la historia del pueblo valenciano.

Para el estudio se elaboraron dos unidades didácticas, una de Música de Moros y Cristianos y otra de Música Clásica en la que se trabajaron los mismos contenidos musicales pero con músicas distintas en dos grupos de 3º de enseñanza secundaria. Los bloques trabajados han sido: sonido musical, lenguaje musical, expresión vocal, expresión instrumental y música y sociedad. Se ha seguido una estrategia de complementación, que combina métodos de orientación cuantitativa -para describir las variables de interés y hacer las comparaciones necesarias- y métodos de orientación cualitativa -para profundizar y completar la información cuantitativa obtenida-.

La Música de Moros y Cristianos ha resultado ser una apuesta interesante que ha planteado nuevas y futuras líneas de investigación.

1. INTRODUCCIÓN

El tema de la Música de Moros y Cristianos o Música Festerera está directamente ligado desde su génesis a la ciudad de Alcoy, que nos remite sin duda a sus orígenes y a la primera vez que encontramos documentos escritos sobre ella como núcleo de población (Botella, 2014). Se puede definir como una manifestación popular y cultural de todos los pueblos que celebran con fervor La Fiesta de Moros y Cristianos que genera su propia música, la Música Festerera. Tomamos las palabras de Blanes (1982, p. 157) cuando dice, refiriéndose a Alcoy como génesis de la Música Festerera que, “sin negar la aportación a la música de la fiesta de Moros y Cristianos de otras localidades, aportación valiosísima y que ha enriquecido sobremanera y extraordinariamente el repertorio musical, no podemos menos de afirmar categóricamente que los pioneros de la música actual festerera, dedicada a los Moros y Cristianos, fueron los compositores alcoyanos. La constante laboriosidad de la ciudad de Alcoy y sus ansias de progreso es nota peculiar de su idiosincrasia”.

Es el único género musical para banda y una música compuesta ex profeso para el desfile que se materializa en sus tres formas: marchas moras, marchas cristianas y pasodobles. Según Botella (2011, pp. 93-94), “la Música Festerera no se interpreta dentro del marco de una fiesta en singular, sino de la Fiesta de Moros y Cristianos y es interpretada no por una sociedad musical, sino por una banda de música. Y su autoría corresponde a Alcoy”.

2. LA MÚSICA DE MOROS Y CRISTIANOS EN EL AULA DE SECUNDARIA

Con la Música de Moros y Cristianos, este material tan valioso tanto desde el punto de vista musical hemos trabajado los elementos musicales y las cualidades del sonido con alumnos de Enseñanza Secundaria para comprobar que se obtienen mejores resultados que con la Música Clásica. Esta investigación abre nuevos y amplios horizontes sobre las posibilidades de la Música Festerera como material didáctico de igual valor que la música culta para trabajar muchos de los contenidos de la música en la etapa de Secundaria: intensidad, ritmo, melodía, armonía, pulso y acento.

Unidades didácticas

El respeto y la valoración del folklore propio de la Comunidad, así como el reconocimiento de la riqueza del patrimonio cultural valenciano es una constante en los diferentes Decretos que establecen los contenidos mínimos de la etapa de Enseñanza Secundaria y de la asignatura de música. El desarrollo de la unidad didáctica de la Música de Moros y Cristianos permitirá a los alumnos la reflexión sobre la música, una mejor comprensión del hecho musical y una mayor capacidad para la valoración estética de las creaciones musicales. De esta manera contribuimos en la consecución de los objetivos j) y l) de la Orden ECI/2220/2007,

los cuales señalan que “el alumno ha de conocer, valorar y respetar los aspectos básicos de la cultura, así como el patrimonio artístico y cultural y apreciar la creación artística y comprender el lenguaje de las distintas manifestaciones artísticas” (p. 31681).

De este modo, a través de la unidad didáctica acercamos la Fiesta de Moros y Cristianos de Alcoy al aula de Secundaria para que el alumno la vivencie y la conozca desde un punto de vista diferente al que puede tener cuando la viva in situ. Así queremos comprobar que con la Música Festera se pueden trabajar en el aula los elementos musicales de la misma manera que lo hacemos con la música clásica. Existe un vacío curricular en torno a este tipo de música que se debe cubrir, así como una ausencia de materiales curriculares adaptados a los alumnos para trabajarla en el aula. Para ello, hemos trabajado la Música de Moros y Cristianos, sus características, sus principales géneros musicales, la agrupación de instrumentos que interpreta esta música y los compositores más importantes que han influido en el desarrollo de este género. En definitiva, se pretende que el alumno amplíe su universo musical a través de la valoración y el respeto por la Música Festera propia y por la riqueza del folklore de la Comunidad Valenciana que, en último término, es parte del patrimonio musical y supone un aspecto fundamental en la historia de esta comarca.

Al mismo tiempo trabajamos en paralelo los mismos elementos musicales a través de una segunda unidad didáctica, pero utilizando la música clásica para comprobar que la Música de Moros y Cristianos es un material curricular muy interesante y tan válido como la música clásica para trabajar con el alumnado de Secundaria. Por ello, la mayoría de las actividades propuestas en las dos unidades han sido las mismas y no creemos conveniente volver a repetir las, únicamente en aquellos casos que se hayan variado debido al material de música clásica utilizado.

En el caso de la unidad didáctica de Música Festera, sabemos que los alumnos han oído hablar de este tipo de música porque forma parte del folklore de la Comunidad, pero nunca han trabajado con ella en los cursos del primer ciclo ya que es un contenido que no aparece reflejado como tal en los bloques de contenidos del currículum para ese ciclo. Por lo tanto, el contacto con este género musical les llega por primera vez gracias a la aplicación en el aula de esta unidad. En el caso de la unidad didáctica de música clásica, el alumno sí la ha trabajado en la etapa de Primaria y en el primer ciclo de Secundaria, a excepción del primer curso en el que esta materia no se imparte.

Objetivos

El objetivo principal de este trabajo es comprobar si la Música Festera facilita el aprendizaje de los contenidos musicales en comparación con la Música Clásica así como comprobar si sirve para trabajar en el aula de secundaria de la misma manera que lo hacemos con la música de concierto. Es notorio el vacío curricular en torno a este tipo de música que se debe cubrir, así como una ausencia de materiales curriculares adaptados a los alumnos.

Metodología

Para el estudio se elaboraron dos unidades didácticas, una de Música de Moros y Cristianos y otra de Música Clásica que se adaptan en todo momento a las necesidades y exigencias de los propios alumnos. Desde el punto de vista metodológico y de acuerdo con este planteamiento, diferenciamos tres fases en este estudio:

a) Fase exploratoria-documental:

- Revisión de la información relativa al tema.
- Análisis de estudios existentes sobre este tipo de música.
- Delimitación de las dimensiones y variables del estudio.

b) Fase descriptiva-analítica:

- Elaboración de dos unidades didácticas para trabajarlas en el aula de Secundaria
- Identificación de la población y de la muestra.
- Confección de las bases de datos.
- Análisis e interpretación de los datos obtenidos.

c) Fase evaluativa:

- Valoración de los resultados.
- Elaboración de las conclusiones.

Las pautas de observación fueron, en una escala del 1 al 10, éstas:

A– SONIDO MUSICAL: Distingue la altura del sonido, discrimina el timbre de los instrumentos de viento, discrimina el timbre de los instrumentos de percusión, diferencia la intensidad del sonido y acompaña rítmicamente la audición con desplazamiento.

B – EXPRESIÓN VOCAL Y CANTO: Realiza correctamente los ejercicios de respiración, tararea *ostinatos* vocales acompañando la audición, canta apoyando la melodía, sabe interpretar canciones de dificultad adecuada a sus conocimientos y capacidades y valora la práctica coral de los demás compañeros.

C – EXPRESIÓN INSTRUMENTAL: Desarrolla una buena técnica instrumental, acompaña la música con los instrumentos de percusión escolar, valora la expresión de los demás compañeros, utiliza correctamente las manos con los instrumentos de percusión escolar y sabe interpretar con los instrumentos de percusión escolar el ritmo de las obras trabajadas en clase.

D – LENGUAJE MUSICAL: Interioriza el compás binario, distingue el pulso del acento, acompaña el ritmo de una canción, interpreta el ritmo de marcha¹ y diferencia las grafías de blanca, negra, corchea y semicorchea

E – MÚSICA Y SOCIEDAD: Conoce la agrupación básica de una banda de música, valora la Música Fester², conoce las características más representativas de la Música Fester³, distingue los tres géneros de Música Fester⁴ y conoce los compositores más representativos de la Música Fester⁵.

Muestra

El estudio se realizó con alumnos del Instituto de Enseñanza Secundaria de Torrellano de Alicante del segundo ciclo (tercer curso, grupos A, B, C y D), con edades comprendidas mayoritariamente entre los 14 y 15 años. En total se ha considerado un grupo de 96 alumnos, 42 chicos y 54 chicas, de los cuales 12 son alumnos repetidores. Del total de los alumnos se ha tomado un grupo de control de 48 (28 niñas y 20 niños), al que se le ha pasado la unidad didáctica de música clásica y un grupo experimental también de 48 (26 niñas y 22 niños), al que se le ha pasado la unidad didáctica de Música de Moros y Cristianos.

3. RESULTADOS

Los resultados más sobresalientes después de los análisis efectuados son los referentes a sonido musical y a lenguaje musical. Estos son:

A) Sonido Musical.

Respecto a la discriminación de la altura del sonido, los alumnos que mejores resultados alcanzan son los que han trabajado con la Música Fester (el 85,4% sacan una nota de 10 frente al 0% con la Música Clásica). Los resultados obtenidos en la discriminación tímbrica de los instrumentos de viento y de percusión también son más elevados al trabajar con esta música (el 68,8% y 75% obtiene una nota de 10 con la Música Fester frente al 8,3% y al 31,3% que lo hace con la Clásica). Por lo que se refiere a la intensidad del sonido, los alumnos que han trabajado con la Música Fester presentan mejores resultados (87,5% frente a 12,5% de Clásica) pues, la Música Fester es muy apropiada para el estudio de esta cualidad del sonido por sus características. El desplazamiento

¹ Para la unidad didáctica de la Música Clásica el criterio de evaluación ha sido: interpreta el ritmo binario.

² Para la unidad didáctica de la Música Clásica el criterio de evaluación ha sido: valora la Música Clásica.

³ Para la unidad didáctica de la Música Clásica el criterio de evaluación ha sido: conoce las características más representativas de la Música Clásica.

⁴ Para la unidad didáctica de la Música Clásica el criterio de evaluación ha sido: distingue la sinfonía del concierto.

⁵ Para la unidad didáctica de la Música Clásica el criterio de evaluación ha sido: conoce los compositores más representativos de la Música Clásica.

sobre la base de la audición aparece compensado entre las dos músicas, a pesar de que se mueven con más facilidad al escuchar una marcha festera que una obra de Música Clásica debido a que es un ritmo que lo llevan dentro (el 16,7% alcanza un 10 con la Música Festera frente al 2,1% que lo hace con la Clásica). Globalmente, el 97,9% alcanza las calificaciones más altas (notable y sobresaliente) al trabajar con la Música Festera frente al 6,3% que lo consigue con la Clásica. El siguiente gráfico refleja los resultados globales:

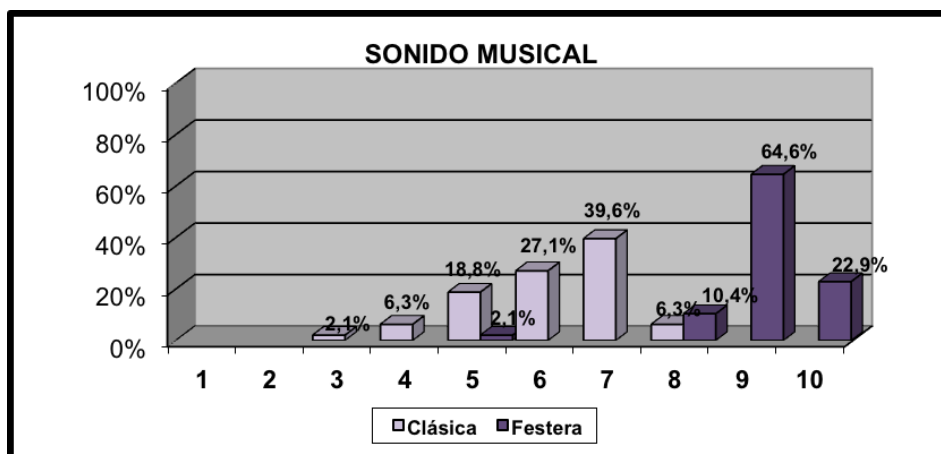


Figura 1. Sonido Musical

B) Lenguaje Musical.

El alumnado que mejor interioriza el compás binario y distingue el pulso y el acento ha sido el que ha trabajado con la Música Festera (79,2%). Esta música es puro ritmo y a través de la audición de las marchas y los pasodobles los alumnos asimilan mejor el pulso y el acento, así como el compás binario. Acompañar el ritmo de una canción ha proporcionado unos resultados muy similares utilizando las dos músicas, pero han sido mejores con la Festera. Cuando hemos empleado la Música Festera para interpretar el ritmo de marcha el alumnado ha respondido de forma muy satisfactoria (sólo el 2,1% ha sacado una nota inferior al 5). Cuando se usa la Música Clásica para interpretar el ritmo binario los resultados descienden, pues el 18,7% del alumnado obtiene calificaciones suspensas de 3 y 4. La diferenciación de las grafías de blanca, negra, corchea y semicor-

chea es un parámetro que se ha trabajado mejor con la Música Festera (75% alcanza la nota de 10) que con la Clásica (el 10,4%). La duración es una cualidad del sonido que queda muy clara cuando se trabaja con la Música Festera ya que en los pasodobles, sobre todo, las duraciones de las notas están muy repetidas dentro de una misma obra en las diferentes secciones y auditivamente se discrimina con más facilidad.

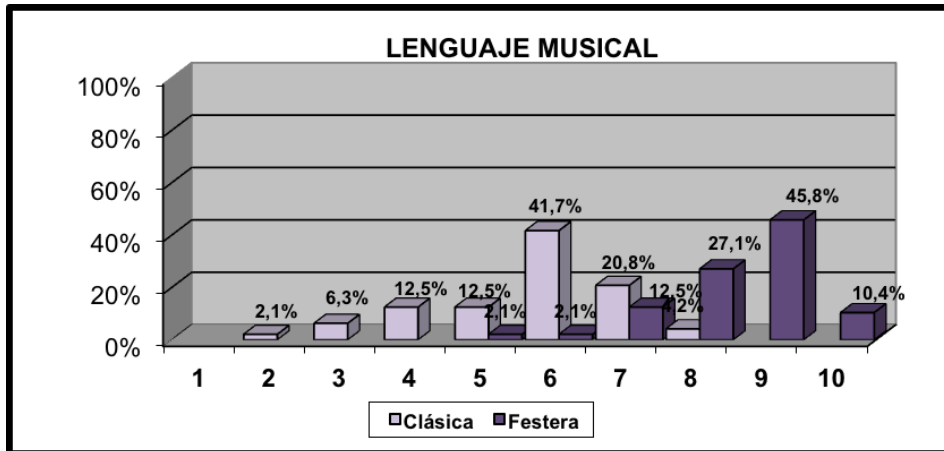


Figura 2. Lenguaje Musical

Globalmente, se ha advertido que los bloques que mayores diferencias representan en función del tipo de música que se utilice son los de Sonido Musical, Lenguaje Musical y Música y Sociedad. Las medias obtenidas en cada bloque (9,04 con la Música Festera y 6,15 con la Música Clásica, en el bloque de Sonido Musical; 8,44 con la Música Festera y 5,65 con la Música Clásica, en el bloque de Lenguaje Musical y 8,67 con la Música Festera y 5,56 con la Clásica, en el bloque de Música y Sociedad). El resto de los bloques no presenta diferencias significativas, ya que la práctica vocal o la expresión instrumental no lleva implícito el tipo de música con el que se trabaje. Los alumnos realizan correctamente los ejercicios de respiración o no, con una música o con otra, de la misma manera que desarrollan una buena técnica instrumental o no, independientemente del tipo de música que se utilice.

4. CONCLUSIONES

La aplicación didáctica de la Música Festera en el aula de Secundaria, ha sido una apuesta interesante que ha planteado prospectivas de futuro, así como nuevas líneas de investigación en este campo. Así, después del trabajo con las dos unidades didácticas diseñadas, podemos apuntar que, de los cinco bloques de contenidos trabajados, los que

mayores diferencias representan en función del tipo de música que se utilice han sido los de Sonido Musical, Lenguaje Musical y Música y Sociedad.

El bloque de Sonido Musical se ha trabajado mejor con la Música Festera que con la Clásica, porque las piezas festeras presentan auditivamente una discriminación muy clara entre los distintos planos sonoros y los timbres de los instrumentos. Esto facilita al alumno una mejor comprensión del hecho musical y del sonido. Pensamos que este bloque es especialmente adecuado para trabajar con esta música, ya que el carácter procesional de los elementos musicales que la Música Festera lleva implícita, la dota de unas características muy apropiadas para ello.

Respecto al Lenguaje Musical y sus elementos, hemos comprobado que son contenidos idóneos para trabajar con la Música Festera debido, entre otros factores, a que el ritmo de marchas y pasodobles se interioriza mejor por parte del alumnado, ayudado por la cantidad de notas sincopadas y a contratiempo que incluyen las obras festeras. El pulso, el acento y el compás binario son elementos base en este tipo de música que están implícitos como muy característicos en ella. Además, es una música muy sencilla de aplicar en el aula y con unas características musicales muy claras y transparentes desde el punto de vista melódico, formal y armónico.

Los contenidos de Música y Sociedad presentan diferencias al trabajarlos con una música u otra quizás por el hecho de la novedad que supone esta música y su estudio en el aula.

Finalmente, apuntar que hemos querido mostrar que la Música Festera, como parte del patrimonio musical que es, no ha sido abordada de manera seria desde la Enseñanza Secundaria. Si desde el sistema educativo actual se contemplan el estudio del lenguaje musical, de los instrumentos o de la danza, ¿por qué no se trabaja el estudio de la propia tradición que suele quedar relegado, como hemos visto, al ámbito familiar y/o lúdico? Todo ello nos lleva a reflexionar sobre la importancia de plantear el estudio de la Música Festera en el aula de Secundaria y qué propuestas podrían sugerirse en este sentido.

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PROGRAMA CURRICULAR DE ENSEÑANZA DE ESTRATEGIAS DE APRENDIZAJE PARA LA MEJORA INTELECTUAL EN EDUCACIÓN PRIMARIA

M. ESPADA y B. GARGALLO

Resumen

La investigación basada en la competencia “aprender a aprender” estuvo fundamentada en el diseño y elaboración de un programa curricular de enseñanza de estrategias de aprendizaje destinado a alumnos de segundo ciclo de Educación Primaria (edades comprendidas entre ocho y diez años). Fundado en la clasificación de estrategias de aprendizaje del profesor Bernardo Gargallo, tras su revisión el programa fue implementado en dos centros educativos durante siete meses. Consta de treinta y seis sesiones y se llevó a cabo dentro del aula, en horario escolar y sobre contenidos curriculares habituales. Los resultados fueron procesados con el programa informático SPSS, concluyendo que se produjeron mejoras en las estrategias trabajadas y, como consecuencia, en el rendimiento académico gracias a una intervención educativa que enseña a pensar de modo sistemático e integrador. El programa de intervención abre nuevos caminos que pueden seguidos y mejorados por otros investigadores y docentes interesados y preocupados por una enseñanza estratégica.

Palabras clave: estrategias de aprendizaje, metacognición, aprender a aprender.

1. INTRODUCCIÓN.

Una de las funciones fundamentales de la escuela es la de transmitir una habilidad que sintetice todas las demás tareas que le son propias: *pensar* (Dorado, 1996).

Hoy en día contamos con una abundante producción de libros con títulos seductores, programas informáticos con mucha publicidad, sesiones “psicopedagógicas” elaboradas por especialistas..., que se limitan a ofertar un repertorio de “recetas” con las que nos podemos acomodar a las exigencias de la concepción escolástica del pensar: cómo subrayar un texto, memorizar una fórmula, hacer un resumen, etc. Todas estas habilidades forman parte de la gimnasia intelectual, pero no constituyen el núcleo de lo que llamamos pensar (Dorado, 1996).

Se trata, pues, de la construcción del pensamiento y no de técnicas de estudio con efectos especiales. Por ello, no es lícito reducirlo todo a una cuestión de procedimientos milagrosos, a no ser que lo que se quiera sea adaptar la cabeza de los alumnos y alumnas a las rutinas de una función docente predeterminada. Monereo (1.993a) citando a otros autores, hacía la siguiente reflexión: “En la escuela, a menudo... lo único que se aprende es a ser alumno...”, como si todo el proceso de la escolaridad obligatoria se volviera un acto de amaestramiento socializado, continuo y permanente, adornado con ciertos contenidos disciplinarios más o menos contextualizados (Dorado, 1996).

“Y es que si la escuela no es capaz de enseñar a pensar, es que realmente no es escuela. Y enseñar de verdad no es limitarse a impartir y repartir paquetes de información y, de tanto en tanto, controlar su ingestión” (Dorado, 1996).

En este contexto, se plantea la pregunta *¿por qué enseñar a pensar de forma directa?*

“En el proceso educativo podemos encontrar libros de texto que piden al alumnado que saque una conclusión basada en los datos observados durante un experimento. Con frecuencia, la mayoría de las veces asumimos que los alumnos y las alumnas conocen cómo inferir, transferir, comparar, generalizar conclusiones, de ahí que nunca les enseñemos esta habilidad”. Sin embargo, comprobamos que en la práctica esto no es cierto. “Como resultado de estos supuestos, los y las estudiantes se sienten desanimados, confusos y “minusválidos” cuando se les pide que analicen o comparen”. Los alumnos y alumnas tienen el derecho y la obligación de poder emplear habilidades de pensamiento, cuando son pre-requisitos de logro y desempeño exitoso. El enseñar los procesos de pensamiento debe ser el contenido de la instrucción y debe practicarse a través de una gran variedad de situaciones y aplicadas en condiciones más allá del contexto en el que fueron

aprendidas (Costa, 1989; Lowery, 1989).

Cuando se enseñan estas habilidades de forma directa hay razones suficientes para creer que se incrementan los logros (De Bono, 1986; Whimbey, 1986; Feuerstein, 1980). Autores como Beyer, 1998, entienden que la enseñanza directa de habilidades de pensamiento conlleva que el desempeño en las tareas educativas mejore puesto que se dedica tiempo a enseñar a pensar. Si se indica a los alumnos y alumnas lo que es importante, si se asignan tiempos dedicados a pensar, los y las estudiantes captan el mensaje de que el pensar es un componente importante de la educación (Costa, 1989; Lowery, 1989).

Por ello, el enseñar a pensar es un punto en la agenda de las escuelas que, día a día, adquiere mayor importancia. No obstante, esta intención no llega a resultados significativos debido a las presiones en las que caen los maestros por cubrir contenidos y datos factuales a los que se enfrenta el centro educativo (Costa, 1989; Lowery, 1989).

El enseñar a pensar, implica una transformación radical del proceso de enseñanza en el que se integran los procesos de pensamiento. ¿Cómo? Redefiniendo el papel del maestro en el aula, perseverando en hacer pensar a través de temas concretos y promoviendo el buscar buenas razones antes de aceptar ideas (Costa, 1989; Lowery, 1989).

“Enseñar a pensar requiere de lecciones deliberadamente diseñadas para crear un ambiente o atmósfera pensante en el aula, estructurada de modo tal que en ellas se facilite el desarrollo de habilidades y actitudes concretas de pensamiento” (Costa, 1989; Lowery, 1989).

Como profesores y profesoras responsables nos interesa, y mucho, el conseguir que nuestros alumnos y alumnas aprendan y que aprendan a aprender. Sin embargo, se aprecian muchas diferencias en la calidad y cantidad de su aprendizaje. Enseñamos a todos y todas, pero el resultado no siempre responde a nuestras expectativas y esfuerzos. De esta forma, cabe preguntarse ¿qué es lo que hace que existan tantas diferencias en el alumnado?, ¿qué es lo que diferencia a los buenos y buenas estudiantes de los que no lo son tanto?

Se ha demostrado que son variadas las causas de estas diferencias: inteligencia, personalidad, conocimientos previos, motivación, etc. Y se ha comprobado que una de las causas más importantes e influyentes es la cantidad y calidad de las estrategias que los alumnos y alumnas ponen en juego cuando aprenden.

Que los y las estudiantes pongan en marcha las estrategias de aprendizaje no es algo que surja espontáneamente, necesita una enseñanza intencional.

De este modo, se observa que es fundamental empezar cuanto antes a enseñar a los alumnos y alumnas las estrategias de aprendizaje y no esperar a que maduren por sí solos y solas, es decir a la Educación Secundaria Obligatoria.

En su momento no se disponía de ningún trabajo empírico en la etapa de Educación primaria, por lo que creí conveniente aportar una investigación original haciendo uso de metodología cuantitativa y cualitativa, basada en “aprender a aprender” y en la que se perseguía la enseñanza-aprendizaje de estrategias que facilitasen la construcción del pensamiento.

En ese sentido el problema fundamental que guio mi investigación fue la posibilidad de enseñar y aprender estrategias de aprendizaje en edades tempranas y de fomentar su desarrollo para motivar y mejorar los resultados educativos.

Por lo tanto, el objetivo fundamental de este trabajo fue validar un programa educativo de enseñanza de estrategias de aprendizaje en alumnos y alumnas de 3º y 4º de Primaria, es decir 8-9 y 10-11 años respectivamente.

2. BASE TEÓRICA. EL ESTADO DE LA CUESTIÓN.

Después de resaltar la importancia de trabajar tempranamente estas habilidades, nos vimos en la obligación de hacernos las siguientes preguntas: *¿Qué son las estrategias de aprendizaje?, ¿es lo mismo estrategias de aprendizaje que técnicas de estudio?, ¿cuáles son las estrategias que el alumnado debe conocer para realizar adecuadamente la mayoría de las actividades escolares?*

Las estrategias de aprendizaje son contenidos procedimentales que pertenecen al ámbito del “saber hacer” (Gargallo, 2000). Son procesos que movilizamos para aprender con eficacia en un contexto social dado. Es relevante mencionar que las estrategias de aprendizaje son conjuntamente con los contenidos, objetivos y la evaluación de los aprendizajes, componentes fundamentales del proceso de aprendizaje.

Mientras que las técnicas de estudio son actividades específicas que llevan a cabo los alumnos y las alumnas cuando aprenden pudiendo ser utilizadas de forma mecánica (repetición, subrayado, esquemas, autpreguntas, deducir, inducir, etc), las estrategias son consideradas como una guía de las acciones que hay que seguir. Por lo tanto, son siempre conscientes e intencionales, dirigidas a un objetivo relacionado con el aprendizaje. Tradicionalmente, ambos conceptos se han englobado en el término de procedimientos.

Desde este punto de vista, las estrategias de aprendizaje no van, ni mucho menos, en contra de las técnicas de estudio, sino que se considera una etapa más avanzada y basada en aquéllas.

Por tanto, se puede definir estrategia de aprendizaje como el proceso mediante el cual el alumno y la alumna elige, coordina y aplica los procedimientos para conseguir un fin relacionado con el aprendizaje.

Además, encontramos la definición de Monereo (1993b) (que es excelente por integradora), entendiendo las estrategias de aprendizaje como *“comportamientos planificados que seleccionan y organizan mecanismos cognitivos, afectivos y motóricos con el fin de enfrentarse a situaciones-problema, globales o específicas de aprendizaje”*.

No hay que olvidar que “aprender a aprender” es uno de los principios básicos de nuestro sistema educativo actual. Por ello el alumno tiene que aprender a buscar, seleccionar, analizar críticamente e integrar en sus esquemas cognitivos la información necesaria para desenvolverse con éxito en la sociedad y así llegar a ser un aprendiz estratégico.

De la misma manera, la Ley Orgánica 2/2006, de 3 de Mayo, de Educación, en su artículo 2 recoge los fines a los que se orientará el sistema educativo español.

Según el Decreto 68/2007, de 29 de Junio, por el que se establece y ordena el currículo de la Educación primaria en la Comunidad Autónoma de Castilla-La Mancha, dicha etapa, de acuerdo con la Ley Orgánica 2/2006, de 3 de Mayo, de Educación, forma parte de la educación básica obligatoria y gratuita y su finalidad es la de proporcionar a todos los niños y niñas una educación que permita afianzar su desarrollo personal y su propio bienestar, adquirir habilidades relativas a la expresión y comprensión oral, a la lectura, a la escritura y al cálculo, así como desarrollar habilidades sociales, hábitos de trabajo y estudio, el sentido artístico, la creatividad y la afectividad.

En este Decreto, dentro del capítulo II que versa sobre el currículo, se encuentra el artículo 6 que hace referencia a las competencias básicas. La Comunidad Autónoma de Castilla-La Mancha las amplía a nueve, añadiendo la competencia emocional, y las incorpora como referente curricular en todas las etapas, adaptando su contenido al desarrollo evolutivo del alumnado.

La Unión Europea fija en ocho las competencias “clave” al concluir la enseñanza obligatoria y el Ministerio de Educación y Ciencia en el Anexo I del Real Decreto 1513/2006, de 7 de diciembre, por el que se establecen las enseñanzas mínimas de la Educación primaria, recoge ocho competencias como básicas al término de la educación obligatoria.

En referencia a los *programas de desarrollo cognitivo y mejora intelectual* y su aplicación, es importante señalar que la enseñanza de las estrategias de aprendizaje en el sistema escolar es necesario abordarla, ya que es demasiado arriesgado pensar que los alumnos y alumnas “aprenderán a aprender” por su propia cuenta y sin ayuda de nadie. Todo esto queda justificado por la gran cantidad de conocimientos e información

disponibles en la sociedad actual y cambiante y por la necesidad de desarrollar habilidades y estrategias en nuestros y nuestras estudiantes para manejar dicha información y así seguir aprendiendo durante toda la vida.

Existen diferentes alternativas para lograr este objetivo educativo general. Son las siguientes:

• *La aplicación de programas extracurriculares*, entre los cuales se encuentran gran parte de los programas de desarrollo cognitivo y mejora intelectual. Uno de ellos es el Proyecto Harvard de Desarrollo de la Inteligencia (Megía, 1992; Nickerson, Perkins y Smith, 1987). También encontramos el Programa de Enriquecimiento Instrumental (P.E.I.), de Feuerstein (1988, 1993), o el Programa Aprender a Pensar, también llamado CORT, de De Bono (1986). Son programas con una alta calidad en el ámbito de la enseñanza de las habilidades del pensamiento. Muchos de ellos son generalistas, puesto que entrenan en habilidades cognitivas generales, se aplican desprovistos de contenidos curriculares ordinarios, fuera de las aulas y del horario escolar habitual.

En la misma línea, hay otros programas (Alonso Tapia, 1991; Nickerson, Perkins y Smith, 1987) que destacan por proporcionar mucha práctica en habilidades básicas necesarias para afrontar tareas cognitivas más complejas. Sin embargo, reflejan una excesiva confianza al admitir que simplemente con entrenar a los y las estudiantes en unas cuantas habilidades básicas (no coincidentes en todos ellos y, como consecuencia, tampoco coincide la concepción de la inteligencia) es suficiente para que se enfrenten a las distintas tareas curriculares con una agilidad mental idónea. Asimismo, no disponen de contenidos curriculares, lo que entorpece la transferencia de las estrategias a los ámbitos escolares concretos.

De la misma manera, los programas de técnicas de estudio aplicados al sistema educativo son, muchas veces, programas de tipo extracurricular. Es bien sabido que la simple enseñanza de estas técnicas no fomenta ni garantiza el aprendizaje estratégico, puesto que además de utilizar una serie de técnicas es indispensable la adecuada planificación y el uso reflexivo de las mismas (metacognición). También se han caracterizado por enseñarse fuera del currículo ordinario, apartados de las materias escolares habituales, fuera del horario lectivo y por profesionales que no están en el aula.

De esta forma, es imposible que un aprendizaje de esta índole asegure la generalización y transferencia de las habilidades conseguidas en estos programas al currículum ordinario.

• *El diseño, elaboración y aplicación de programas curriculares de enseñanza de estrategias de aprendizaje*. Es decir, aquellos que se aplican dentro del aula, en horario lectivo y sobre contenidos escolares habituales. También se les denomina programas insertados, entroncados (Bernad, 1999), integrados o infusionados (Monereo, 1998). La investigadora de este trabajo está a favor de este tipo de programas, ya que favorece la generalización y transferencia de las estrategias aprendidas y fomenta un aprendizaje contextualizado.

Dentro de esta alternativa, se encuentran, por un lado, la enseñanza de estrategias específicas en contextos concretos, es decir en las diversas materias del currículo: Lengua Castellana y Literatura, Matemáticas, Conocimiento del Medio Natural, Social y Cultural... (Monereo, 1994; Monereo, 1998; Monereo y Castelló, 1997; Pérez Cabaní, 1997, etc). Por otro lado, se podrían trabajar estrategias comunes a diversas áreas en esas mismas materias. Se realizaría mediante la intervención educativa cotidiana, apoyada con la integración en los proyectos curriculares de los centros y en las unidades didácticas de cada aula. Esta opción, al igual que los programas generalistas, comentados anteriormente, defiende que hay determinadas estrategias que son comunes a distintas materias y cabe la posibilidad de utilizarlas en ellas (planificación, selección, elaboración y organización de la información, retención, etc). Sin embargo, se diferencia en que estas habilidades se encuentran contextualizadas, dentro del currículo y aplicadas sobre contenidos escolares habituales.

Ambos enfoques se consideran complementarios y no excluyentes, ya que es posible enseñar y trabajar estrategias generales (sirven para aprender distintas áreas) y además estrategias específicas propias de una materia determinada. Consideramos que este enfoque “generalista contextualizado” es necesario para conseguir que esas estrategias inespecíficas de ningún área se trabajen en el aula (Gargallo, 2006).

Así, el programa de intervención se encuentra dentro de esta doble dirección. Por una parte, se les enseñó a los alumnos y alumnas estrategias generales a aplicar en las diversas áreas y por otra, estrategias específicas propias de una materia concreta (Lenguaje, Matemáticas y Conocimiento del Medio Natural, social y Cultural). Basado en la clasificación de estrategias de aprendizaje de Gargallo (2000) que se apoya en otras anteriores (Beltrán, 1993; Justicia y Cano, 1993; Pozo, 1990; Pozo y Postigo, 1997; Weinstein y Mayer, 1985; Weinstein y Palmer, 1987), sigue el criterio de secuencia de procesamiento de la información y de los procesos implicados en el aprendizaje e incorpora procesos cognitivos y metacognitivos, elementos disposicionales y afectivos. Por lo tanto, nos situamos en un enfoque “generalista contextualizado” (Gargallo, 2000).

Pensamos que realizar este tipo de trabajos de investigación es muy útil puesto que implica a aquellos docentes que elaboran y aplican los programas junto con los investigadores y las investigadoras, toman conciencia del problema y aprenden métodos y técnicas de intervención que, en un momento dado, les ayudarán a enseñar a pensar de modo sistemático e integrador, en su intervención habitual (Gargallo, 2006).

3. METODOLOGÍA.

Cabe comenzar este apartado citando los *objetivos de la investigación* realizada que fueron los siguientes:

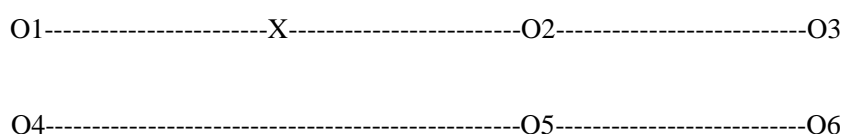
1. Incrementar y mejorar el conocimiento y manejo de estrategias de aprendizaje de los alumnos y las alumnas de los grupos experimentales mediante la aplicación de un programa educativo concreto.
2. Aumentar el rendimiento académico de los sujetos de los grupos experimentales mediante la mejora de sus estrategias de aprendizaje.

En cuanto a las *hipótesis* determinadas en el momento de iniciar el trabajo de investigación, se estableció que no habría diferencia significativa de medias en el pretest en las puntuaciones de estrategias de aprendizaje ni en las calificaciones de Lengua, Matemáticas y Conocimiento del Medio Natural, Social y Cultural entre los grupos experimentales y de control evaluadas mediante el cuestionario elaborado al efecto por Gargallo y Ferriols (2006), y sí en el primer y segundo postest. Además, gracias a la puesta en práctica del programa de intervención se lograría que los y las estudiantes de los grupos experimentales consiguiesen una mejora significativa en las estrategias de aprendizaje y en las calificaciones de las áreas citadas, no habiendo cambios significativos en los alumnos y las alumnas de los grupos de control ya que no se les aplicó ningún programa de intervención.

También se observarían diferencias importantes en la calidad de la ejecución de diferentes trabajos escolares que mostrasen la competencia de los sujetos de los grupos experimentales en las estrategias a trabajar, recogidos antes de aplicación, durante la misma y al finalizar el mantenimiento del programa de intervención. Todo ello, nos serviría como información complementaria de la parte cuantitativa.

Respecto al *diseño* de la investigación fue cuasi-experimental con dos grupos experimentales (tercero y cuarto de Educación primaria) y dos de control (tercero y cuarto de la misma etapa) que se supuso equivalentes en estrategias de aprendizaje y en calificaciones, lo que se corroboraría a partir de los datos recogidos en el pretest y en ambos postests. Dicho diseño es cuasi-experimental ya que los grupos experimentales y de control fueron determinados de manera aleatoria, aunque los sujetos de estos grupos con los que se trabajó ya estaban establecidos previamente.

El esquema del diseño es el que sigue:



Se observa que O1 es el pretest de los grupos experimentales, X es el programa de intervención llevado a cabo en las aulas de tercero y cuarto, O2 es el primer postest y O3 es el segundo postest realizados en los grupos experimentales; mientras que O4 es pretest y O5 y O6 postests en los grupos de control.

Acerca de la *muestra y los grupos* con los que contaba, el N de la misma fue de 58 sujetos ¹. 32 chicos y 26 chicas formaron parte de los 4 grupos participantes en esta investigación, dos experimentales y dos de control de dos colegios de Educación primaria de titularidad pública con 178 y 375 alumnos y alumnas respectivamente. 28 eran de 3º de primaria (con 2 grupos, 1 experimental y 1 de control) y 30 de 4º (con 2 grupos, 1 experimental y 1 de control). 23 de ellos y ellas (14 chicos y 9 chicas) pertenecían a los grupos experimentales y 35 (18 chicos y 17 chicas) a los grupos de control. Los sujetos tenían una edad comprendida entre los 8 (alumnos de 3º-1 repetidor) y 11 años (alumnos de 4º; 6 repetidores).

El trabajo de investigación tuvo que llevarse a cabo en dos colegios de Educación infantil y primaria de carácter público, situados en dos localidades anejas de la provincia de Cuenca, comunidad de Castilla-La Mancha: un Colegio Rural Agrupado (C.R.A.²) y un Colegio de Educación Infantil y Primaria (C.I.P.). Puesto que la cabecera del C.R.A. cuenta con clases de una línea (un tercero y un cuarto en este caso), hubo que recurrir a otro centro educativo para poder disponer de los grupos de control imprescindibles en esta investigación. Además, al comienzo del diseño del programa me encontré con el inconveniente de que la ratio de las aulas del C.R.A. era muy inferior a lo habitual, por lo que decidí ampliar la muestra con dos grupos de alumnos y alumnas más para completar los primeros y así reducir el margen de error de las estimaciones. Así, la clase de 3º de primaria de la cabecera del C.R.A., que contaba con 11 estudiantes, se completó con la clase de 4º de ese mismo colegio donde se aplicó el programa de intervención. De ese modo, las clases de 3º y 4º del C.I.P. formaron los dos grupos de control.

El programa de estrategias de aprendizaje se aplicó en el C.R.A. citado anteriormente, concretamente en la cabecera por ser mi lugar de trabajo habitual y contar con mayor número de alumnado.

Los grupos experimentales de 3º y 4º de Educación primaria de este centro son aulas formadas por 11 y 12 alumnos y alumnas respectivamente, cuyo nivel académico es aceptable ya que consiguen superar los objetivos planteados para cada ciclo. El nivel de motivación e interés por el estudio y trabajo escolar no llega a ser el deseable, calificándose de poco satisfactorio. Sin embargo, el grado de participación e implicación en las actividades complementarias y extraescolares es admisible. Igualmente, cumplen con sus tareas educativas dentro del recinto escolar, aunque a veces no fuera de él, dada la carencia en técnicas de trabajo, hábitos de estudio y estrategias de aprendizaje, lo cual constituye un gran problema a la hora de obtener un rendimiento adecuado en su trabajo. Por otra parte, es importante reseñar que el nivel de participación e implicación de los padres en la educación de sus hijos es medio, aunque acuden regularmente a las reuniones generales e individuales realizadas durante el curso escolar. El nivel socio-cultural de las familias es medio-bajo.

¹ Éste es el N de la muestra con la que trabajé, aunque de todos aquellos estudiantes de los grupos experimentales que asistían al programa, tan solo se incluyeron en ella los sujetos que colaboraron activamente en el desarrollo del mismo. En un principio la muestra contaba con 59 alumnos y alumnas, pero más adelante tuve que prescindir de uno de ellos ya que no estuvo dispuesto a participar en el programa, con lo que quedaron 58 sujetos interesados. Creí necesario cumplir este requisito para que los resultados no fuesen sesgados. El hecho de que algún alumno o alguna alumna quisiese participar parcialmente en la aplicación del programa y, con ello, se tuviesen en cuenta algunos de los datos, podía provocar cierta alteración en los resultados cuantitativos y cualitativos.

² C.R.A es un término que atiende a Colegio Rural Agrupado. Es un centro educativo de carácter singular, ya que está constituido por varias escuelas incompletas situadas en localidades diferentes del entorno rural español y donde se imparten las enseñanzas de Educación infantil y Educación primaria. En muchos de estos pueblos con poca población no hay alumnos suficientes como para mantener una infraestructura educativa tradicional, por lo que se establecen colegios rurales de pocas aulas (generalmente entre una y tres) donde los docentes imparten varios cursos simultáneamente y los alumnos, en muchas ocasiones, comparten el mismo aula. Normalmente esta organización tiene un centro cabecera, emplazado en la localidad más importante de la comarca, que asume las tareas de gestión y administración del C.R.A. y donde suele impartir docencia el director. *“La escuela rural es una institución educativa que tiene como soporte el medio y la cultura rurales y que se caracteriza por tener una estructura organizativa heterogénea y singular, además de una configuración pedagógica didáctica multidimensional”* (Boix, 1995)

Referente a los *instrumentos de evaluación* es evidente que la elección de los mismos es un requisito imprescindible para garantizar la fiabilidad de los resultados y la validez del programa de intervención que se vaya a aplicar.

El instrumento de evaluación de estrategias de aprendizaje de los estudiantes de educación primaria que utilicé fue el C.E.E.A.P. 9-12, debidamente diseñado y validado con rigor (Gargallo y Ferriols, 2006). Recurrí a él ya que hasta el momento no se disponía de ningún cuestionario de evaluación de dichas estrategias para la educación primaria en España que se presentase bien estructurado y fuese lo suficientemente sólido y fiable.

El instrumento usado para evaluar las estrategias de aprendizaje fue un cuestionario elaborado por Gargallo y Ferriols (2006), con formato de respuesta tipo Likert. El cuestionario consta de cuatro escalas que pertenecen a once subescalas y, a su vez, estas subescalas a 26 estrategias, representadas por diversos ítems conformando un total de 112. Cada una de ellas, aparece acompañada de su componente correspondiente y explicativo de la misma. No trabajé y evalué todas las escalas, subescalas y estrategias recogidas en el cuestionario, sino que seleccioné aquellas estrategias más adecuadas de acuerdo a las necesidades y al nivel académico de los alumnos y las alumnas. Sin embargo, se procesaron todos los datos siendo muy útiles en la interpretación de los resultados cuantitativos.

Respecto a la fiabilidad y consistencia interna del cuestionario, una vez realizado el análisis factorial se volvió a comprobar la fiabilidad del mismo, de cada una de las escalas y de cada una de las subescalas mediante el coeficiente de Alpha de Cronbach. La fiabilidad de todo el cuestionario, de 112 ítems, fue de α de Cronbach: .921 (Gargallo y Ferriols, 2006).

También, como medida de evaluación del rendimiento académico de los diversos grupos (experimentales y de control) recogimos las calificaciones en las tres áreas trabajadas: Lengua Castellana y Literatura, Matemáticas y Conocimiento del Medio Natural, Social y Cultural. Estas materias eran las que más se prestaban al uso de las estrategias incluidas en el programa de intervención.

Como complemento a la medición cuantitativa, realicé una *evaluación cualitativa* en la que reuní materiales que mostraban la progresión académica de los sujetos de ambos grupos en algunos trabajos escolares (horarios diarios de planificación del estudio; aspectos necesarios y preparatorios a la hora de estudiar -una alimentación sana, dormir bien, practicar algún deporte o actividad física, disponerse a estudiar con ganas y poner atención en el estudio- verificados mediante una autoevaluación final y propuesta de mejora; algunas unidades didácticas de las áreas curriculares de Conocimiento del Medio Natural, Social y Cultural, subrayadas y resumidas, correspondientes a los tres trimestres escolares). Todas estas pruebas las recogí en el pretest y en ambos postests.

En relación al *procedimiento* seguido, se ha de considerar que desde una concepción constructivista de la educación es fundamental considerar dentro del acto didáctico los procesos de enseñar a pensar y de enseñar a aprender, que en definitiva son mecanismos que favorecen el conocimiento de uno mismo, ayudan al estudiante a identificarse y a diferenciarse de los demás. Así, los alumnos y las alumnas llegarían a ser conscientes de sus motivos e intenciones, de sus propias capacidades cognitivas y de las demandas de las tareas académicas, siendo capaces de controlar sus recursos y regular su actuación posterior. Para ello, sería fundamental realizar un trabajo riguroso de tutoría y orientación (Dorado, 1996).

El conocimiento de unas determinadas técnicas no es sinónimo de éxito, pero ayuda a la realización y concreción de trabajos educativos. El docente no puede pretender sólo enseñar técnicas y procedimientos algorítmicos de su uso. Hemos de razonar y determinar la conveniencia de su utilización en función de diversos factores personales, ambientales, etc.

Dicha actitud de análisis previa de las condiciones que envuelven un hecho didáctico supone un nivel superior de procedimientos de aprendizaje, es decir una actitud estratégica hacia las diversas materias. Primero se planifica la acción y sus posibles consecuencias. Más tarde se desarrolla y regula el procedimiento escogido, para terminar evaluando todo el proceso (Dorado, 1996).

La práctica estratégica genera inferencia y transferencia de los contenidos a otros ámbitos similares y, por

consiguiente, esta negociación intra-inter psicológica (metacognición) hace crecer la zona de desarrollo próximo (ZDP) del individuo (Dorado, 1996).

Por ello, si en un momento dado los estudiantes se dan cuenta de un diálogo interno o si tienen que hacer un alto para evaluar su toma de decisiones o la solución de un problema, estarían experimentando lo que se denomina *metacognición*. Es decir, están pensando en sus procesos de pensamiento. La *metacognición* es la habilidad que poseemos para darnos cuenta de lo que sabemos y lo que no sabemos. Nos permite planificar una estrategia para producir la información necesaria, ser consciente de los pasos y las estrategias durante el proceso de solución de problemas, reflexionar sobre ello y evaluar la productividad de nuestro propio pensamiento.

Si los docentes queremos desarrollar conductas inteligentes y una forma de pensar efectiva, es preciso que nuestras estrategias de enseñanza sean intencionadas para desarrollar las habilidades metacognitivas en los estudiantes (Costa, 1989; Lowery, 1989).

Al comenzar este trabajo de investigación realizado durante un curso escolar, tenía claro que la simple ejecución mecánica de ciertas técnicas no era una manifestación de aplicación de una estrategia de aprendizaje; sino que para que la estrategia se aprendiese, se requería una planificación de esas técnicas en una secuencia lógica dirigida a un fin. Esto sólo era posible cuando existía metaconocimiento, palabra clave cuando se habla de estrategias de aprendizaje que implica pensar sobre los pensamientos, autoevaluar la propia ejecución y autorregularse. Esto incluye la capacidad para evaluar una tarea y poder determinar la mejor forma de llevarla a cabo y de hacer el seguimiento al trabajo realizado.

A partir de aquí era evidente que para elaborar un programa educativo adecuado tenía que contar con un buen “mapa de la situación”; es decir, una clasificación de estrategias de aprendizaje lo suficientemente completa e integradora y un instrumento de evaluación validado y fiable.

Estas dos “herramientas” escogidas, la clasificación de Gargallo (2000) y el instrumento de evaluación de Gargallo y Ferriols (2006), me sirvieron de guía y orientación para diseñar el programa de intervención en estrategias de aprendizaje dirigido a alumnos y alumnas de segundo ciclo de Educación primaria.

Para comenzar a aplicarlo, como he aclarado anteriormente, fue necesario ampliar el grupo experimental de tercero con sujetos de cuarto de Educación primaria, puesto que el número de alumnos era muy limitado y no me permitía contar con una muestra amplia y variada y solicitar colaboración en otro colegio de la zona, ya que en el mío no se disponía de los sujetos suficientes para tener los grupos de control imprescindibles.

El programa de intervención fue diseñado y aplicado por la autora de este artículo y bajo la dirección del profesor Bernardo Gargallo, en colaboración con los docentes del C.I.P. que participaron activa y desinteresadamente siguiendo las indicaciones establecidas previamente.

4. EL PROGRAMA DE INTERVENCIÓN.

El programa educativo, diseñado y elaborado para los sujetos de los grupos experimentales, consta de treinta y seis sesiones de intervención descritas con el objetivo u objetivos, contenido a trabajar y metodología de intervención-descripción de la actividad.

Los *objetivos generales del programa educativo* fueron incrementar y mejorar el conocimiento y manejo de estrategias de aprendizaje de los alumnos y las alumnas de los grupos experimentales mediante la aplicación de un programa educativo concreto y aumentar el rendimiento académico de los mismos mediante la mejora de sus estrategias de aprendizaje.

Antes de establecer los contenidos a trabajar en las sesiones de intervención, comencé la planificación con la *detección de los conocimientos previos* de los estudiantes y la *contextualización de la intervención*. A partir de aquí, *determiné las estrategias que me interesaba enseñarles* y estructuré el programa en tres partes diferenciadas e interrelacionadas: en la primera parte se trabajaron la *motivación intrínseca* y *atención* desde el inicio hasta el final del programa; en la segunda, la *planificación* (estas estrategias, junto con las anteriores, se trabajaron hasta el final del mismo); y en la tercera, se desarrollaron, junto con las anteriores, hasta su finalización, la *selección, elaboración y organización de la información y retención MCP/MLP*.

Estas estrategias seleccionadas y distribuidas en diferentes sesiones de intervención se enseñaron cíclicamente a través de una secuencia instruccional adecuada (Gargallo, 2006): *planificación, detección de los conocimientos previos y contextualización de la intervención; motivación para su uso; presentación de la estrategia; práctica guiada de la estrategia en diversos contextos; interiorización de la estrategia; práctica independiente; instrucción explícita en procesos de regulación y autocomprobación del aprendizaje; inclusión de entrenamiento en metacognición sobre su uso y funcionamiento, como garantía para la generalización, el transfer y el mantenimiento a largo plazo; enseñanza en contextos reales y evaluación*.

Por consiguiente, el proceso seguido en la enseñanza y uso de estrategias de aprendizaje a los alumnos y las alumnas fue a través del modelado, la práctica guiada y la práctica autónoma o independiente.

5. RESULTADOS. DISCUSIÓN.

Con el fin de reafirmar los supuestos enunciados en las hipótesis planteadas, realizamos pruebas “t” de diferencia de significación de medias con distintos análisis intergrupo (grupos experimentales: 3º,4º/grupos de control: 3º/4º) e intragrupo (sujetos experimentales y de control de 3º y sujetos experimentales y de control de 4º, comparados consigo mismos), durante tres periodos de tiempo: antes (pretest), durante y después de la intervención (primer y segundo postest). Para procesar y extraer los resultados se utilizó el programa estadístico SPSS.

Tras el *análisis cuantitativo* de los resultados de las estrategias de aprendizaje trabajadas en los dos grupos experimentales (tercero y cuarto de Educación primaria), se observó que el programa de intervención elaborado al efecto resultó eficaz. Se logró que los sujetos experimentales mejoraran en estrategias referidas a *aspectos afectivo-emotivos y de automanejo, de control, de búsqueda y selección, atencionales, de codificación, elaboración y organización y de retención y almacenamiento de la información*.

Como complemento a dicho análisis, se llevó a cabo una *evaluación cualitativa*. El programa educativo comenzó con el objetivo de conseguir que los alumnos y las alumnas adoptasen una correcta disposición a la hora de estudiar, mostrando interés y ganas de aprender, haciéndoles conscientes de la importancia que tiene la satisfacción por aprender (*motivación intrínseca*). Con ello, los sujetos, progresivamente, se propusieron pequeñas y alcanzables metas, siempre contando con la ayuda de sus padres y docentes. Para ello, fue necesario trabajar las estrategias de procesamiento y uso de la información, en concreto *el control de la atención*. Progresivamente mostraron concentración mental en las tareas escolares. Aprendieron a organizar su horario diario de estudio y lo cumplieron de manera flexible, teniendo así controladas sus tareas diarias (*planificación*). Aquellos aspectos relacionados con la *organización correcta del proceso de estudio* se fueron evaluando a través de un cuestionario elaborado para ese fin. Además, los factores preparatorios a la hora de estudiar (una alimentación sana, dormir bien, practicar algún deporte o actividad física, disponerse a estudiar con ganas y poner atención en el estudio) fueron mejorados considerablemente, siendo evaluados a través de una autoevaluación final. Una vez que los sujetos estuvieron adecuadamente preparados para llevar a cabo el proceso de estudio, se inició el desarrollo de *estrategias de selección, elaboración y organización de la información en diferentes actividades* (ejemplos de películas, programas de televisión, libros de lectura adecuados a su edad, unidades didácticas de Conocimiento del Medio Natural, social y Cultural). Se

desarrollaron capacidades como la atención y la concentración, pues requería un trabajo y un esfuerzo de elaboración personal; la lógica y la capacidad de síntesis, ya que aprendieron a organizar la información de una forma coherente y a distinguir lo fundamental de lo accesorio; la expresión escrita, puesto que realizaron resúmenes de forma continuada, comprobando que cada vez les resultaba más fácil encontrar las palabras que necesitaban para contar algo en el papel; y, por último, el resumen les obligó a relacionar ideas, lo cual es un buen ejercicio para facilitar la realización de exámenes. Dependiendo de los conceptos a retener, se utilizaron procedimientos eficaces como la *repetición automática*, los *recursos mnemotécnicos* y la *memorización comprensiva* a través del parafraseado como paso previo y preparatorio antes de resumir.

6. CONCLUSIONES. RECOMENDACIONES.

De acuerdo con las conclusiones extraídas en los análisis de resultados, el programa educativo aplicado resultó eficaz puesto que los sujetos de los grupos experimentales aprendieron y perfeccionaron el uso de algunas estrategias de aprendizaje y, como consecuencia, aumentaron el rendimiento académico en las materias escolares. El hecho de que fuesen conscientes de la adquisición de tales estrategias cognitivas (motivación intrínseca, control de la atención, planificación, selección, elaboración y organización de la información, retención MCP/MLP) favoreció el dominio y control de las mismas por parte de los alumnos y las alumnas.

Compartimos la idea con los expertos en estrategias de aprendizaje (Beltrán, 1993; Bernad, 1993a y 1999; Pozo y Monereo, 1999, etc), que es conveniente enseñar y evaluar las estrategias y su desempeño en aquellos contextos habituales donde se utilizan, de acuerdo a los contenidos curriculares de ese curso y al nivel académico de los alumnos y alumnas.

El trabajo de investigación realizado tiene un gran interés para la intervención psicopedagógica porque es un tipo de programa educativo poco usual, ya que ha sido elaborado y aplicado a estudiantes de segundo ciclo de Educación primaria, algo inusual al no disponer de investigación sobre el tema. Asimismo, al ser sujetos de edades tempranas y sin bagaje en este campo, el objetivo del programa fue enseñar a los alumnos y a las alumnas a “aprender a aprender”, epígrafe que resume cómo se deben enseñar las estrategias de aprendizaje.

Uno de las aportaciones que deriva de este trabajo es la de proporcionar recursos de intervención a los profesionales de la educación para que, progresivamente, sitúen la enseñanza de estrategias de aprendizaje al mismo nivel que el de los contenidos curriculares.

De igual manera, los resultados de este programa pueden animar y ayudar a los y las docentes a que se preparen como aprendices y enseñantes estratégicos, ya que han de saber cómo tratar la información, de qué forma han de comunicarla y transmitirla y observar cómo la van adquiriendo los alumnos y las alumnas. Así, investigadores, investigadoras y docentes interesados y preocupados por una enseñanza más estratégica lograrán formar estudiantes estratégicos.

Un valor añadido de la investigación es poner a disposición de la comunidad científica un programa educativo para una etapa que no disponía, hasta ese momento, de ninguno.

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MICRO ENTORNOS DE APRENDIZAJE EN DISPOSITIVOS MÓVILES

J.M. PASTOR AND A. RUIZ

Abstract

The use of last generation mobile devices (smartphones and tablets) has spread rapidly in the last few years. Its use goes beyond the traditional use of mobile phones and it's usual to see people, mainly young people, interacting with their devices while travelling by metro, bus, etc. All these situations share the fact that they turn short waiting periods of time or travelling in leisure time due to the offered connectivity and screening options of these devices that can also share learning times.

In order to turn these new leisure times into learning times, our purpose is to offer contents as micro learning units, no longer than fifteen minutes, taking advantage from the mobile devices technology connectivity that we have. This situation allows us to manage new electronic format materials and it also enables the training centers to use their virtual platforms and the teachers blogs as support tools for students adapted to these devices. In this way we can offer the students "low cost-time" materials that can be showed in micro-contents electronic formats requiring short learning times.

With this proposal we aim that students use these new learning resources from their mobile devices, thus breaking their bad image as recreational tools mainly used only in social nets, gaming and photo and video recorded interchange.

1- INTRODUCCIÓN

Este trabajo se enmarca dentro del plan de innovación y mejora puesto en marcha en nuestra institución durante el curso 2013-14 como una continuación a los cambios introducidos en nuestro modelo de enseñanza-aprendizaje basado en el desarrollo de proyectos integrados en todas las titulaciones universitarias y ciclos formativos de grado superior que se imparten en nuestro centro de formación [1].

Desde las instituciones universitarias y centros de formación profesional se promueve el uso de la tecnología como herramienta de mejora en los procesos formativos tanto dentro del aula [2] (cañones de proyección, pizarras digitales, ordenadores con conexión a Internet, etc.) como fuera de ella (plataformas formativas digitales, tutorías virtuales, sesiones formativas on-line, etc.). A todas estas tecnologías que se están utilizando en la mayoría de niveles educativos se está incorporando de forma progresiva el uso de los dispositivos móviles [3], donde destacan por su presencia y su uso muy extendido los smartphones y las tablets. Se trata de dos herramientas que, a diferencia de todas las anteriores, no se diseñaron con fines estrictamente formativos pero que tienen un gran potencial de utilización en este ámbito debido a

que la mayoría de la población que en estos momentos está formándose en las universidades y centros de formación profesional dispone de estos dispositivos, sobre todo en el caso de los smartphones, y hace uso de ellos en su vida cotidiana [4].

El uso de los dispositivos móviles ha acentuado la idea de la inmediatez, de lo rápido, de la no espera para acceder a cualquier tipo de contenido accesible desde Internet de forma inmediata. Cualquier propuesta de contenidos que se ofrezca al alumnado debe tener en cuenta estos factores para que sea aceptada por los estudiantes. Otro factor a considerar es el del tiempo que los estudiantes están dispuestos a invertir delante de un dispositivo móvil para estudiar. Por las características específicas de estos dispositivos no parecen adecuados contenidos extensos o contenidos cuyo aprendizaje tenga cierto grado de dificultad. Con la idea de combinar las variables de espacio-tiempo y dificultad de los contenidos, nuestra propuesta propugna la elaboración de materiales adaptados a los dispositivos móviles en general con el objetivo de que los estudiantes puedan aprovechar pequeños intervalos de tiempo a lo largo del día, independientemente de las circunstancias y el lugar donde se encuentren para acceder a microcontenidos de aprendizaje elaborados expresamente para dispositivos móviles. Ya que los estudiantes siempre llevan encima sus smartphones, y en muchas ocasiones sus tablets, se trata de que puedan aprovechar pequeños intervalos de tiempo para acceder a microcontenidos desde sus dispositivos móviles y puedan desarrollar su aprendizaje en cualquier situación [5].

Para la elaboración de nuestro estudio, hemos analizado los resultados de una encuesta sobre la predisposición de estudiantes de nuestro centro de formación en cuanto disponer de materiales específicos para dispositivos móviles. Estos datos se han visto complementados con sesiones de trabajo en el aula, con entrevistas y discusiones en equipos de trabajo sobre la conveniencia de disponer de este tipo de materiales: sus ventajas e inconvenientes. El análisis conjunto de todos estos datos nos ha ofrecido unos interesantes resultados a cerca de la idoneidad de nuestra propuesta inicial.

2- CONTEXTO Y OBJETIVOS

Los estudiantes universitarios y de ciclos formativos de grado superior pertenecen en su mayoría a una generación que desde edades muy tempranas empezó a utilizar ordenadores personales y teléfonos móviles que les permitían navegar por Internet. Esta circunstancia les ha conferido algunos hábitos de comportamiento muy generalizados [6], como por ejemplo lo que podemos denominar la cultura de lo inmediato: consideran normal el hecho de que acceder a información que sea de su interés debe ser algo rápido, instantáneo y, sobre todo, que no admite tiempos de espera elevados. Para ellos todos los contenidos son accesibles desde Internet a través de sus dispositivos móviles y no entienden que pueda haber tiempos de espera salvo que sea por motivos excepcionales, como puede ser la falta de cobertura o que la

batería del dispositivo esté descargada. Entre estos motivos no conciben el fallo técnico.

La influencia de los dispositivos móviles en los hábitos de comportamiento de las personas en general y de los estudiantes en particular está corroborada por diferentes estudios sociológicos [7]. En el caso de los estudiantes esa influencia también ha alcanzado a la forma en que acceden a materiales de estudio, a la forma en que estudian y al tiempo que dedican al estudio. Todos estos factores deben considerarse por parte del profesorado a la hora de preparar los materiales de las asignaturas y adaptarlos de manera adecuada a los dispositivos móviles disponibles por parte de los estudiantes. Para iniciar ese proceso de adaptación es importante conocer la predisposición de los estudiantes a utilizar sus dispositivos móviles como una herramienta más de estudio.

Para conocer la opinión de los estudiantes, hemos realizado una encuesta en nuestro centro de formación, complementada con entrevistas personales y debates en el aula con estudiantes y profesores para saber cuál es la situación de partida en la que nos encontramos: cuál es la disponibilidad de dispositivos móviles por parte de los estudiantes, sus hábitos de uso con estos dispositivos y lo que consideramos más importante: su predisposición a utilizar para estudiar dispositivos que hasta ahora, han utilizado sobre todo con fines personales y como herramientas de ocio y esparcimiento.

3 ANÁLISIS DE DATOS

Para el estudio que planteamos hemos recogido datos cuantitativos a través de una encuesta que han contestado 110 estudiantes. Estos datos los hemos complementado con datos cualitativos obtenidos por medio de entrevistas realizadas a grupos de estudiantes. Hemos dividido las preguntas en dos grupos: en el primero queríamos averiguar las características técnicas de los dispositivos móviles así como la accesibilidad que el alumnado tiene desde ellos. En el segundo grupo de preguntas hemos querido constatar su predisposición a utilizar los dispositivos móviles como herramienta de estudio en circunstancias no habituales.

Uno de los datos más relevantes que hemos obtenido es que el 94% del alumnado dispone de un smartphone propio y de ellos, la mitad también dispone de tableta digital. También hay un escaso 2% del alumnado que tiene tableta digital y no dispone de Smartphone. Estos primeros datos nos indican que la disponibilidad de dispositivos móviles es muy elevada, lo cual era una de nuestras prioridades a la hora de poner en marcha nuestro proyecto: que el alumnado disponga de los dispositivos que servirán de soporte a los nuevos materiales que queremos diseñar.

El tamaño de las pantallas de los dispositivos móviles también es un factor determinante a la hora de diseñar materiales adecuados. En ese sentido un 75% del alum-

nado dispone de dispositivos con 4 o más pulgadas y un 80% dispone de tabletas digitales con 9 o más pulgadas de tamaño de pantalla. En cuanto al software utilizado, el sistema Android es mayoritario en el caso de los smartphones y también en las tabletas digitales, 70% donde el iOS se encuentra en el 22% de los casos.

El hecho de que más del 90% del alumnado encuestado disponga de conexión Wi-Fi en casa, coincidentes con los datos facilitados por el INTECO sobre conectividad en los hogares españoles [8], supone una base amplia de conectividad para poder ofrecer a los estudiantes contenidos accesibles por la red. Estas cifras se ven complementada con otras que hemos analizado y según la cual los estudiante también accede a contenidos digitales desde locales públicos como bibliotecas, bares etc. (66%) o desde redes accesibles en espacios abiertos (75%). Este dato debemos tenerlo en cuenta para explorar si en esos intervalos de tiempo tiene cabida los micro-contenidos que planteamos al alumnado para que pueda estudiarlos en esos momentos.

Con respecto a las preguntas acerca de la predisposición de los estudiantes a estudiar directamente desde sus dispositivos móviles hemos obtenido resultados que resaltan su buena predisposición como se aprecia en que al 85% de los estudiantes le gustaría disponer de materiales de estudio adaptados a sus dispositivos móviles. Atendiendo que se trata de dispositivos pequeños, con capacidades limitadas de visualización debíamos saber el tiempo que los alumnos serían capaces de estar concentrados en su lugar habitual de estudio, en el aprendizaje desde sus dispositivos sin perder la concentración. Los resultados obtenidos se presentan en la tabla 1.

Tiempo (min.)	Alumnos (%)
5	18.31%
10	04.23%
15	19.72%
20	09.86%
30	16.90%
Más de 30	30.99%

Tabla 1. Tiempo que los alumnos podrían estar concentrados en su lugar habitual de estudio aprendiendo desde su dispositivo móvil.

Los datos anteriores se refieren a La buena predisposición a utilizar los smartphones como herramienta de estudio también se ve reflejada en el siguiente dato: el 80% de los estudiantes estaría dispuesto a realizar pruebas de evaluación de tipo test desde

su teléfono. Más interesante resulta saber que los estudiantes también estarían dispuestos a aprovechar pequeños intervalos de tiempo en espacios no habituales de estudio para llevar a cabo tareas de aprendizaje como reflejan los datos que aparecen en la tabla 2.

Tiempo (min.)	Alumnos (%)
Si, durante 5 min.	09.59%
Si, durante 10 min.	12.33%
Si, durante 15 min.	15.07%
Si, durante 20 min.	20.55%
Si, durante 30 min.	20.55%
No, no podría concentrarme en estudiar algo en esas situaciones.	21.92%

Tabla 2. ¿Crees que podrías estudiar desde tu dispositivo móvil pequeñas unidades de aprendizaje de una asignatura fuera de los ámbitos habituales de estudio y formación? (Por ejemplo, mientras te desplazas en metro o bus, esperando a un amigo en un bar, etc.?)

Como puede apreciarse en la tabla anterior, aproximadamente el 70% de los estudiantes serían capaces de convertir entre 10 y 30 minutos de su tiempo no habitual de estudio en tiempo de estudio. Frente a este dato observamos que casi el 22% afirma que no podría concentrarse fuera de su ámbito habitual de estudio y un 9,5% cree que sólo podría aprovechar 5 minutos de estudio en tales circunstancias.

La principal duda les surge a los estudiantes en cuanto a si serán capaces o no de estudiar desde sus dispositivos móviles. El 47% cree que podría estudiar al igual que con los medios tradicionales, un 18% cree que no podría estudiar desde el teléfono móvil y un 35% afirma que primero debería probar a estudiar desde su teléfono móvil para saber si es un medio de estudio válido.

La tabla 3 presenta la opinión de los estudiantes sobre qué asignaturas serían las más adecuadas para presentar materiales de estudio desde un dispositivo móvil. En cuanto a cómo deberían ser esos materiales, el 67% cree que serían indiferente que estos fuesen de audio, vídeo o de pequeños textos con imágenes, frente al 17% que se decanta sólo por pequeños textos con imágenes, un 13% preferiría sólo vídeos y apenas un 3% sólo por materiales de audio.

A todas las asignaturas.	50.70%
A las asignaturas más teóricas.	32.39%
A las asignaturas más prácticas	16.90%

Tabla 3. ¿En qué tipo de asignaturas crees que serían útiles los materiales adaptados a dispositivos móviles?

4. DISCUSIÓN

En la sociedad post industrial en la que nos encontramos, las actividades formativas que se ofrezcan desde los dispositivos móviles deben ofrecer contenidos digitales que permitan personalizar el aprendizaje. Para ello, hemos de aprovechar las oportunidades que ofrece la conectividad universal para que los estudiantes puedan en cualquier momento y desde cualquier dispositivo acceder a contenidos que les permitan adquirir sus competencias profesionales. Se trata de explotar el potencial formativo que nos ofrece los dispositivos móviles en manos de estudiantes que siempre los llevan consigo y que siempre están conectados para mejorar sus resultados formativos.

Los dispositivos móviles forman parte de la realidad social del momento actual. Su integración en el sistema educativo ya se está produciendo, como lo demuestra el hecho de la presentación de materiales formativos en tabletas digitales en centros educativos de enseñanza primaria, secundaria, formación profesional y centros universitarios. Tras la expansión y éxito del e-learning, el m-learning se presenta como un paso más de la integración de los avances tecnológicos en los sistemas educativos [9].

Uno de los factores que han actuado de facilitador al uso extensivo de los dispositivos móviles es el de la facilidad de conexión y la seguridad que ofrecen las redes Wi-Fi para su acceso.

Los dispositivos móviles están sirviendo de plataforma para el trabajo en grupo por parte de los estudiantes cuando realizan proyectos conjuntos. Existe un grupo de herramientas facilitadoras que los estudiantes utilizan para comunicarse de manera fluida y que hoy no escapa a ninguna propuesta de trabajo en grupo en cualquier nivel. El desarrollo de proyectos interdisciplinares en ciclos formativos de grado superior y en titulaciones universitarias es un claro exponente de esta tendencia [10].

Los estudiantes adoran la tecnología móvil como lo prueba el hecho de que la utilizan con profusión en su vida cotidiana, hasta el punto de que no conciben su vida sin la conectividad que les ofrecen estos dispositivos. Por tanto no es de extrañar

que en tales circunstancias los estudiantes valoren de forma positiva utilizar sus dispositivos móviles como un instrumento más de formación que se adapta a sus necesidades y que permite un nivel de personalización elevado.

Una de las ventajas que ofrecen los dispositivos móviles es que permite personalizar los contenidos y adaptarlos a las circunstancias de cada estudiante. Frente a esto, el profesorado se encuentra que la diversidad en las aulas debido a la mayor o menor destreza en el uso de estos dispositivos o a la disponibilidad o no de estos dispositivos puede suponer un problema de adaptación.

La tecnología móvil permite que los estudiantes puedan acceder a sus contenidos formativos en cualquier lugar, a cualquier hora y durante el tiempo que quieran con sus móviles y tablets. Todo ello con las funcionalidades propias de un ordenador. Estudios similares al que hemos realizado corroboran que los estudiantes están mucho más abiertos al uso de las herramientas de aprendizaje sobre dispositivos móviles que están modernizando algunos aspectos de los sistemas de educación porque tienen la capacidad de acceder de manera instantánea a gran cantidad de información.

El profesorado es crucial en cualquier proceso de innovación que se produzca en los entornos de aprendizaje. Como agente principal del aprendizaje en el aula, debe guiar en el proceso formativo que allí desarrolla. Si disponen de las herramientas necesarias pueden dirigir de manera eficiente el proceso de aprendizaje de su alumnado, convirtiendo estas plataformas tecnológicas en plataformas de aprendizaje. El profesorado espera aprender cómo hacer uso de nuevas herramientas sin necesidad de largos procesos de aprendizaje. Al igual que sucede en otras profesiones, necesita periodos de formación y oportunidades para poder aplicar lo aprendido y transformarlo así en innovación docente. Necesitan instrucciones sobre cómo utilizar la tecnología móvil puede facilitar el trabajo de sus alumnos desde estos dispositivos. Los estudiantes, de forma progresiva, van tomando más responsabilidad sobre su aprendizaje mientras que el profesorado puede centrar más su atención en la resolución de problemas más complejos en el aula con el objetivo de mejorar las habilidades y competencias que los alumnos pueden adquirir en la propia aula.

Conforme el uso de los dispositivos móviles se extiende entre los estudiantes, gracias a la tecnología inalámbrica, los contenidos digitales a los que ellos pueden acceder mejora de forma considerable su aprendizaje. No es ninguna sorpresa que los estudiantes quieran emplear los dispositivos móviles para personalizar su aprendizaje porque están acostumbrados a que su dispositivo móvil atienda mucha de sus necesidades personales de manera instantánea.

5 CONCLUSIONES

Las conclusiones de este estudio no pueden más que animarnos a trabajar con ilusión y esfuerzo en el desarrollo de contenidos y entornos de aprendizaje que se basen en los dispositivos móviles que los propios estudiantes usan de manera cotidiana y que facilita nuevas formas de colaboración entre ellos. Las aplicaciones móviles para desarrollar contenidos formativos es un campo que debemos explotar.

La tecnología móvil está llamada a romper las barreras físicas del aula tradicional y puede permitir nuevas formas de aprendizaje fuera de ese entorno. Si a esto unimos la cada vez mayor conectividad de los dispositivos (4G y la futura 5G [11]), y la tremenda predisposición de los estudiantes al uso de estos dispositivos, podemos afirmar que contamos con el factor motivación claramente conseguido. Ahora sólo falta que seamos capaces de crear desde las instituciones educativas las herramientas y los contenidos que estén a la altura de lo esperado por nuestros alumnos.

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LAS REDES DE RELACIONES DE LOS ESTUDIANTES EN EL AULA UNIVERSITARIA. UN ANÁLISIS DESDE EL CONTEXTO SOCIAL Y ACADÉMICO EN EL GRADO DE INGENIERÍA EN DISEÑO INDUSTRIAL

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Resumen.

En los últimos años la literatura ha destacado la importancia que poseen los aspectos relacionales de los estudiantes sobre su desempeño en la universidad. Así, cuestiones como las redes sociales establecidas con el resto de compañeros de aula y de otros cursos o las relaciones académicas a través de las cuales comparten conocimiento y desarrollan proyectos y actividades, pueden tener una influencia significativa en su rendimiento académico. Por otro lado, la variedad de metodologías docentes incorporadas al Espacio Europeo de Educación Superior son más intensivas en el desarrollo de actividades en equipo entre los estudiantes, tanto en el aula como fuera de ella. En este contexto, pensamos que puede resultar interesante explorar con detalle la estructura e interrelación que poseen las redes sociales y académicas de los estudiantes, así como la vinculación de la morfología e intensidad de estas relaciones con el rendimiento del alumno.

Utilizando la técnica del *Social Network Analysis*, se ha procedido a realizar un estudio exploratorio de las relaciones entre los alumnos de 4º curso del Grado de Ingeniería en Diseño Industrial y Desarrollo de Productos del Campus d'Alcoi de la *Universitat Politècnica de València*. Los resultados obtenidos muestran que las redes sociales y académicas de los estudiantes presentan en ambos casos una elevada densidad y correlación mutua y, por otro lado, que la manera en la que el alumno se integra en las redes académicas condiciona su desempeño académico. Estos resultados pueden tener consecuencias relevantes para la comunidad educativa. En este sentido, los resultados ayudan al profesorado a ampliar el conocimiento sobre el comportamiento de los estudiantes en la universidad, permitiendo una mejor organización de los grupos de trabajo y de las actividades docentes.

Keywords: Redes de relaciones, Rendimiento académico, *Social network analysis*, Grado en ingeniería en diseño industrial.

1. INTRODUCCIÓN. OBJETIVOS DEL TRABAJO

El estudio de los factores que influyen en el rendimiento académico de los estudiantes universitarios es un tema que ha centrado la atención de educadores y profesionales en las últimas décadas (entre otros, McKenzie y Schweitzer, 2001; Vélez y Roa, 2005). Entre este conjunto de variables, la literatura ha destacado la importancia que poseen las relaciones desarrolladas por los estudiantes en su desempeño en la universidad (Yang y Tang, 2003; Smith, 2010; Chen *et al.*, 2011). Los vínculos que desarrollan los estudiantes configuran redes informales de contactos a través de las cuales establecen lazos de amistad y confianza e intercambian información y conocimiento. La literatura identifica dos tipos principales de estas redes (Ibarra, 1993). En primer lugar, las redes académicas, las cuales proporcionan soporte al estudiante, bien para intercambiar y compartir materiales y apuntes, como para resolver problemas de manera conjunta, con el fin de completar con éxito su aprendizaje. La forma que adopta una red académica es coherente con la idea de *comunidad de aprendizaje* en la que tienen lugar la comprensión común de las prácticas y el aprendizaje colectivo (Stassen, 2003). Por otra parte, la segunda de las redes principales que identifica la literatura es la social. Cuando un alumno se relaciona con otros para formar una red social, los vínculos interpersonales y los recursos con los que cuenta constituyen su capital social y pueden ayudarle a perseguir objetivos más emocionales, como es el hecho de crear amistades entre los compañeros de clase. Los alumnos suelen tener más libertades a la hora de elegir a sus amistades, centrándose más en aquellos que tengan gustos y actitudes similares. Muchos de los procesos de influencia social se realizan entre amigos.

La importancia de estas relaciones se ve además reforzada en el caso de la Educación Superior Española por la inclusión de nuevas metodologías docentes dentro del marco del Espacio Europeo de Educación Superior que son más intensivas en el desarrollo de actividades en equipo en las que se promueve la participación, implicación e interacción mutua.

A pesar de la relevancia de las relaciones de los estudiantes universitarios, consideramos que la literatura existente no ha profundizado en gran medida en el estudio de su morfología, intensidad o vinculación con otras variables, quedando todavía, por tanto, muchas cuestiones por resolver. En consecuencia, este trabajo pretende contribuir a reducir este vacío mediante la exploración a través de la técnica del *Social Network Analysis* del grado de desarrollo de relaciones sociales y académicas entre los alumnos universitarios y de la estructura e interrelación de estas redes, así como su vinculación con el rendimiento académico. Para el desarrollo del estudio empírico hemos seleccionado a los alumnos del Grado de Ingeniería en Diseño Industrial y Desarrollo de Productos (GIDIDP) del Campus de Alcoy de la *Universitat Politècnica de València* (UPV).

El trabajo se ha estructurado como sigue. Tras la introducción y la definición de objetivos de la investigación, se describe la metodología y el estudio empírico llevado a cabo, se comentan los principales resultados obtenidos y, finalmente, se exponen las conclusiones e implicaciones del trabajo.

2. ESTUDIO EMPÍRICO

El Campus de Alcoy de la UPV cuenta con 2.344 alumnos en el curso 2013-2014 e imparte un total de 6 grados y 3 másteres oficiales. Entre estas titulaciones, se encuentra el GIDIDP, el cual posee 346 alumnos matriculados y repartidos entre los cuatro cursos de los que consta la titulación. En estos estudios se pretende capacitar científica y técnicamente al alumno para que pueda desarrollar su actividad con desenvoltura en un contexto de dirección y gestión de todo el proceso de vida de un producto desde la generación de ideas (análisis de mercados, creatividad, marketing, diseño básico, etc.) pasando por la producción, la fabricación y el lanzamiento del producto, hasta el estudio del impacto ambiental al final de su vida útil.

Confeción de la muestra

La muestra analizada se ha centrado en los estudiantes de 4º curso del GIDIDP del Campus de Alcoy de la UPV. Se trata de estudiantes que están en el último curso de la titulación con relaciones sociales y académicas consolidadas y presumiblemente en su punto de mayor intensidad. La realización del trabajo de campo se desarrolló a través de un *roster recall method* aplicado a todos los alumnos de la asignatura durante el mes de Noviembre de 2013. Al fin del proceso se obtuvieron un total de 58 respuestas válidas, lo que supone que la totalidad de los alumnos han formado parte de este estudio. A continuación en la Tabla 1, se muestra la ficha técnica del estudio.

Tabla 1. Ficha técnica del estudio

Universo	Grado de Diseño Industrial del Campus de Alcoy de la UPV
Ámbito geográfico	Campus de Alcoy (Alicante)
Marco muestra	Alumnos matriculados en 4º curso del GIDIDP de la UPV (total población 58 alumnos)
Elemento muestra	Alumnos
Tamaño muestra	58 respuestas válidas
Nivel de confianza	95,5% ($p = q = 0,5$)

Diseño muestra	Diseño y Pre-test del cuestionario
Información recogida	Respuestas alumnos en cuanto a relaciones académicas y sociales

Descripción de las variables y técnicas de análisis

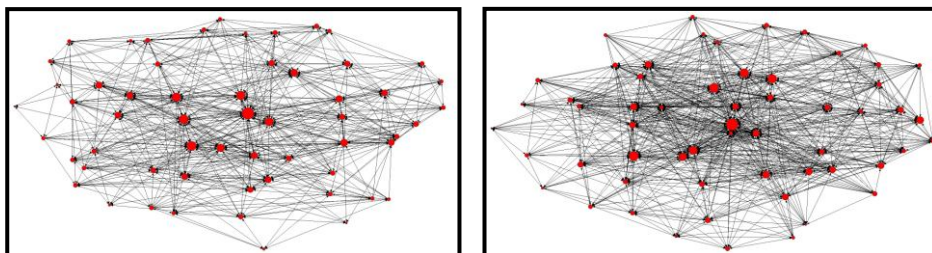
Para el estudio de la morfología y estructura de las redes se han utilizado descriptores básicos así como variables del *Social Network Analysis*, como rango, cercanía e intermediación. Por otro lado, para operativizar la variable del rendimiento académico de cada estudiante se ha utilizado la nota media de las asignaturas cursadas por cada uno de ellos en el primer semestre del 4º Curso del GIDIP.

Respecto a las técnicas de análisis, los datos recogidos se han procesado mediante la aplicación de técnicas de *Social Network Analysis* a través del software UCINET v6 (Borgatti *et al.*, 2002). Estas técnicas proporcionan una herramienta para explorar las propiedades estructurales de una red, agrupando teorías, modelos y aplicaciones que están expresadas en términos de conceptos y procesos relacionales. Asimismo, para representar gráficamente las redes de relaciones utilizamos la aplicación NETDRAW que forma parte también de las funcionalidades proporcionadas por el software UCINET. Para el estudio de los vínculos entre el posicionamiento en las redes de los alumnos con su desempeño académico se han aplicado otras técnicas como el análisis de varianza (ANOVA) a través del software estadístico SPSS v16.

3. RESULTADOS DEL ESTUDIO

Los resultados obtenidos se presentan a través de una serie de tablas y de gráficos. Los distintos gráficos, donde cada nodo de la red hace referencia a un alumno, proporcionan una representación visual de los datos que aparecen en las tablas. En la Figura 1, se muestran ambas redes, la académica y la social, donde podemos observar aquellos alumnos que tienen un mayor número de conexiones. Los tamaños de los nodos varían, de forma que a medida que su tamaño aumenta su nivel de interacción también.

Figura 1. Red académica (izquierda) y Red social (derecha)



A partir de las figuras anteriores podemos apreciar que ningún estudiante está des-

conectado del resto en ninguna de las dos redes. Además, podemos detectar que existen diferencias de cohesión entre ambas redes. Así, la red social es más densa que la red académica. Con el objetivo de cuantificar las diferencias que acabamos de comentar, se ha procedido a analizar numéricamente las principales características de las redes estudiadas (Tabla 2).

Características estructurales de las redes

Se han obtenido diferentes medidas de la red tanto a nivel individual como de grupo. A nivel individual analizamos la centralidad, la cual se refiere al grado en que un alumno está conectado con otros en la red. Además, se estudia el factor intermediación de cada alumno y el valor cercanía. Estas medidas reflejan si existen nodos (alumnos) que funcionan como nexos o puentes entre otros que no cuentan con relaciones directas entre sí. En cuanto a las medidas a nivel de grupo (red) hemos estudiado la densidad de las redes, poniendo en relación el número total de vínculos o conexiones existentes en las mismas y el máximo y mínimo que podrían tener en el caso de que todos los alumnos considerados estuviesen relacionados entre sí.

En la siguiente tabla se presentan todas las medidas que hemos calculado para cada una de las redes analizadas.

Tabla 2. Características estructurales de las redes

Medidas	Red académica	Red social
Densidad media	21,75%	32,46%
Nº medio de contactos	719	1073
Nº mínimo de contactos	8	14
Nº máximo de contactos	51	74
Nodos aislados	0	0
Índice de Gini	,22	,22
Reciprocidad	41,81%	44,41%
	Rango (<i>degree</i>)	
Media	21,748	32,456
Desv. Típica	14,518	21,682
Mínimo	7,018	0
Máximo	75,439	92,982
	Cercanía (<i>closeness</i>)	
Media	51,574	58,702
Desv. Típica	8,554	3,264
Mínimo	37,748	32,203
Máximo	80,282	55,340
	Intermediación (<i>betweenness</i>)	
Media	1,766	1,263
Desv. Típica	1,719	1,668
Mínimo	,032	0
Máximo	7,727	8,600

En la Tabla 2, observamos que la densidad es significativamente más alta en la red social (32,46%) que en la académica (21,75%). Esto nos lleva a deducir que los alumnos desarrollan más relaciones sociales que de carácter académico, basando estas relaciones en la reciprocidad, estabilidad y confianza. Esta afirmación se corrobora con el número medio de contactos que existen en las redes, el cual también es mayor en la red social. Por otro lado, se estudia a través del índice de concentración de Gini si existen alumnos que mantienen un mayor número de contactos que otros. Los resultados indican una cierta homogeneidad en el número de enlaces por estudiante, siendo además estos resultados similares para ambas redes. Por su parte y en cuanto la reciprocidad, es algo mayor en la red social (44,41%) que en la red académica (41,81%), aunque ambos casos presentan valores notables. Los otros tres indicadores que hemos calculado (rango, cercanía e intermediación) nos revelan un resultado que sigue en la línea de los valores que acabamos de comentar.

Fortaleza de los enlaces. Relaciones múltiples en las redes estudiadas

Los estudiantes pueden estar implicados en múltiples tipos de relaciones a la vez. Las relaciones diádicas múltiples son un indicador relevante de la fortaleza y confianza existente en un vínculo dada las posibilidades que tienen los nodos de interactuar en una variedad de contextos (Ibarra, 1993). En este apartado pretendemos explorar el grado en el que el patrón de interacciones existente en la red social de los estudiantes de Grado analizados está alineado con el patrón de interacciones existentes de los mismos en la red académica.

Para proceder a este análisis hemos estudiado el nivel de superposición entre las relaciones de ambas redes a través del procedimiento QAP (*Quadratic Assignment Procedures*) en UCINET. Para ello, seguimos el procedimiento expuesto en Ramos y Maya-Jariego (2013) utilizando como indicadores de superposición de las redes los coeficientes de correlación de Pearson y de Jaccard. Los resultados obtenidos muestran un elevado grado de solapamiento entre las relaciones exploradas, con un nivel de superposición según el Coeficiente de Jaccard del 54% y un Coeficiente de Pearson de 0,618. De esta manera, los estudiantes tienden a establecer relaciones académicas con aquellos compañeros con los que han establecido vínculos de amistad y viceversa. Los vínculos académicos permiten a los estudiantes compartir situaciones y experiencias ejerciendo de facilitadores para aumentar la confianza mutua y el desarrollo vínculos de amistad. De la misma manera, los vínculos de confianza y amistad permiten compartir experiencias que pueden actuar también como facilitadores para el establecimiento de vínculos en el ámbito académico.

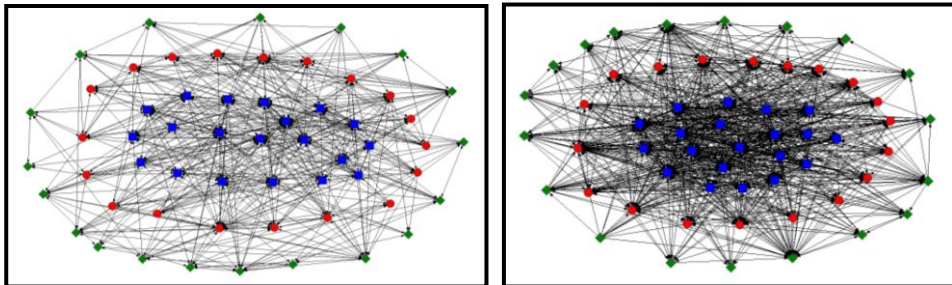
El posicionamiento de los estudiantes en las redes de relaciones y su vínculo con el rendimiento académico

Para finalizar el análisis, se han estudiado los posibles vínculos existentes entre el posicionamiento de los alumnos en las redes de relaciones y su rendimiento académ-

mico. Para ello, se ha procedido inicialmente a dividir a los estudiantes en cada una de las redes según su nivel de integración en las mismas a partir de un modelo *Core/Periphery* en UCINET para posteriormente verificar si existen diferencias significativas entre el rendimiento académico de los alumnos de cada grupo.

Las estructuras de red *Core/periphery* se caracterizan por la presencia de un núcleo cohesivo y denso y de una periferia dispersa y relativamente desconectada del núcleo de actores centrales. A partir del procedimiento expuesto en Borgatti y Everett (1999) hemos estimado el grado de *Coreness* de cada nodo mediante el ajuste de un modelo continuo de la estructura *Core/Periphery* a nuestra información de las redes de estudiantes. El grado de *Coreness* hace referencia a la cercanía que posee cada nodo de la red con el núcleo de nodos densamente conectados. El algoritmo de UCINET atribuye valores altos a los miembros del núcleo de la red y bajos a los de la periferia. En nuestro caso, hemos optado, siguiendo un procedimiento similar al desarrollado en García-Muñiz *et al.* (2011), por clasificar los nodos según el valor de *Coreness* en 3 grupos para ambas redes (*Core*, *Semi-periphery* o *Periphery*). La Figura 2 muestra los resultados de la aplicación de este procedimiento.

Figura 2. Estructuras de las redes académica (izquierda) y social (derecha) con los nodos agrupados según su nivel de *Coreness* (azul=*Core*, rojo=*Semi-periphery* y verde=*Periphery*)



Una vez clasificados los estudiantes según su nivel relacional y para validar si los rendimientos académicos de los alumnos de cada grupo y en cada red estudiada presentan diferencias significativas entre sí se ha aplicado un modelo ANOVA. En este caso, el diseño del experimento para ambas redes tendría un factor (ubicación en *Core*, *Semi-periphery* o *Periphery*) y tomaríamos como variable dependiente el rendimiento académico del alumno. Los resultados se muestran en la Tabla 3.

Tabla 3. Promedio de notas por grupo y resultados de la prueba ANOVA para ambas redes

Red	Media <i>Core</i>	Media <i>Semi-Periphery</i>	Media <i>Periphery</i>	F
Red académica	5,858	6,927	5,883	5,174*

Red social	6,179	6,664	5,864	1,967
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*p<,05

A partir de los resultados anteriores solo encontramos diferencias significativas en el rendimiento académico medio obtenido entre los diferentes grupos en el caso de la red académica. Para precisar dónde están las diferencias entre los 3 grupos de esta red hemos desarrollado un análisis *post hoc*. Si bien, necesitamos conocer previamente si se puede asumir la igualdad de varianzas poblacionales, para lo que aplicaremos el contraste de *Levene*. El valor del contraste (estadístico de *Levene* = ,384) y su nivel crítico (Sig. = ,683) permiten aceptar esta hipótesis. Esta consideración es relevante ya que permitirá determinar el tipo particular de contraste que aplicaremos para realizar la comparación *post hoc*. En este caso, hemos utilizado el método de *Tukey*, análisis comúnmente aceptado en trabajos de investigación. El resultado obtenido se expone en la Tabla 4.

Tabla 4. Comparaciones múltiples *post hoc* para la red académica. Prueba de *Tukey*

Grupo	Grupo comparación	Diferencia de medias
Core	<i>Semi-Periphery</i>	-1,069*
	<i>Periphery</i>	-,025
<i>Semi-Periphery</i>	Core	1,069*
	<i>Periphery</i>	1,045*
<i>Periphery</i>	Core	,025
	<i>Semi-Periphery</i>	-1,045*

*p < .05

Estos resultados ponen de manifiesto que la media de los alumnos del grupo *Semi-Periphery* es superior y significativamente diferente del resto. De esta forma, el grupo *Semi-Periphery* constituiría por sí mismo un grupo homogéneo. Por otro lado, las notas de los alumnos de los grupos de *Core* y *Periphery* son más bajas y no presentan diferencias estadísticamente significativas entre sí, por lo que constituiría un segundo grupo homogéneo.

4. CONCLUSIONES

El estudio de los factores que influyen en el rendimiento académico de los estudiantes universitarios ha centrado la atención de educadores y profesionales durante décadas. Este trabajo ha analizado las relaciones sociales y académicas que establecen los estudiantes en el ámbito universitario y la posible influencia que poseen las mismas en su desempeño.

Los resultados obtenidos indican que los estudiantes desarrollan de forma extensiva entre ellos tanto redes sociales como académicas, incidiendo más en las primeras. Estos resultados están en línea con los obtenidos en Smith (2010) en estudiantes de grado norteamericanos. Por otro lado, los estudiantes refuerzan sus interacciones construyendo múltiples relaciones a lo largo de las diferentes redes. Los resultados

del trabajo muestran la existencia una vinculación entre las redes analizadas. Estas conclusiones son similares a las obtenidos en Chen *et al.* (2011).

Sin embargo, desde nuestro punto de vista, la mayor aportación de este trabajo está relacionada con el estudio de los vínculos existentes entre la ubicación del alumno en la red de relaciones y su rendimiento académico. Los resultados obtenidos no permiten confirmar una relación entre la posición del estudiante en la red social y su desempeño en línea con trabajos como Yang y Tang (2003).

No obstante, los resultados sí que permiten confirmar un vínculo entre la posición en la red académica donde se comparten ideas y conocimiento con el rendimiento del estudiante. Aquellos estudiantes ubicados en el *Semi-Periphery* de la red obtienen unas mejores calificaciones finales en los estudios. Tomando como base la titulación analizada, en la cual se valora de la creatividad y capacidad de innovación de los estudiantes, los resultados pueden explicarse a través de la literatura que ha justificado las ventajas para la creatividad de ubicarse en los límites entre una sub-red densamente relacionada, con elevada confianza y acceso a información pero redundante como es el *Core* y otra red dispersa con acceso a información novedosa pero con pocos intercambios de conocimiento como es el *Periphery* (Cattani y Ferriani, 2008). Por tanto, estar en contacto con el *Core* sin perder contacto con el *Periphery* proporciona una manera de adquirir conocimiento sin estar sujeto a los lazos que típicamente unen tales conocimientos a mundos particulares. Estos resultados permiten orientar a los alumnos sobre la mezcla de relaciones que les permiten obtener el mejor desempeño en sus estudios.

Para finalizar, este trabajo no está exento de limitaciones. Así, la muestra y titulación analizada han podido influir en los resultados obtenidos. Por ello, sería interesante, por un lado, ampliar este estudio a nuevas titulaciones donde aspectos como la creatividad puedan tener menor relevancia para verificar si se obtienen resultados similares y, por otro, desarrollar un análisis dinámico de estas relaciones estudiando su evolución desde los primeros cursos hasta los finales donde las relaciones ya están consolidadas. Estas tareas se dejan planteadas como líneas de trabajo futuras.

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NUEVAS METODOLOGÍAS DE APRENDIZAJE EN CIENCIAS PSICOSOCIALES APLICADAS A LOS CUIDADOS DE SALUD.

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Resumen.

De acuerdo con las nuevas metodologías de enseñanza, presentamos en este trabajo una propuesta de aprendizaje basada en la adquisición de conocimientos y habilidades esenciales en Ciencias Psicosociales Aplicadas a los Cuidados de Salud. Esta propuesta incluye el empleo de comics de Mafalda, la reflexión acerca de la delgada línea entre lo fisiológico y lo psicológico, la enseñanza de técnicas de relajación y meditación, el trabajo con dinámicas de grupo y juego de roles para favorecer la adquisición de habilidades interpersonales, especialmente en relación a la comunicación verbal y no verbal, incluso sobre comunicación de malas noticias. Con el fin de evaluar el éxito de este conjunto de técnicas sobre el aprendizaje y satisfacción de los y las estudiantes, medimos dos variables dependientes: las calificaciones obtenidas en la parte teórica y práctica de la asignatura, así como el grado de satisfacción con el uso de nuevas metodologías de aprendizaje. Se empleó como medio para evaluar dicha satisfacción un soporte virtual. Los resultados mostraron que más del 80% del alumnado superó la asignatura y más del 90% se mostró altamente satisfecho con el uso de las nuevas metodologías de aprendizaje desarrolladas en la asignatura. Estos resultados ponen de manifiesto la importancia de utilizar este tipo de recursos para mejorar la adquisición de conocimientos y habilidades relacionadas con las Ciencias Psicosociales Aplicadas a los Cuidados de Salud

Palabras clave: metodologías de aprendizaje, habilidades, satisfacción, medidas, conocimiento.

1. INTRODUCCIÓN

Uno de los ejes fundamentales del Espacio Europeo de Educación Superior (EEES) se basa en alcanzar el mayor nivel posible de calidad en los sistemas educativos. Para ello, se enfatiza el aprovechamiento de la capacidad de innovación, así como las fortalezas y oportunidades que cada institución -y los profesionales que la integran- ponen al servicio del alumnado y la sociedad. Asimismo, cobra especial importancia el impulso de nuevas metodologías docentes que centran el objetivo en el proceso de aprendizaje del estudiante en un contexto que se extiende a lo largo de su vida. Esto implica llevar a cabo un proceso didáctico con el fin último de imprimir conocimientos y habilidades profesionales y personales duraderas y aplicables en el futuro laboral.

Para lograr un cumplimiento satisfactorio de los propósitos anteriores es imprescindible construir las asignaturas desde esta filosofía, elaborando y estructurando el contenido -tanto teórico como práctico- de forma que se garantice una formación integral, un alto grado de satisfacción y un exitoso resultado académico. La presente contribución recoge, precisamente, la experiencia llevada a cabo en una asignatura del Grado de Enfermería denominada *Ciencias Psicosociales Aplicadas a los Cuidados de Salud*. Una de las principales motivaciones que guía la labor de los y las docentes de esta asignatura se centra en ofrecer en un tiempo limitado (un cuatrimestre), el mayor número de conocimientos y habilidades provenientes del campo de la psicología entre una oferta formativa exclusivamente reservada a asignaturas sanitarias.

La motivación de proporcionar una oferta formativa que asegure los estándares de calidad mencionados, ha llevado al profesorado de esta asignatura a compilar contenidos, materiales, metodologías y técnicas multidisciplinares con un alto poder didáctico. Entre ellas, se incluyen las siguientes: a) empleo de comics de Mafalda, b) reflexión acerca de la delgada línea entre lo fisiológico y lo psicológico, así como otros contenidos complejos a través de frases para reflexionar, textos y ejemplos, c) enseñanza de técnicas de relajación y meditación, d) trabajo con dinámicas de grupo y juegos de roles. Todo ello haciendo uso de canales de transmisión tradicionales (e.g., exposición teórica, pizarra, presentaciones con diapositivas) combinadas con otras más novedosas (e.g., plataforma de docencia virtual y mini-vídeos).

Para evaluar el éxito del proceso didáctico en la asignatura se consideraron dos indicadores. Por un lado, el grado de satisfacción del alumnado a través de un cuestionario elaborado específicamente para tal fin (ver Anexo 1), y por otro lado, la superación de la prueba que evaluaba el contenido teórico.

Consideramos ambas variables indispensables, la segunda por ser un estándar general de superación de contenidos adquiridos y la primera, por considerar que las opiniones de los y las estudiantes son imprescindibles para valorar la calidad y utilidad del material empleado.

Respecto a las metodologías y estrategias empleadas, el uso de cómics de Mafalda (ver Figura 1) sirve para ilustrar procesos psicosociales y ayudar a la comprensión de fenómenos complejos. Por ejemplo, tal y como muestra la Figura 1, para ilustrar las diferencias entre prejuicio sutil y manifiesto se empleó una viñeta que reflejaba la inconsistencia, más o menos consciente, entre los comportamientos y manifestaciones explícitas respecto a determinados grupos sociales y las creencias o afectos que en realidad suscitan.



Figura 1. Viñeta de Mafalda. Quino (1992). Todo Mafalda, pp. 75 (4). Barcelona: Editorial Lumen.

Otra de las técnicas empleadas para facilitar la comprensión de contenidos complejos se basó en el uso estratégico de frases para reflexionar, textos y ejemplos. Sirva como ejemplo la afirmación de Cayo Cornelio Tácito que decía: “*el poder nunca es estable cuando no tiene límites*”, empleada para recrear los procesos de influencia social. Este tipo de frases, en muchas ocasiones conocidas por el alumnado, permiten partir de conocimientos compartidos -condensados en oraciones concretas- para iniciar un proceso de reflexión y debate que permita construir un conocimiento más elaborado y complejo que el inicial.

Por su parte, la enseñanza de técnicas de relajación y meditación se integró como parte de los contenidos prácticos con un doble objetivo. En primer lugar, enseñar al alumnado a controlar su nivel de activación mediante la modificación de sus condiciones fisiológicas sin la utilización de ningún recurso externo (ni personas, ni instrumentos). Es importante subrayar que la finalidad de estas técnicas no era únicamente relajar al alumno o alumna en el momento, sino enseñar a hacerlo por sí mismos. De forma que puedan ponerlo en práctica en futuras situaciones en el contexto profesional mediante el control de la respiración, el ritmo cardíaco y pensamientos (Montes-Berges y Aranda, 2012). En segundo lugar, el aprendizaje de técnicas de relajación y meditación tenía como fin dotar a los futuros profesionales de la enfermería de herramientas que ayuden a los pacientes y/o familiares a gestionar situaciones de estrés y ansiedad, evitando –por ejemplo- la aparición de contracciones musculares que agravan problemas como el dolor crónico o disminuyendo la activación fisiológica antes de una intervención quirúrgica.

Finalmente, la utilización de dinámicas y juegos de roles favorecen la adquisición de habilidades interpersonales en el contexto profesional, especialmente en relación a la comunicación verbal y no verbal en casos especialmente difíciles como los relacionados con la comunicación de malas noticias. Este tipo de técnicas permiten poner en práctica los conocimientos adquiridos durante la exposición teórica, de forma que se contribuya a consolidar las habilidades, no sólo por la propia puesta en práctica, sino por la observación de la ejecución llevada a cabo por los y las compañeras. Asimismo, las dinámicas de grupo y juego de roles permiten explorar las propias capacidades en un contexto seguro y supervisado, permitiendo cometer errores y subsanarlos sin temor a las consecuencias que podrían conllevar en una situación real. En concreto, se emplearon dinámicas de grupo y role-playing para trabajar aspectos relacionados con los siguientes ámbitos:

- Autoconocimiento.
- Habilidades de comunicación no verbal, con el fin de aumentar la consciencia respecto a las propias características y habilidades en la transmisión de información, así como mejorar la capacidad de manipular estas habilidades para obtener mejores resultados en el diálogo y relación con los demás.
- Habilidades de comunicación verbal. En este sentido, se centró la atención en practicar técnicas de comunicación que resultan necesarias en situaciones de interacción paciente-enfermero/a (resolución de un conflicto, aumento de la adherencia terapéutica, negociación, etc.).
- Comunicación de malas noticias en distintas situaciones (e.g., comunicación de diagnóstico de una enfermedad, de fallecimiento esperado o inesperado, comunicación con menores, etc.).

Además, el uso de dinámicas de grupo en pacientes con diferentes patologías se alza como una estrategia de trabajo eficaz y divertida que consigue objetivos claramente eficaces de una manera fácil, potenciando las relaciones humanas (Montes-Berges y Aranda, 2012).

Un ejemplo concreto de dinámica grupal empleada en las clases prácticas fue el *ejercicio de hacer el ridículo*. El objetivo de este ejercicio se basa en la necesidad de afrontar una de las emociones que frecuentemente experimentan los pacientes en un contexto hospitalario: la vergüenza. Dado que el mejor antídoto para la vergüenza es saber reírse de uno mismo y que es difícil enseñar lo que no se sabe superar por uno mismo, se proponía a cada estudiante que “hiciera el ridículo” como quisiera durante 3-5 minutos al principio de cualquiera de las clases de prácticas de la asignatura (por ejemplo, cantar, hacer una coreografía cómica individualmente o en grupo, contar chistes, etc.).

Respecto a los soportes empleados para implementar las técnicas y estrategias anteriores destacan, por su capacidad innovadora y potencial didáctico, la plataforma de docencia virtual y los mini-vídeos. La plataforma de docencia virtual permite colocar una gran diversidad de material docente en Internet (temarios, apuntes, ejercicios, exámenes resueltos, transparencias, material multimedia, etc.) de una forma cómoda, segura y eficaz, teniendo el control en cada momento tanto de los contenidos como de las personas que acceden a ellos. Asimismo, está diseñada para ser un espacio colaborativo e interactivo con el

alumnado ya que, entre otros recursos, permite crear foros o blogs. En resumen, esta plataforma da soporte a una metodología basada en la constante comunicación entre los alumnos y alumnas y el profesorado. Por su parte, los mini-vídeos consistían en grabaciones de corta duración (6-10 minutos) por parte de las profesoras de la asignatura explicando contenidos teóricos de cierta dificultad y complejidad. Este material, disponible durante todo el cuatrimestre, permite repasar dichos contenidos tantas veces como el estudiante necesite una vez pasada la explicación en la clase presencial.

En conclusión, consideramos que para los profesionales de la salud, y más concretamente los enfermeros y enfermeras, resulta crucial adquirir conocimientos y habilidades básicas procedentes de la psicología. El dominio de estas habilidades facilitará su labor garantizando la alta calidad de sus servicios con personas que, por sus condiciones físicas y emocionales, necesitan en esos momentos un trato interpersonal de una gran calidad humana. Esto supone no sólo ofrecer al alumnado los conocimientos teóricos y prácticos que les permita llevar a cabo una labor sanitaria eficaz, sino también ser capaces de brindar interacciones basadas en la escucha activa, empática y compresiva, generando relaciones positivas y adaptativas tanto para el profesional sanitario como para los pacientes y familiares.

1. MÉTODO

Participantes

La muestra estaba formada por 98 estudiantes del 1^{er} curso de Enfermería, que habían acabado las clases de la asignatura Ciencias Psicosociales Aplicadas a los Cuidados de Salud, pero aún no habían realizado el examen. De ellos 19 eran hombres y 79 mujeres. La media de edad era de 20.80 años ($Sd = 1.65$). La participación en el estudio fue anónima y voluntaria.

Instrumentos

Se creó un cuestionario para este propósito en el que se preguntaba en qué grado las distintas herramientas habían ayudado a cada estudiante a entender los conceptos y los objetivos de la asignatura (e.g., *¿En qué grado te han ayudado las*

viñetas de Mafalda a entender conceptos de la asignatura?). Teniendo en cuenta el número de herramientas didácticas empleadas, se incluyeron ítems sobre: 1) viñetas de Mafalda, 2) frases célebres, 3) textos y reflexiones, 4) ejemplos, 5) prácticas de relajación, 6) prácticas de meditación, 7) uso de dinámicas de grupo, 8) creación de dinámicas de grupo, 9) role-paying, 10) técnica del ridículo. El formato de respuesta fue de 4 puntos, concretamente, 0 (“nada”), 1 (“poco”), 2 (“bastante”), y 3 (“mucho”). La puntuación total del cuestionario se halló calculando la media de cada ítem. Los datos sociodemográficos (edad y sexo) eran recogidos de manera automática a través de la plataforma.

Las calificaciones en teoría, práctica y nota final se recogieron e introdujeron en la tabla de resultados a través de la correspondencia con el DNI del alumnado. La nota de teoría suponía el 70% de la nota global, mientras que la nota de prácticas contaba el 30% restante.

Procedimiento

Se contactó con el alumnado a través de la plataforma virtual y se les pidió que rellenaran el cuestionario. Se les explicaba que los resultados obtenidos servirían para analizar la utilidad de los materiales y procedimientos y para poder mejorar los aspectos necesarios de la asignatura. De igual manera, se les garantizaba que los resultados globales les serían enviados una vez analizados.

2. RESULTADOS

Los resultados respecto a la superación de la asignatura mostraron que el 4.62% no se presentó a la prueba escrita. Del 95.38% que sí realizó el examen, sólo el 10.77% suspendió, mientras que del 89.23% que superó la asignatura el 70.77% obtuvo una calificación de aprobado y el 13.85% restante, de notable.

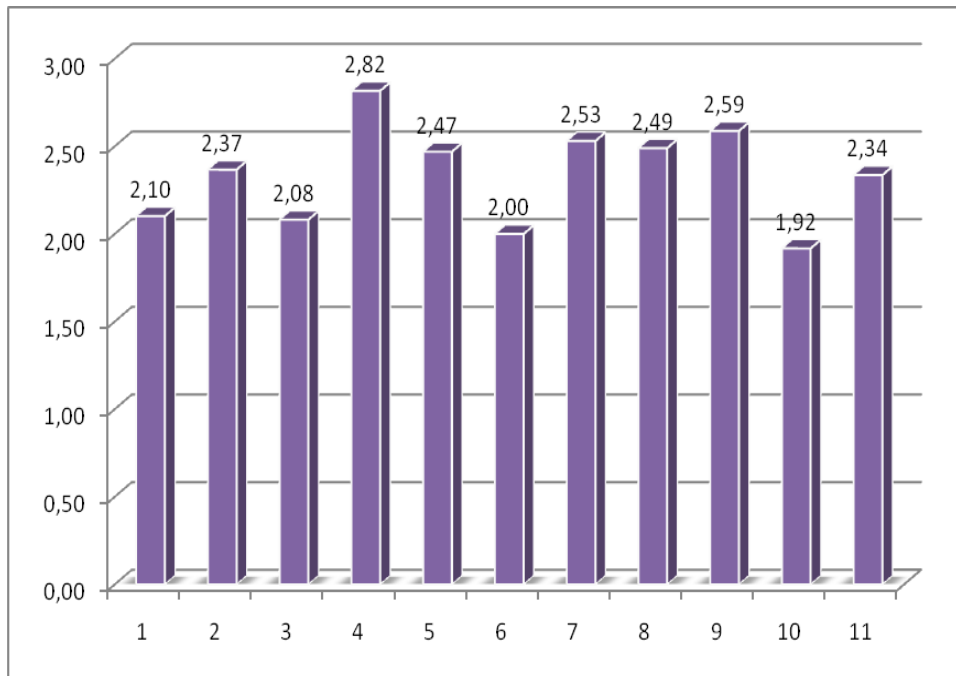
Los análisis descriptivos arrojaron que el 89.8% del alumnado que contestó a la encuesta superó la asignatura ($M = 6.48$; $Sd = 4.48$) y más del 84% se mostró muy satisfecho (más de 2 puntos sobre 3) con el uso de las nuevas metodologías de aprendizaje desarrolladas en la asignatura. De éstos, el 30% le otorgaron más de un 2.5 (sobre 3) de puntuación a estas herramientas. Todas las metodologías empleadas superaron la puntuación media (1.5), siendo las herramientas didácticas mejor

puntuadas los ejemplos de clase ($M = 2.82$), seguidos de los role-playing ($M = 2.56$), la realización de dinámicas de grupo que monitorizaba la profesora ($M = 2.53$), y la representación de las dinámicas de grupo que ellos mismos habían creado ($M = 2.49$) (ver Tabla 1 y Gráfico 1).

Tabla 1. Medias y desviaciones típicas de las metodologías didácticas y las notas de práctica, teoría y final.

	<i>Media</i>	<i>Desv. típ.</i>
Mafalda	2.10	0.56
Frases	2.37	0.61
Textos y reflexiones.	2.08	0.60
Ejemplos	2.82	0.41
Relajación	2.47	0.60
Meditación	2.00	0.84
Dinámicas de grupo	2.53	0.64
Creación de dinámicas de grupo	2.49	0.63
Role-playing	2.56	0.64
Dinámica del “ridículo”	1.90	0.99
Total escala satisfacción	2.34	0.35
Nota de prácticas (sobre 10)	6.83	4.26
Nota de teoría (sobre 10)	5.27	6.39
Nota final	6.48	4.48

Gráfico1. Medias de la satisfacción con las diferentes metodologías didácticas.



1: Viñetas de Mafalda; 2: frases; 3: textos de reflexión; 4: ejemplos; 5: relajación; 6: meditación; 7: dinámicas de grupo; 8: creación de dinámicas de grupo; 9: role playing o supuestos; 10: ridículo; 11: media total.

Se realizó un análisis de correlación entre cada herramienta didáctica y las puntuaciones alcanzadas por cada alumno/a en teoría, práctica o nota final (media de teoría y práctica). Los resultados mostraron que existía una correlación significativa y positiva entre la nota de teoría y la puntuación que los estudiantes le daban a la realización de los supuestos de role-playing, $r = .246$, $p = .015$, de manera que una mayor puntuación en esta nota se relacionaba con una mejor puntuación de los supuestos como herramienta didáctica. De forma similar, se encontró una correlación significativa, pero en este caso negativa, entre la nota de práctica y la puntuación del ejercicio de hacer el ridículo, $r = -.260$, $p = .007$, de

manera que los estudiantes que obtenían mejor nota en prácticas puntuaban peor este ejercicio.

Por último, se realizó un ANOVA introduciendo la variable género como independiente y las puntuaciones de las diferentes metodologías como dependientes. Los resultados arrojaron que existían diferencias significativas sólo en dos herramientas, las prácticas de relajación, $F_{(1,97)} = 5.723$, $p = .019$ y las de meditación, $F_{(1,97)} = 5.773$, $p = .018$, siendo en ambas las puntuaciones de

los chicos mayores que las de las chicas, $M = 2.80$ vs. $M = 2.41$, para relajación y $M = 2.47$ vs. $M = 1.92$ para meditación.

3. CONCLUSIONES

Los resultados mostraron que una gran parte del alumnado superó la asignatura en su contenido teórico. Respecto a la satisfacción con la metodología y técnicas empleadas, un alto porcentaje de estudiantes se mostraron altamente satisfechos, especialmente con el uso de ejemplos para explicar contenidos, los role-playing y las dinámicas grupales.

Las correlaciones arrojaron que a medida que se obtenían mejores puntuaciones en la parte teórica, se evaluaba más satisfactoriamente la realización de supuestos a través de role-playing. Esta relación denota la importancia otorgada al aprendizaje y consolidación de conocimientos gracias a su implementación en supuestos que recrean situaciones reales, especialmente ente aquellos alumnos con mejores notas. Asimismo, se halló que a mayor puntuación obtenida en la parte práctica peor se valoraba el ejercicio de hacer el ridículo. En ocasiones el sentimiento de responsabilidad que suele ir unido a los estudiantes que se esfuerzan por obtener altas calificaciones puede ir emparejado con una dificultad para desinhibirse y emplear el sentido del humor en un contexto académico. Sin embargo, no debe tomarse este resultado como un indicativo de quiere decir que deba omitirse este ejercicio en próximos cursos porque precisamente si es por esta razón, puede poner de manifiesto que quienes peor lo valoran son los que más lo necesitan.

En resumen, la incorporación de nuevas metodologías docentes y el esfuerzo por implicar el alumnado resulta una experiencia altamente satisfactoria en términos de resultados académicos y de crecimiento personal. Afirmación que se corrobora no sólo por los datos obtenidos en el presente estudio, sino también por la experiencia observable de los profesionales que lo desarrollan día a día en el aula.

Para poder obtener conclusiones más sólidas que permitan seguir profundizando en las técnicas, instrumentos y métodos más útiles en procesos de enseñanza-aprendizaje, se ha de seguir evaluando de forma longitudinal los resultados de su implementación, respecto a la superación de la asignatura en las pruebas estándar, como en relación a la satisfacción generada en el alumnado.

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ANEXOS

Anexo 1. Escala de satisfacción con las técnicas y metodologías empleadas en la asignatura de Ciencias Psicosociales Aplicadas a los Cuidados de Salud.

Mafalda

¿En qué grado te han ayudado las viñetas de Mafalda a entender conceptos de la asignatura?

- nada
- poco
- bastante
- mucho

frases

¿En qué grado te han ayudado las frases para reflexionar a entender conceptos de la asignatura o interiorizar objetivos de las competencias?

- nada
- poco
- bastante
- mucho

textos de reflexión

¿En qué grado te han ayudado los textos para reflexionar a entender conceptos de la asignatura o interiorizar objetivos de las competencias?

- nada
- poco
- bastante
- mucho

ejemplos

¿En qué grado te han ayudado los ejemplos de clase a entender conceptos de la asignatura o interiorizar objetivos de las competencias?

- nada
- poco
- bastante
- mucho

relajación

¿En qué grado te ha ayudado la práctica sobre relajación a tener una herramienta de cuidado personal importante en tu futuro profesional o en tus estudios actuales?

- nada
- poco
- bastante
- mucho

meditación

¿En qué grado te ha ayudado la práctica sobre meditación a tener una herramienta de cuidado personal importante en tu futuro profesional o en tus estudios actuales?

- nada
- poco
- bastante
- mucho

dinámicas de grupo

¿En qué grado te ha ayudado las prácticas sobre dinámicas de grupo a tener una herramienta de trabajo con grupos importante en tu futuro profesional?

- nada
- poco
- bastante
- mucho

creación de dinámica de grupos

¿En qué grado te ha ayudado la realización práctica de una dinámica de grupo y su representación a saber utilizar esta herramienta de trabajo en tu futuro profesional?

- nada
- poco
- bastante
- mucho

role playing o supuestos

¿En qué grado te han ayudado los supuestos o role playing para ensayar situaciones reales de CV y CNV y así aprender a interactuar y expresarse adecuadamente consiguiendo los objetivos de las competencias de la asignatura?

- nada
- poco
- bastante
- mucho

ridículo

¿En qué grado te ha ayudado el ejercicio del ridículo a aprender a reírte de ti mismo/a aunque sea un poco para poder enseñar eso mismo a tus pacientes futuros?

- nada
- poco
- bastante
- mucho

UN PASEO POR LA BIOQUÍMICA

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Resumen

La bioquímica y biología molecular es una ciencia de gran importancia en el siglo XXI. Está en continuo crecimiento y, además de estudiar el funcionamiento celular y la organización de los seres vivos desde una visión molecular, tiene como finalidad la mejora de nuestra calidad de vida. Podemos encontrar aplicaciones suyas desde la medicina con los nuevos fármacos hasta la agricultura con la obtención de especies mejoradas genéticamente pasando por la biotecnología o la nanotecnología.

El Departamento de bioquímica y biología molecular de la Universidad de Barcelona en colaboración con la Sociedad Española de Bioquímica y Biología Molecular viene realizando anualmente unos talleres, unas sesiones prácticas de mañana o de tarde, de bioquímica para el alumnado de Secundaria. En este trabajo se presenta y se evalúan los conocimientos y la parte experimental desarrollada en dichas sesiones. Además, se analizaron las opiniones sobre los talleres obtenidas tanto del profesorado como del alumnado. Estas actividades han sido muy bien recibidas por ambos grupos. Aumentar el interés por la ciencia y, por la bioquímica en particular, entre los jóvenes estudiantes es el objetivo principal de dichas actividades.

Palabras clave: difundir la bioquímica, motivar, educación secundaria.

Walking into Biochemistry

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Abstract

Biochemistry and molecular biology is a science of great importance in the XXI century. It is continuously growing and it studies cell function and the organization of living organisms from a molecular point of view. Finally, it aims to improve our quality of life. We can find its applications in a wide range of areas for example medicine, agriculture, new drugs obtained by techniques using genetics or biotechnology and nanotechnology; to mention just a few.

The Department of biochemistry and molecular biology at the University of Barcelona in collaboration with the Spanish Society of Biochemistry and Molecular Biology have conducted a yearly workshop with biochemical practical sessions (morning or afternoon) for Catalan students from Secondary Education. In this paper we present and analyze the knowledge and the experimental practices developed in these sessions. The teachers' and students' opinions were obtained and also analyzed. As a result, these activities have been well received and appreciated by both, science teachers and secondary school students. Increasing the interest of these young students for science and for biochemistry in particular is our main objective.

Keywords: spreading biochemistry, motivation, higher education.

1. INTRODUCCIÓN

La última encuesta sobre la percepción social de la ciencia en España fue realizada por la Fundación Española para la Ciencia y la Tecnología (FECYT) el 2012. En ella, a partir de 7.784 entrevistas personales, se preguntó sobre 4 áreas relacionadas con la ciencia: el interés y formación en ciencia y tecnología; las políticas de apoyo a la ciencia y la tecnología; los medios de comunicación; la imagen y confianza social de la ciencia y de la profesión científica [1].

El análisis de dicha encuesta nos deja unos datos que se deben tener muy en cuenta, así solo el 15.6 % de la población encuestada tiene interés por la ciencia y la tecnología. Es positivo indicar, sobre estos valores, que en la franja de 15 a 24 años este interés por la ciencia y la tecnología sube hasta el 24 %.

En referencia a la formación adquirida solo un 10,3 % indica que su formación en ciencias y tecnología ha sido alta o muy alta. Para terminar mostrando que para un 59% de los jóvenes ser investigador es una profesión atractiva pese a que está mal remunerada, solo el 27 % cree que está bien remunerada económicamente y que solo el 37,5 % le atribuye un alto reconocimiento social.

Con todos estos datos se puede entender el descenso actual, entre los jóvenes de toda Europa, a seguir estudios científicos [2]. Pero la ciencia ha sido y es una actividad dirigida a mejorar la calidad de vida, desde la antigüedad ya se aplicaba el “ensayo error” como método para satisfacer la curiosidad científica. Hoy en día, nuestra vida es bastante mejor que hace unos siglos atrás gracias a estos avances científicos y tecnológicos.

Observar, preguntar y experimentar forman una espiral continua que conduce al conocimiento y al progreso. Una pequeña parte de nuestros jóvenes estudiantes observan, preguntan y experimentan pero es nuestra obligación hacer que el interés por la ciencia impregne a cuantos más mejor.

Con este enfoque, el Departamento de bioquímica y biología molecular de la Universidad de Barcelona (UB) en colaboración con la Sociedad Española de Bioquímica y Biología Molecular (SEBBM) viene realizando desde hace 17 años el curso “¿Y tú? Yo, Bioquímica” para el alumnado de Bachillerato interesado en las ciencias de la vida [3-4].

Estas instituciones dedicadas a la promoción de la ciencia [5-7] ya desde el curso 2011 decidieron realizar unos talleres o sesiones prácticas denominadas “Explora en la Bioquímica” que están dirigidas al alumnado que se encuentra en el último año de la Enseñanza Secundaria Obligatoria (ESO) y otras sesiones de mayor dificultad denominadas “Bioquímica en vivo” que están dirigidas al alumnado de primer curso de bachillerato. Ambas actividades configuran nuestro “Paseo por la Bioquímica”.

2. MATERIAL Y MÉTODOS

En la Tabla 1 aparecen algunas de las preguntas que se han utilizado para empezar estas sesiones, para “romper el hielo” con los jóvenes participantes. Se observa que, básicamente, un grupo hace referencia a cuestiones personales o preferencias o creencias mientras que el otro grupo presenta cuestiones generales sobre diversos temas científicos relacionados con la bioquímica.

Tabla 1. ¿Cómo iniciar una discusión científica con jóvenes de 15-17 años?
¿Qué prefieres hacer preguntas o dar las respuestas?
¿Querrías contribuir al descubrimiento de la vacuna del SIDA?
¿Cuál de estas palabras te atrae más: ciencia, tecnología o innovación?
¿Cómo podemos substituir la energía del petróleo antes de que se acabe? ...
¿Qué relación existe entre los viajes espaciales y la salud?

- ¿Cuánta población se podría salvar cada año si existiese la vacuna de la malaria?
- ¿Cuánta gente crees que participa en la realización de un transplante?
- ¿Las plantas transgénicas pueden acabar con el hambre en el mundo? ...

Esquema de las sesiones.

Tanto las sesiones para el alumnado de la ESO como para el de bachillerato son de mañana o de tarde. Tienen una duración aproximada de cuatro horas y media, siendo su horario desde las 9 hasta las 13.30 horas en la sesión de mañana y de 15 a 19.30 horas en las de tarde.

Tanto el “Explora en la Bioquímica” como la “Bioquímica en vivo” se desarrollan según el siguiente esquema:

- Una presentación inicial, una breve explicación sobre qué es la bioquímica con ejemplos históricos, cuales son los últimos descubrimientos en este campo de la ciencia y qué ventajas representan estos descubrimientos para nuestra sociedad.
- Realización de tres prácticas. A lo largo de estos últimos tres cursos, además de aprender las normas de seguridad, cómo utilizar el material volumétrico y las pipetas automáticas, las experiencias, algunas explicadas en [8-9], que se han realizado han sido:
 - Obtención de ADN de vegetales (cebolla, plátano o kiwi).
 - ¿Cómo medir la concentración de glucosa o de proteína de una muestra utilizando un espectrofotómetro?
 - Producción de una proteína como la proteína verde fluorescente (green fluorescent protein, GFP) en bacterias.
 - Condiciones de precipitación de la caseína de la leche.
 - También, desde Internet, se ha trabajado sobre cómo extraer el ADN humano y cómo clonar un ratón [10-11].
- Discusión de los resultados, conclusiones sobre toda la sesión y, además, al finalizar cada sesión se han repartido, rellenado i, finalmente, recogido dos tipos de encuestas, una dirigida al alumnado y la otra a su profesorado de ciencias para saber el grado de aceptación de dicha actividad.
- Tiempo para desayunar o merendar. Tanto en las sesiones de mañana como en las de tarde se hace un descanso, aproximadamente a la mitad de la sesión para que el alumnado se relaje un poco, hablen entre ellos sobre las prácticas que están haciendo y tomen energía en el desayuno o la merienda.

Las prácticas se llevan a cabo en los laboratorios del propio departamento universitario en los periodos en que no son utilizados por el alumnado de los distintos grados que imparte el Departamento de bioquímica y biología molecular. Así, los laboratorios quedan vacíos las dos últimas semanas del mes de Enero y las dos primeras del mes de Febrero ya que, en este periodo, se realizan los exámenes finales del primer semestre.

3. RESULTADOS

En los últimos tres años han participado de estas sesiones un total de 1954 alumnos, de los cuales un 57,2 % provenían de la ESO y el 42,8 % restante de bachillerato. Esta diferencia se explica porque el primer año, curso 2011-2012, solo se realizaron los talleres para el alumnado de la ESO, en los que participaron 324 alumnos. Ello nos deja que en los dos cursos siguientes, cuando se realizaron distintas sesiones para ESO y bachillerato el número de alumnos procedentes de la ESO que participaron ha sido de 794 mientras que en el mismo periodo de tiempo participaron 836 alumnos de bachillerato (Tabla 2).

De todo el alumnado participante un 38 % han sido alumnos mientras que el 62 % restante han sido alumnas. Todos ellos y ellas pertenecían a un total de 126 centros de los cuales el 68 % eran centros públicos mientras el 32 % restante eran centros privados. Finalmente, participaron, como acompañantes, un total de 185 profesores de las áreas científicas de la ESO y del bachillerato, podemos remarcar que la mayoría de este profesorado se implicó participando y realizando también aquellas prácticas que hacía su alumnado.

Estudiantes participantes:	
ESO	1118
Bachillerato	836
TOTAL	1954
Centros participantes	126
Profesores participantes	185

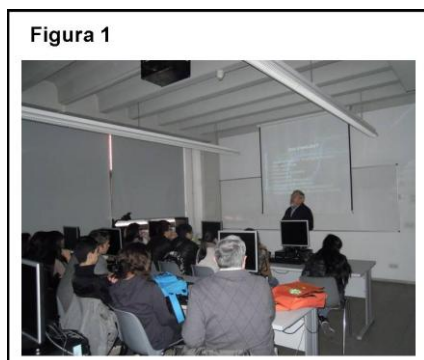
4. DESARROLLO DE LA PARTE EXPERIMENTAL.

Todo el alumnado que participaba en una sesión, muchas veces de dos o más centros a la vez, se juntaban en una aula donde se hacía la presentación del taller y se les impartía las primeras nociones sobre bioquímica.

Este primer contacto debe ser distinto para el alumnado de la ESO que para aquel que ya hace biología en primero de bachillerato, su currículum es distinto [12-13]. Pero en ambos casos, el punto importante sobre el que gira toda la presentación es relacionar los conceptos, pensar y hacer pensar, hacerse preguntas y tratar de responderlas, cada cual a su nivel.

Forzoso es contestar las preguntas que propone el alumnado relacionadas con el estudio del grado de Bioquímica o sobre el trabajo de los científicos en la Universidad así como si dicho trabajo es rentable o no.

En la Figura 1 se observa un momento de dicha presentación con la presencia del alumnado participante y de su profesorado. Éste último muchas veces participa con el mismo entusiasmo que su alumnado.



Después de la presentación se forman cuatro grupos con todo el alumnado asistente y cada grupo realiza una determina práctica en los laboratorios del Departamento. Una vez terminada la experiencia, los grupos se mueven y cambian de práctica y de monitor, al final de la sesión, al final de la mañana o de la tarde, todo el alumnado debe haber realizado las cuatro experiencias programadas.



La Figura 2 muestra cuatro instantes de dichas experiencias. Cabe resaltar la importancia que se da a la presencia de mujeres científicas del propio Departamento en dicha actividad [14] a la vez que los monitores de las prácticas sean el personal más joven, generalmente estudiantes de doctorado, del Departamento. Así el alumnado de secundaria ve y comprueba que la ciencia, la bioquímica y la investigación la hacen personas no muy alejadas de ellos y ellas en cuanto a la edad y sentimientos.

5. IMPACTO DE ESTA ACTIVIDAD.

Después de recogidas y analizadas las encuestas, tanto del alumnado como del profesorado de secundaria, se puede afirmar que esta actividad está muy bien valorada por la gran mayoría de participantes, tanto por el alumnado como por su profesorado de ciencias. Ello se hace notorio en algunos ejemplos extraídos de sus opiniones, véase las siguientes citas, solo como ejemplos.

Del alumnado:

“Me ha servido para saber de qué trata la bioquímica y qué para curar el cáncer se necesita trabajar mucho”

“No sabía que la profesora de la extracción de ADN... estaba haciendo su tesis doctoral, sabe mucho de proteínas y genes”

“Utilizar el espectrofotómetro me ha motivado para seguir una carrera científica”

Del profesorado:

“A mi alumnado le ha servido para consolidar conceptos”

“Es muy motivador para mi alumnado asistir a estas sesiones”

“Han trabajado con un material de laboratorio que no tenemos en el centro”

6. CONCLUSIONES

Los puentes que hace más de 17 años se empezaron a tejer entre la Universidad y la enseñanza secundaria, más concretamente entre el Departamento de bioquímica y biología molecular de la UB y los seminarios y/o departamentos de ciencias experimentales de los centros de secundaria y su profesorado, han empezado a dar sus frutos. El soporte recibido por parte del profesorado de secundaria a estas dos nuevas actividades es, sin duda, muy importante para que tengan éxito.

Después de analizar todo el trabajo realizado y los resultados obtenidos se puede resumir en unas pocas pero importantísimas conclusiones

- Para el alumnado de secundaria es ilusionante y motivante poder hacer unos experimentos en los laboratorios de la universidad.
- Este mismo alumnado necesita conocer y, sobre todo, entender la ciencia, la bioquímica porque ésta forma parte de su vida, como la respiración, la nutrición, las enfermedades, los genes o la muerte.
- Muchas de las controversias actuales sobre ciencia, como las plantas transgénicas, la inteligencia artificial o la evolución y la religión, han aflorado a la hora de discutir y sacar conclusiones de cada sesión.
- El objetivo inicial de aumentar el interés por la “Bioquímica” entre el alumnado de secundaria se ha conseguido.
- También se ha estimulado la capacidad de nuestros jóvenes para extraer conclusiones de los resultados de sus experimentos.
- La relación que se establece entre el alumnado y profesorado de secundaria con el profesorado y científicos universitarios ha sido muy positiva.
- Los experimentos y preguntas discutidas al final de cada sesión pueden realizarse también en las clases de secundaria, lo cual puede servir de ayuda para las clases de ciencias.
- Actividades, talleres o sesiones como éstas permiten mejorar la relación entre la ESO y el bachillerato y entre ambos y la Universidad.

Agradecimientos

Nuestro agradecimiento a todos los colaboradores de estos talleres, profesorado y monitores de prácticas del Departamento de bioquímica y biología molecular de la

UB. También agradecer al profesorado de ciencias de secundaria, ESO y Bachillerato y a su alumnado por participar de esta aventura científica.

Parte de estos talleres han sido subvencionados por la SEBBM y parte por el propio Departamento de bioquímica y biología molecular de la UB.

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INVESTIGACIÓN Y DIFUSIÓN DE LAS PLATAFORMAS TECNOLÓGICAS DE SOFTWARE LIBRE PARA FORMACIÓN ONLINE MASIVA Y ABIERTA

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Resumen.

La Fundación Asmoz al amparo del Departamento de Industria, Innovación, Comercio y Turismo del Gobierno Vasco ha llevado a cabo el proyecto denominado "INVESTIGACIÓN Y DIFUSIÓN DE LAS PLATAFORMAS TECNOLÓGICAS DE SOFTWARE LIBRE PARA FORMACIÓN ONLINE MASIVA Y ABIERTA" con el objeto de de examinar esta tendencia en la formación e-Learning desde una perspectiva tecnológica y en colaboración con la UPV/EHU, con el objetivo de poder contribuir a su implantación como modelo válido para la formación permanente en la CAPV; publicando y difundiendo con posterioridad las conclusiones obtenidas a Universidades, centros educativos, agentes formativos y empresas.

Resultados:

En general, los resultados obtenidos a través del proyecto han sido:

- Investigar, testear las diferentes plataformas de código abierto de aprendizaje online que permiten impartir formación de tipo MOOC.
- Dar la oportunidad al profesorado (vector indispensable) de generar por sí mismos 'cursos online masivos y abiertos', ya que dicho colectivo cuenta con pocas referencias conceptuales y pragmáticas que le sugieren cómo en-focar el trabajo desde esta nueva perspectiva.
- Fomentar en el profesorado la implementación de esta nueva tendencia educativa, que lleva a cursos de formación gratuita ofrecidos por plataformas más accesibles a través de Internet y enfocados a grupos muy grandes de personas. Los MOOC se suelen caracterizar por basarse en contenidos actualizados, una orientación práctica y un plan de estudio de acuerdo a los intereses del alumnado.
- Realizar un estudio de los problemas y necesidades tecnológicas que surjan a la hora de definir y desarrollar cursos MOOC.
- Difundir el estudio realizado en la comunidad educativa (Universidades, centros educativos, agentes formativos y empresas) y aportar soluciones en la medida que sea posible.

1. ANÁLISIS DEL ESTADO DEL ARTE

El recibimiento dispensado a los MOOC ha sido diverso y va entre el entusiasmo de quienes los ven como un tsunami para el sistema universitario, y, el escepticismo de una parte del mundo académico. Estamos desde luego ante un gran desafío. Debemos dejar de pensar la educación como un sistema rígido, de severa e inamovible normativa y abordarlo como un proceso moldeable, de metamorfosis continua, de transformación y reinención. Los MOOCs se presentan como una opción que no podemos dejar de atender. Dan mucha flexibilidad a las personas que quieren completar su formación en un determinado tema, o bien a quienes quieren aprender nuevos contenidos sobre temáticas esenciales, como idiomas, diseño, programación, estadística, tecnología...

El primer MOOC data de un ensayo en la Universidad de Manitoba (Canadá) que ofreció uno de sus cursos, que habitualmente contaba con una veintena de alumnos/as matriculados/as en el formato tradicional, en modo abierto, llegando a matricularse 2.300 personas. Actualmente las plataformas agregadoras (aquellas que ofertan catálogos de esta modalidad formativa y que a su vez están construidas sobre herramientas propietarias o de código abierto) de cursos MOOC siguen creciendo. Las principales plataformas anglosajonas son Coursera, edX y Udacity y en el ámbito Iberoamericano destacan Miriadax y RedunX.

Para considerar un MOOC como tal debe reunir las siguientes características según la Wikipedia:

- Ser un curso, contando con una estructura orientada al aprendizaje, que suele conllevar material y una serie de pruebas o evaluaciones para acreditar el conocimiento adquirido y un equipo docente de apoyo.
- Que sea masivo. El número de posibles matriculados es, en principio, ilimitado, o bien en una cantidad muy superior a la que podría contarse en un curso presencial. El alcance es global y no necesariamente universitario.
- En línea. El curso es a distancia pensado en Internet como principal medio de comunicación.
- Abierto. Los materiales son accesibles de forma gratuita en Internet.

2. PLATAFORMAS TECNOLÓGICAS

Las plataformas MOOC ofrecen herramientas para almacenar y analizar grandes cantidades de datos sobre los/las estudiantes, sobre el uso que hacen del sistema y

sobre las formas de interacción entre ellos y los profesores. El análisis de estos enormes repositorios de datos con el objetivo de comprender y optimizar los procesos de aprendizaje se conoce como learning analytics (Siemens & Long, 2011).

Es de prever que las propias plataformas MOOC permitirán ajustar en el futuro, automáticamente y gracias a la ingente cantidad de datos de los que se nutren sus sistemas de análisis, experiencias educativas personalizadas, más efectivas que los sistemas de e-learning tradicionales (Nihalani, 2013).

3. COMPARACIÓN ENTRE PLATAFORMAS TECNOLÓGICAS.

En primer lugar, y precisamente por ser Moodle la plataforma en la que basamos nuestros cursos de e-learning, nuestra primera reflexión fue responder a la siguiente pregunta: ¿Se puede hacer un MOOC con Moodle?

Si bien Moodle no es una plataforma específicamente diseñada para la impartición de MOOCs, deberemos tener en cuenta que el primer MOOC del mundo se implementó en una plataforma Moodle.

Moodle (Module Object-Oriented Dynamic Learning Environment) ha estado en el centro del e-learning desde hace más de diez años. Desde que lanzó el primer código bajo una licencia de código abierto en el año 2001, ha creado una amplísima comunidad de aprendizaje en la que conviven los desarrolladores y usuarios y en la que a través de foros comparten las distintas experiencias, dudas e inquietudes, intentando aprender unos de otros, colaborando en el desarrollo del proyecto.

Moodle dispone de una amplia gama de herramientas que a priori pueden ser válidas para la impartición de un MOOC: por ejemplo, la posibilidad de corrección entre pares, herramienta que los expertos consideran importante y de gran utilidad en el desarrollo de un curso masivo debido a que este tipo de evaluación aumenta la motivación del alumno al verse implicado en el proceso de evaluación y a su vez, la evaluación pasa a ser parte del proceso de aprendizaje.

Además de las diferentes utilidades del sistema, tiene una serie de características que hacen que en un principio sea una plataforma a tener en cuenta. Por un lado, la instalación inicial y su posterior configuración es una tarea sencilla. A su vez, la creación de cursos y la inserción de recursos didácticos se hacen de forma fácil e intuitiva. Por otro lado, existe abundante información y ayuda en foros que puede ayudar a resolver los diferentes problemas que puedan ir surgiendo en la configuración y uso de la plataforma.

Así pues, teniendo en cuenta todas estas características ya conocidas, y con el fin de responder a la pregunta anteriormente formulada, hemos querido impartir nuestro primer MOOC en la plataforma Moodle, para así poder iniciar el estudio desde un entorno conocido por nosotros que nos permita detectar las necesidades específicas para este nuevo modelo formativo.

El curso titulado “Android programazioaren hastapenak - Herramientas de programación Android”, ha contado con una duración de 10 horas y ha sido impartido en euskera. El número de alumnos matriculados ha sido de 436, de los cuales han aprobado 118, lo que supone una tasa de aprobados del 27%, muy por encima de la media en este tipo de formación, que se sitúa en torno al 8%.

Para la impartición del curso se ha hecho uso de amplios recursos y material multimedia, aportando diverso material complementario recomendado por el profesorado del mismo.

La evaluación del curso se ha realizado mediante cuestionarios de autoevaluación al final de cada tema. El acceso a cada tema por parte del alumno ha estado condicionado a la superación del cuestionario del tema anterior. Además como trabajo final cada alumno ha tenido que desarrollar una aplicación, que ha sido evaluada mediante el procedimiento de evaluación entre pares. Cada alumno ha sido evaluado por dos compañeros y a su vez ha tenido que evaluar a otros dos, siendo esta última, condición indispensable para poder obtener la puntuación final del curso.

Un dato a tener en cuenta es que la propia organización Moodle, con posterioridad a nuestro MOOC y con la intención de demostrar las posibilidades que ofrece su propia plataforma para la impartición de este tipo de cursos en cuanto a herramientas y escalabilidad, organizó un MOOC denominado “Teaching with Moodle: An introduction”. Además, en sus nuevas versiones ha incorporado entre otras funcionalidades, el uso de insignias o badges compatibles con Mozilla Open Badges.

Si bien el resultado de la experiencia ha sido satisfactorio, es sabido que hasta la fecha Moodle no tiene un sistema de analíticas de aprendizaje muy desarrollado, algo que puede ser de gran importancia para la impartición de cursos online masivos. El rastreo y análisis del rendimiento de los alumnos proporciona al docente datos desde varios puntos de vista: en conjunto, de manera personalizada, y desde el punto de vista de los recursos (tasas de abandono por recurso). La información aportada permitirá visualizar interacciones e identificar patrones de comportamiento de los estudiantes, de tal forma que será de gran ayuda para poder personalizar la acción formativa y diseñar entornos de aprendizaje acordes con las necesidades, intereses y formas de interacción entre docentes y estudiantes y entre sí.

Una vez realizada la experiencia en la plataforma Moodle e identificados los pros y los contras, hemos querido conocer otras plataformas para poder compararlas y

conocer las ventajas que pueden aportarnos. Es por eso que nos hemos decidido a su estudio.

Como punto de partida, conoceremos cuál ha sido la evolución en la publicación del código fuente de algunas de las plataformas más conocidas.

□ Siguiendo con la filosofía de la apertura de contenidos de recursos educativos y la formación de comunidades de aprendizaje alrededor de los mismos, puesta en práctica por la iniciativa P2PU en 2009, esta organización publica en julio de 2010 el contenido fuente de su plataforma Lernanta para la gestión de MOOCs.

Lernanta es el software que da soporte al sitio web P2PU (Peer to Peer University), una comunidad de aprendizaje online sin ánimo de lucro. P2PU comenzó su andadura en 2009, con financiación de la fundación Hewlett y la fundación Shuttleworth. Lernanta comenzó con la base de código del proyecto Batucada, de la fundación Mozilla. Desarrollada en Python bajo el framework Django, el código está licenciado con una triple licencia: MPL 1.1/GPL 2.0/LGPL 2.1.

□ La empresa Google, ante el nuevo mercado de plataformas para el desarrollo de cursos online que estaba apareciendo, decidió publicar el código de su propia herramienta, Course Builder, preparada para soportar escalado automático ante grandes cargas de usuarios, sin necesitar la intervención del gestor del curso, gracias al uso de la propia infraestructura hardware de Google (Google App Engine). Su origen se remonta a julio de 2012, cuando la empresa publicó un curso online sobre el uso avanzado de su buscador. El curso fue seguido por 155.000 estudiantes, aunque como es habitual en los MOOCs, la tasa de finalización del curso supuso un 8%.

□ Otra organización que decidió publicar su código fuente fue OpenMOOC, quien desarrolló su propia infraestructura para la impartición de los cursos MOOC de la iniciativa UNED COMA, con más de 10.000 estudiantes inscritos.

OpenMOOC (Gil & Martin, 2013) es un desarrollo europeo bajo licencia Apache License 2.0 que gestiona, internamente, distintas herramientas de código abierto (foros, wiki, sistema de gestión de identidades) a través de un módulo central de desarrollo propio (MOOCng), desarrollado en Python usando también el framework Django.

OpenMOOC hace un uso intensivo de recursos de vídeo y está preparada para soportar grandes cargas de usuarios concurrentes: dispone de scripts para la gestión de la escalabilidad de la plataforma mediante el uso de recursos de computación de la nube Amazon AWS y usa MongoDB, el sistema de base de datos NoSQL para dar soporte a la captura de todos los datos generados por los usuarios sin que afecte al rendimiento de la plataforma.

□ En junio de 2013, la plataforma edX (MIT, 2012), publicó el código fuente de su plataforma para el desarrollo y gestión de MOOCs, bajo el apoyo de la universidad de Harvard, MIT (Instituto Tecnológico de Massachusetts). Además de la apertura del código, hizo posible el participar en el desarrollo oficial de la plataforma.

Para la realización de este análisis comparativo se han teniendo en cuenta estas cuatro plataformas (Lernanta, CourseBuilder, OpenMOOC y edX).

□ Hay ciertas características que cumplen las cuatro plataformas analizadas:

El lenguaje de programación de todas ellas es el Python. Salvo CourseBuilder, que utiliza un framework de desarrollo distinto (webapp2), las otras tres plataformas utilizan el framework Django como base.

Respecto a las funcionalidades permitidas:

Permiten crear el material docente para su uso en cada curso, mediante un sistema de gestión de contenidos (CMS, Content Management System).

Permiten gestionar los usuarios, el contenido a mostrar a cada uno de ellos y sus tareas y ejercicios, mediante un sistema LMS (Learning Management System).

Permiten usar vídeos con subtítulos e indexado de los mismos para posteriores búsquedas.

Permiten crear ejercicios online de diferentes tipos (respuesta única, respuesta múltiple, texto libre, rellenar huecos).

Permiten crear foros de discusión.

Permiten edición colaborativa mediante wikis.

□ Hay ciertas características que sólo están presentes en una o varias de las plataformas:

La posibilidad de evaluación entre pares y autoevaluación para las tareas que los alumnos realizan en la plataforma es de gran importancia en un curso tipo MOOC. Sólo disponen de esta funcionalidad OpenMOOC y edX.

Por otro lado, edX es la única que dispone de un sistema de evaluación automática, y lo hace mediante un módulo externo que aplica técnicas de machine learning.

A su vez, edX es la única que dispone de un laboratorio virtual con un interfaz interactivo de simulación.

Sólo OpenMOOC y edX disponen de soporte de internacionalización.

Cabe destacar el desarrollo por parte de edX de una arquitectura de componentes denominada XBlock, que permite a los desarrolladores construir componentes de material didáctico y que pueden ser integrados en cualquier curso online que siga la especificación.

Una vez vistas las similitudes y diferencias en cuanto a las posibilidades que nos proporcionan las diferentes plataformas, un aspecto que a nuestro entender es de gran relevancia a la hora de inclinarnos hacia una de ellas es el grupo de desarrollo y el apoyo que hay detrás de cada una de ellas.

Analizando la tabla que hace referencia al estudio de las métricas de repositorios de código de las plataformas MOOC (Juanan Pereira, Silvia Sanz-Santamaría y Julián Gutiérrez -CINAIC 2013), quedan patentes una serie de datos que nos llevan a inclinarnos en la investigación y desarrollo de una de ellas.

En referencia al número de autores de cada una de ellas, se puede ver que destaca edX en cuanto al número de autores, con más de medio millón de líneas de código y 15.000 commits, con una alta actividad diaria (más de 26 commits al día), seguido muy de lejos por Lernanta y OpenMOOC. CoureBuilder registra un gran número de commits por día activo (34,7) pero sólo 3,7 commits por día. Esto se debe al carácter cerrado de CourseBulider, ya que aunque tenga una licencia Apache, el núcleo de desarrolladores se ciñe a empleados de Google, que actualizan la versión diariamente de forma interna, aunque sólo lanzan una versión pública en fechas concretas.

En definitiva, teniendo en cuenta que edX destaca sobre las demás en cuanto a actividad y equipo de desarrollo, y además ofrece más características y funcionalidades que el resto, nos hemos animado a investigar a fondo todas las posibilidades que nos ofrece dicha plataforma, siguiendo todo el proceso desde su instalación y puesta en marcha, para así poder adentrarnos en este nuevo mundo de los MOOC.

Si realizamos una comparación entre Moodle y edX, podemos aportar los siguientes datos:

□ El proceso de instalación y configuración de la plataforma edX resulta más largo y complejo que el de la plataforma Moodle. La plataforma edX cuenta con varios componentes y dispone de dos versiones: una para desarrollo (pruebas) y otra para producción (explotación), lo que dificulta el proceso. Sin embargo, la instalación de Moodle resulta mucho más sencilla y rápida.

□ Ahora bien, una vez realizado el proceso de instalación de ambas plataformas, se puede decir que la creación de cursos y la inserción de recursos didácticos resulta tanto o más sencilla en edX que en Moodle.

□ Mientras Moodle no dispone de un sistema de analíticas de aprendizaje muy desarrollado hasta la fecha, edX ofrece una serie de módulos con funcionalidades concretas como ‘EASE’, (que es un motor de puntuación mejorado, por ejemplo para tareas), ‘Discern’ (que permite ofrecer el servicio como una API) o ‘Edinsights’ (para analíticas en tiempo real y más completas) entre otras.

□ Otro aspecto a tener en cuenta en la comparación de ambas plataformas es la información y foros de ayuda para resolver problemas de configuración que hay sobre cada una de ellas. A diferencia de Moodle, que dispone de mucha información, nos hemos encontrado con que hay disponible muy poca información que ayude a resolver los problemas de instalación y configuración de la plataforma edX, lo que dificulta aún más el proceso. Es por eso, por lo que nos hemos animado a realizar los siguientes manuales, con el fin de compartir nuestra experiencia y colaborar en su difusión:

□ [Manual de instalación y configuración de la plataforma edX](#)

Este documento se divide en 2 secciones. La primera explica cómo instalar la versión de desarrollo (devstack) y la segunda se centra en detallar cómo instalar la versión de producción, incluyendo una sección sobre "Resolución de problemas" y otra sobre "Personalización del diseño gráfico" (Theming).

□ [Manual de edX estudio](#)

Este documento explica cómo crear un curso desde cero. Está dirigido a los profesores que quieran configurar y cargar de contenidos un curso MOOC a través de edX.

□ [Guía rápida de instalación de una AMI en edX](#)

Mediante esta guía es posible lanzar una instancia de edX en menos de 15 minutos usando los servicios de cloud computing de AWS (Amazon Web Services)

Aunque el resultado de nuestro estudio ha sido decidimos a investigar y probar las plataformas edX y Moodle como plataformas MOOC, no debemos olvidar que el entorno de los MOOCs está en pleno auge, y que los equipos de desarrollo que hay detrás de las diferentes plataformas irán evolucionando a gran velocidad, por lo que no debemos cerrarnos a ninguna de ellas y deberemos estar muy atentos a la evolución de todas ellas y al nacimiento de las nuevas que puedan surgir.

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EL CINE Y EL DOCUMENTAL COMO HERRAMIENTAS DE APOYO EN LA DOCENCIA DE ORGANIZACIÓN DE EMPRESAS EN LAS INGENIERÍAS: UNA APROXIMACIÓN A LA REALIDAD EMPRESARIAL

R. GONZÁLEZ

Resumen.

Las asignaturas relacionadas con la organización y gestión empresarial en las titulaciones de las diferentes ingenierías tienen entre sus principales objetivos dotar al alumnado de ciertas capacidades empresariales y directivas. Para ello, se exige el desarrollo de nuevas habilidades mentales y técnicas que otorguen al alumno la preparación para introducirse en nuevas teorías. Los docentes de estas asignaturas deben replantearse los métodos docentes tradicionales, enfocados en el contenido teórico [1] y que les aleja de un aprendizaje satisfactorio de un alumnado con marcado perfil técnico y práctico. Para cubrir esta necesidad, se describe la experiencia del uso de la realidad empresarial como recurso didáctico para mejorar el aprendizaje de alumnos del primer curso del Grado en Ingeniería en Sistemas Audiovisuales y Multimedia, conceptualmente alejados del área de conocimiento empresarial. Para ello, se utilizaron dos herramientas –el cine y el documental–. Los resultados obtenidos de esta actividad demostraron que este conjunto de fuentes de información sobre noticias de realidades empresariales de actualidad, enriqueció la experiencia docente

1. INTRODUCCIÓN

El actual entorno educativo, promueve la adopción e implantación de técnicas y herramientas docentes de carácter dinámico y participativo [2, 3] que propicien la implicación práctica del alumnado y el desarrollo de sus capacidades profesionales. En este sentido, el empleo de una combinación de diversas herramientas docentes audiovisuales –cine y documentales– que permitan acercar la realidad empresarial a alumnos del área de ingeniería, resulta extraordinariamente útiles. Numerosos docentes han puesto en práctica el uso de estas herramientas en clase que ofrecen distintas posibilidades a través de la visualización completa del material empleado o de fragmentos seleccionados [4].

Se trata de la utilización de dos instrumentos audiovisuales con una clara orientación divulgativa, que pueden conseguir mejorar el aprendizaje de los contenidos teóricos por parte de los estudiantes con marcado perfil técnico y práctico, motivarles y despertar su interés hacia temas de actualidad del ámbito empresarial.

Los resultados obtenidos entre estudiantes del primer curso del Grado en Ingeniería en Sistemas Audiovisuales y Multimedia, tanto a nivel didáctico como motivacional, parecen mostrar la idoneidad de esta combinación. Su utilización es muy recomendable como método de divulgación de noticias de actualidad y como invitación a la reflexión crítica y el debate del contenido teórico de los programas de las distintas asignaturas.

Además, se ha comprobado que el empleo de estos medios, satisface notablemente a los alumnos y cumple con sus expectativas. La sencillez de los medios empleados –cine y documentales-, disponibles en la práctica totalidad de las bibliotecas de las facultades españolas y la accesibilidad pública, abierta y gratuita de este material en la red Internet, invitan a los docentes a emplear estas herramientas en los programas académicos no sólo del área de organización de empresa, sino de cualquier ámbito de conocimiento.

2. EL CINE Y LOS DOCUMENTALES COMO HERRAMIENTAS DOCENTES

El empleo de películas y documentales de diversos formatos y temáticas permite mejorar la formación y el aprendizaje experimental significativo de los estudiantes y eleva su motivación [5].

Por un lado, podemos considerar a los documentales como instrumentos que pretenden describir lo real para contar la verdad y abarcan un amplio espectro de temas, convirtiéndose en uno de los más importantes materiales de aprendizaje en un ámbito multimedia [6,7].

Por otro lado, podemos definir el cine como poderosa arma didáctica en el área de conocimiento de la dirección y organización de empresas [8]. Esta herramienta fomenta el debate crítico y permite una mejor comprensión de conceptos complejos o difíciles de explicar [9]. Puede afirmarse que la potencialidad docente del cine reside en que es un procedimiento visual que posee un carácter lúdico que facilita los procesos de aprendizaje [10]. Además, el cine es un buen instrumento que permite desarrollar los currículos transversales y la integración de distintas perspectivas educativas [11].

3. METODOLOGÍA

Objetivos de la experiencia

Al afrontar esta investigación, la autora se planteó alcanzar tres grandes categorías de objetivos: generales, didácticos y motivacionales.

En primer lugar, el empleo de estas herramientas debería permitir alcanzar algunos objetivos generales como concienciar sobre la importancia del conocimiento de la actualidad y potenciar el desarrollo del espíritu crítico en los estudiantes. En segundo lugar, los objetivos didácticos pretendían fundamentalmente aprovechar el potencial de estas herramientas para complementar y aportar experiencias de carácter práctico en algunos de los contenidos teóricos incluidos en los programas de la asignatura. Por último, los objetivos motivacionales buscan fomentar un mayor interés en el alumno. Se pretende incrementar una actitud positiva hacia los contenidos de la asignatura con una perspectiva de aprendizaje presente y futuro, lo que debería permitir aumentar los niveles de conocimiento de los alumnos, tanto en el presente como en el futuro.

1. *Objetivos generales:*

- Potenciar conocimiento de actualidad empresarial.
- Desarrollar espíritu crítico y capacidad de análisis con base a conocimientos aprendidos.

2. *Objetivos didácticos:*

- Aportar experiencias prácticas sobre contenidos teóricos.
- Mejorar y reforzar aprendizaje alumnos.
- Herramientas de aprendizaje autónomo ágiles y actualizadas.

3. *Objetivos motivacionales:*

- Motivar al alumno en el aprendizaje de la asignatura.
- Generar interés: Formación continua.
- Incentivar pensamiento crítico.

4. DESARROLLO DE LA ACTIVIDAD

El trabajo partía de los principios básicos y objetivos que se han descrito en el apartado anterior. En este sentido, la autora considera que es importante utilizar diversos recursos didácticos que se apoyen en materiales audiovisuales que al mismo tiempo fomenten la participación activa de los estudiantes. La experiencia docente que se describe constituye un buen ejemplo, tanto por la incorporación de métodos docentes sencillos que promueven la participación activa del alumno, como de una utilización más efectiva y satisfactoria de distintas herramientas docentes. En este sentido, uno de los aspectos clave de éxito, antes de introducir nuevas técnicas docentes es tomar como punto de partida los medios actualmente disponibles.

La población objeto de estudio estaba compuesta por todos los alumnos matriculados (74 alumnos) en el primer curso del “Grado en Ingeniería en Sistemas Audiovisuales y Multimedia” en la asignatura “Introducción a la empresa” del curso 2011/12.

En la práctica totalidad de las asignaturas del Área de Organización de Empresas se explica como unidad de contenido dentro de los programas docentes, el concepto de empresa como un conjunto de grupos de interés con sus propios objetivos, que no siempre son convergentes (accionistas, directivos, Estado, trabajadores, clientes, proveedores,...). En este sentido, la empresa representaría un nexo de contratos que reflejaría el equilibrio resultante de la negociación entre todos los grupos participantes que configuran la empresa. La disparidad de objetivos genera problemas en el seno de las empresas, siendo los problemas derivados de la divergencia de objetivos entre la propiedad y la dirección, los que han sido estudiados en mayor profundidad por la literatura en Dirección de Empresas. En esta línea, los accionistas-propietarios (principal) encargan a los directivos (agentes) la labor de gestionar su empresa a cambio de una remuneración (contrato de agencia). El problema surge al producirse la divergencia de intereses entre ambos colectivos. La asimetría que se produce en la distribución de información entre ambos grupos (claramente favorable a los directivos), así como la dispersión de la propiedad favorecen que los directivos impongan sus objetivos por encima de los de los accionistas en muchas ocasiones.

Para la realización de la actividad se utilizaron dos medios diferentes –fragmentos de películas de cine y documental de un caso empresarial-, ya que su combinación proporcionaba las siguientes ventajas:

- Descripción experiencias prácticas y actuales de empresa.
- Fácil acceso y sin coste económico (disponibles en la plataforma youtube).
- Estructura dinámica y ágil.
- Corta duración de cada actividad con los distintos medios.

La primera actividad consistió en la reproducción de un fragmento de la película “The company men”. La película muestra como la corporación GTX, inmersa en la recesión económica actual, decide reducir drásticamente empleos para mantener sus márgenes y asegurar su valor en el mercado. Este fragmento, con una duración de 1,07 minutos, exponía los diferentes intereses subyacentes en las organizaciones. Todo ello permitió, en primer lugar establecer la terminología que íbamos a emplear en el desarrollo del tema y, en segundo lugar establecer un interesante debate sobre la opinión inicial de los alumnos, cuando aún no habían estudiado la temática.

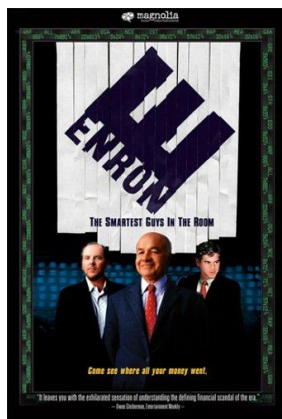
<http://www.youtube.com/watch?v=XbajhpTWTiw&list=PL9C417142C1A9787F>

Figura 1. Cartel película *The company men* (2010)



Para finalizar la experiencia se proyectó el documental “Enron, Los tipos que estafaron América” (<http://www.teledocumentales.com/enron-los-tipos-que-estafaron-america/>) de 1:45 minutos de duración. Este documental describe uno de los mayores escándalos de la historia financiera de Norteamérica. Esta parte de la actividad se desarrolló al finalizar el tema y, por lo tanto, cuando los alumnos contaban con todas las herramientas conceptuales para su correcto trabajo. Se les propuso el desarrollo de un trabajo en grupo cuyo resultado debía debatirse en común. Este último debate resultó el más productivo de todos los realizados.

Figura 2. Cartel documental *Los tipos que estafaron América* (2005)



5. RESULTADOS

Al finalizar la experiencia se les entregó cuestionario para su valoración. Éste comprendía la evaluación de algunos aspectos de la actividad en una escala Likert de 1 a 5 (1 → Puntuación más baja, 5→ Puntuación más alta) y una serie de preguntas abiertas que trataban de verificar la valoración general de la actividad, sus fortalezas y sus puntos de perfeccionamiento. En primer lugar, se puede apreciar una clara evolución positiva del aprendizaje de los alumnos. Según se puede apreciar en el cuestionario, la mayoría de los alumnos considera que tiene un conocimiento superior sobre la Teoría de la Agencia una vez finalizada la experiencia.

En segundo lugar, en lo que respecta a la valoración de las características propias de los casos analizados, los alumnos consideraron el tema muy interesante y de notable actualidad. De las respuestas obtenidas se puede apreciar que todos los alumnos participantes en la experiencia consideraron muy relevante la actividad, aportando valoraciones muy elevadas al respecto.

Por último, en relación a la valoración general de la experiencia, los estudiantes otorgaron una puntuación muy alta a la actividad, un 4,5 sobre 5. Entre las opiniones recogidas en los cuestionarios a las preguntas “¿Qué le ha parecido la actividad?” y “Aspectos positivos de la actividad” se pueden citar las calificaciones de

“interesante, actual, relevante, práctico, realista”. Cabe destacar, como dato relevante que no se ha registrado ninguna valoración de carácter negativo respecto a la misma.

Tabla 1. Valoración de la actividad por los alumnos

VALORACIÓN DE LA ACTIVIDAD	1	2	3	4	5	MODA	MEDIA
Actualidad e interés de los temas presentados	0	0	5	17	20	5	4.35
Tiempo de la actividad	0	0	8	20	14	4	4.1
Relevancia de la actividad	0	0	0	12	30	5	4.7
Conocimiento Teoría de la Agencia previo a la actividad	0	13	17	12	0	3	2.9
Conocimiento Teoría de la Agencia posterior a la actividad	0	0	12	25	5	4	3.8
Aprendizaje obtenido	0	0	0	27	15	4	4.3
Valoración General de la actividad	0	0	3	12	27	5	4.5

Fuente: Elaboración propia

Para finalizar y con el ánimo de mejorar la realización de la actividad de cara al futuro se introdujeron dentro del cuestionario algunas preguntas relativas a “¿Cómo sería posible mejorar la actividad para futuras ediciones?”. Los alumnos destacaron a tal respecto la posibilidad de contar con un glosario previo con el vocabulario mínimo para el óptimo desarrollo de su trabajo posterior y otorgar a la actividad una mayor duración.

6. CONCLUSIONES

A través de la presente experiencia se ha proporcionado a los alumnos herramientas que le permitan alcanzar un aprendizaje tanto individual como colectivo. Además, acercar la realidad empresarial al estudiante de perfil técnico, consigue que los contenidos teóricos se llenen de significado y aplicación práctica. Por otro lado, las diferentes herramientas empleadas, les permitirán continuar con un aprendizaje dinámico más allá de las fronteras del aula y de su periodo universitario, ayudando a la consolidación de un proyecto educativo a lo largo de la vida de individuo.

Los resultados obtenidos han permitido validar que la observación de esta realidad relacionada con la temática de la asignatura, facilita procesos de reflexión y generación de conocimiento en el área organizativo-empresarial. Sin embargo, con el objetivo de una mejora continua, las sugerencias de la presente práctica docente llevan a la autora a plantearse la posibilidad de aplicación a otras áreas de conocimiento y la introducción de herramientas complementarias, como la inclusión de un glosario

previo con el vocabulario mínimo para el óptimo desarrollo de su trabajo posterior, que facilitarán y mejorarán los resultados obtenidos. De igual modo, cabría la posibilidad de utilizar otras herramientas tecnológicas de fácil acceso como podcast de las fonotecas virtuales de las distintas cadenas de radio, que completarían la experiencia.

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EL DEBATE EN LA ENSEÑANZA DE LA ECONOMÍA: EL CINE COMO HERRAMIENTA DE INNOVACIÓN DOCENTE

F. BERMEJO, R. DEL POZO, N. LEGAZPE and A.M^a. PRIEGO

Resumen.

El nuevo enfoque metodológico impuesto por el Espacio Europeo de Educación Superior (EEES) tiene como uno de sus pilares básicos la obtención de determinadas competencias, tanto genéricas como específicas, por parte de los estudiantes. El presente trabajo pretende que el alumno piense, medite y reflexione sobre la realidad económica, desarrolle un pensamiento crítico y pueda extraer sus propias conclusiones. Para ello se plantea la visualización y debate de dos películas/documentales que defienden dos posturas totalmente opuestas sobre un tema económico, lo que permite la confrontación de ideas entre los alumnos participantes. Esta actividad concede al alumnado la posibilidad de desarrollar competencias en las que la metodología del EEES pone especial énfasis: aprendizaje continuado, autodirigido y autónomo; desarrollo de la comunicación escrita para elaborar informes y capacidad para trabajar en equipo, liderar, dirigir, planificar y supervisar equipos de trabajo. Los resultados muestran la utilización de los recursos pedagógicos que aporta el cine como vehículo de información es un método satisfactorio para alcanzar una serie de competencias propuestas en el Grado de Administración y Dirección de Empresas en la Universidad de Castilla-La Mancha (UCLM).

1. INTRODUCCIÓN

El proceso de integración en el Espacio Europeo de Educación Superior (EEES) o Acuerdo de Bolonia (1999), en el marco de elaboración de una estrategia común e integrada en educación y formación superior (Aranda, 2008), ha supuesto importantes modificaciones tanto en la organización de los estudios universitarios españoles como en la propia docencia, siendo éstos la adopción del diseño de un sistema de titulaciones comparable entre sí, con una estructura de estudios basada en dos ciclos principales, así como el establecimiento del sistema de transferencia de créditos europeos (*European Credit Transfer System, ECTS*) (Feixas, 2004).

De este modo, es necesario llevar a cabo una rigurosa planificación de la enseñanza universitaria que englobe todos los aspectos del proceso de enseñanza-aprendizaje, suministrando, para ello, la información necesaria al alumnado sobre los conoci-

mientos y habilidades que se deben de conseguir, cómo lograrlos y de qué modo se van a verificar los resultados (Martínez *et al.*, 2010). Dicho proceso de enseñanza-aprendizaje debe estar fundamentado en la adquisición de una serie de competencias genéricas y específicas que el alumnado deberá adquirir una vez terminado el mismo.

Con el fin de plantear un aprendizaje más centrado en el estudiante, en el cuál este desempeñe un papel más activo, incluso participando en los proceso de evaluación (Boud y Falchikov, 2007; Brown y Glasner, 2003; Dochy, Segers y Sluijsmans, 1999; Falchikov, 2005; Knight, 2005), y le permita afianzar una serie de competencias propuestas en el Grado en Administración y Dirección de Empresas en la Universidad de Castilla-La Mancha (UCLM) y, en concreto, en las áreas de conocimiento de Teoría Económica, Economía Financiera, Economía Española e Internacional y Contabilidad, se plantea una actividad que consiste en la visualización de dos documentales que defiendan posturas totalmente opuestas sobre un tema económico y un posterior debate sobre los mismos. Con esta actividad se pretende que el alumno piense, medite y reflexione sobre la realidad económica que se intenta plasmar en los documentales, desarrolle un pensamiento crítico y pueda extraer sus propias conclusiones.

Los resultados, tras la realización de esta actividad docente, muestran que los alumnos han adquirido en un alto grado de desarrollo de las competencias genéricas (G1, G3, G4 y G5) y específicas (E7 y E11) que se pretendían alcanzar con la misma. Y el alumnado valora positivamente dicha actividad.

Este trabajo se estructura, tras esta introducción, como sigue: a) desarrollo de las competencias genéricas y específicas; b) se expone la metodología; c) se comentan los resultados; y, d) por último, se detallan las conclusiones.

2. COMPETENCIAS GENÉRICAS Y ESPECÍFICAS

Las *competencias* son definidas como un sistema de conocimientos, destrezas, actitudes y valores que se adquieren de forma continua en diversos contextos y que se emplean en situaciones específicas a la resolución de problemas mediante un desempeño eficaz de tareas académicas y profesionales, con la finalidad de lograr un pleno desarrollo personal, social y económico (López, 2011).

A estos efectos, la educación superior debe poner el énfasis en implementar un acervo de conocimientos que sean sustantivos e importantes, junto con un conjunto de destrezas y habilidades clave que doten al alumnado de competencias para desarrollar tareas y resolver problemas académicos y profesionales, tanto a nivel individual como grupal.

El objetivo global del proceso de aprendizaje del alumnado a su paso por la universidad es la obtención y el desarrollo de una serie de competencias. Este proceso debe estar influido por lo útil del conocimiento (competencias genéricas) y por el conocimiento de lo útil (competencias específicas).

La utilización de la metodología que se desarrolla en el presente artículo permitirá al alumno alcanzar en un grado de muestra *cómo se hace y sabe cómo se hace* (frente a los grados, ordenados de menor a mayor conducta, *de hace, muestra cómo se hace, sabe cómo se hace y sabe* (Miller, 1990, Tolentino, 2012)) una serie de competencias tanto genéricas como específicas definidas en el plan de estudios del Grado de Administración y Dirección de Empresas de la Universidad de Castilla-La Mancha (cuadro 1).

Cuadro 1: Competencias genéricas y específicas

Competencias genéricas	
G1	Poseer habilidades para el aprendizaje continuado, autodirigido y autónomo, lo que les permitirá desarrollar habilidades de aprendizaje necesarias para emprender estudios posteriores con un alto grado de autonomía.
G3	Desarrollar la comunicación oral y escrita para elaborar informes, proyectos de investigación y proyectos empresariales, y ser capaz de defenderlos ante cualquier comisión o colectivo (especializado o no) en más de un idioma, recogiendo evidencias pertinentes e interpretándolas de forma adecuada.
G4	Utilizar de manera adecuada las TIC, aplicándolas al departamento empresarial correspondiente con programas específicos de dichos ámbitos empresariales.
G5	Capacidad para trabajar en equipo, liderar, dirigir, planificar y supervisar equipos multidisciplinares y multiculturales, en el entorno nacional e internacional de la empresa y sus respectivos departamentos, de forma que se consigan sinergias beneficiosas para la entidad.
Competencias específicas	
E7	Comprender el entorno económico como resultado y aplicación de representaciones teóricas o formales acerca de cómo funciona la economía. Para ello serán capaces de comprender y utilizar manuales comunes, así como artículos y, en general, bibliografía puntera en materias centrales de su plan de estudios.
E11	Conocer el funcionamiento y las consecuencias de los distintos sistemas económicos.

Fuente: Elaboración propia

3. METODOLOGÍA

La metodología utilizada en la actividad desarrollada en el presente trabajo consiste en la proyección, en una jornada de cine económico, de dos documentales que presentan visiones complementarias sobre un mismo tema, dichos documentales varían en cada edición de la jornada. En concreto, para esta actividad los dos documentales propuestos se centran en la situación actual del problema medioambiental, puesto

que ambos basan su hilo argumental en esencia sobre el cambio climático, presentando versiones diametralmente opuestas sobre sus posibles causas y consecuencias, así como un análisis crítico de las políticas económicas aplicadas y los agentes involucrados.

El primer documental proyectado, *“Una verdad incómoda”* de Al Gore, defiende la evidencia de un cambio climático que se ha visto acelerado por el comportamiento de la sociedad actual, en donde priman más los intereses económicos que las cuestiones morales y éticas. El segundo documental, *“La gran estafa del calentamiento global”* de Martin Durkin, básicamente cuestiona el impacto del hombre en el supuesto cambio climático y se critica la actitud de una comunidad científica más preocupada del mantenimiento de su estatus que de un análisis objetivo de la realidad medioambiental.

Previamente a la proyección de ambos documentales, se realiza una presentación a los alumnos donde se les exponen las claves de cada uno de ellos, de manera que éstos dispongan de un esquema básico sobre su contenido para la realización de las tareas evaluables. Dichas tareas consisten en una memoria escrita con los aspectos más significativos de cada postura y un análisis crítico de sus principales argumentos, así como la participación activa en el debate posterior a la proyección de los documentales.

Con el fin de conocer la opinión del alumnado, se plantea y diseña un cuestionario de satisfacción a los alumnos asistentes a la jornada. El cuestionario, anónimo, consta de una serie de preguntas que pueden clasificarse en tres bloques. Un primer bloque de preguntas demográficas y relacionadas con el acceso del alumno a los estudios universitarios (sexo, lugar de residencia y nota de acceso a la universidad); un segundo bloque de valoración y percepción, por parte del alumno, del grado con que se alcanza cada una de las competencias que se pretenden potenciar con esta actividad y, finalmente, un tercer bloque de preguntas relacionadas con la valoración de la actividad por parte del alumnado.

4. RESULTADOS

Del total de alumnos que participaron en la actividad (113 personas), el 46.0% eran hombres (53) y el 53.10% mujeres (60); 69 personas residen en Cuenca capital (61.06%), mientras que 32 (28.32%) lo hacen en la provincia y 12 (10.62%) fuera de la misma. La nota media de acceso a la Universidad fue para el 46.02% (52 alumnos) de entre 5 y 6.9; para un 34.51% de entre un 7 y un 8.9; y casi un quinto del total (19.47%, 22 personas) obtuvo una calificación superior a 9 puntos, todos ellos sobre una base de 10 puntos.

liderar, dirigir, planificar y supervisar equipos					
E7: Comprender el entorno económico	0.88	3.54	16.81	54.87	23.89
E11: Conocer el funcionamiento y las consecuencias de los distintos sistemas económicos	0.88	1.77	30.97	46.02	20.35

Fuente: Elaboración propia

Como se puede observar en la tabla 1, el grado de consecución alcanzado en todas las competencias, tanto genéricas como específicas es algo o bastante, excepto la competencia específica referida a la comprensión del entorno económico (E7), en la que tres de cada cuatro alumnos valoran haber desarrollado esta competencia bastante o mucho. Complementando dicha competencia, la referida al funcionamiento y consecuencias de los distintos sistemas económicos muestra unos resultados similares.

El resto de competencias, que no son sino las genéricas, muestran una mayor dispersión a la hora de haber sido desarrolladas en la evaluación realizada por los alumnos. Destaca como menos desarrollada la competencia que incluye la capacidad para trabajar en equipo, liderar, dirigir, planificar y supervisar equipos.

En la tabla 2 se recogen algunos parámetros relacionados con la valoración que el alumnado ha concedido a la actividad.

Tabla 2: Valoración general del alumnado tras la realización de la actividad

	Nada	Poco	Algo	Bastante	Mucho
Motiva y estimula para aprender	0.88	3.54	20.35	56.64	18.58
Me gusta	1.77	2.65	19.47	50.44	25.66
Aumenta la participación activa del alumnado	0.00	1.77	30.99	43.36	24.78
Permite alcanzar mejor los objetivos y competencias de aprendizaje del Grado	0.88	1.77	32.74	49.56	15.04
Estimula el aprendizaje cooperativo	0.88	4.42	26.55	46.90	21.24

Fuente: Elaboración propia

De esta tabla se desprende que la mayor parte del alumnado participante considera la actividad como motivadora y estimulante (75.22% bastante o mucho); a uno de cada dos le ha gustado bastante, y a uno de cada cuatro le ha gustado mucho. Un patrón de comportamiento similar es encontrado cuando se analizan tanto el estímulo de esta actividad hacia el aprendizaje cooperativo así como la invitación a aumentar la participación activa del alumnado como. Respecto al último parámetro analizado de satisfacción, esto es, alcanzar mejor los objetivos y competencias in-

herentes al grado, el 82.3% de los alumnos manifiestan haber alcanzado algo o bastante dicha premisa.

Con el fin de identificar las variables que pueden incidir de manera más notable sobre la satisfacción obtenida por el alumno derivada de la realización de esta actividad, se estima un modelo de regresión logística ordenado, cuyos resultados se muestran en la tabla 3.

Tabla 3: Modelo de regresión logística ordenado: factores sociodemográficos y competencias asociadas a la satisfacción del alumnado tras la realización de la actividad

	Intervalo de Confianza			p-value	Odds Ratio
	B	Inf.	Sup.		
Curso	1.722	0.854	2.590	0.000 ^a	5.595
Residencia	0.564	-0.062	1.190	0.077 ^c	1.758
G3	0.535	0.095	0.975	0.017 ^b	1.707
E7	0.840	0.270	1.410	0.004 ^a	2.317
Pto. Corte 1	3.366	0.315	6.416	-	-
Pto. Corte 2	4.139	1.221	7.056	-	-
Pto. Corte 3	8.700	5.289	12.111	-	-
N:113; Chi-cuadrado: 37,96 (p-value:0,000); 2log-verosimilitud: 76,266; R² Ajustado: 0,1993					
^a Indica significación al 1%; ^b Indica significación al 5%; ^c Indica significación al 10%					

Fuente: Elaboración propia

La tabla 3 recoge las variables cuyo parámetro ha resultado estadísticamente significativo en la estimación del modelo de regresión logística ordenado. Como se puede observar, estas variables han sido el curso al que pertenece el alumnado, el lugar de residencia, la competencia genérica 3 y la competencia específica 7. El curso y la competencia E7 han resultado estadísticamente significativos al 1%, la competencia G3 al 5% y el lugar de residencia al 10%.

El modelo ha resultado estadísticamente significativo a nivel global, con un aceptable R cuadrado ajustado de 0,1993.

Las cuatro variables enumeradas muestran valores de odds-ratio superiores a uno, lo que pone de manifiesto que conforme se incrementan estas variables, la consecuencia es un aumento de la probabilidad de satisfacción del alumnado. De esta manera, cursar años superiores (frente a estar matriculado en primer curso) y residir fuera de Cuenca o en la provincia de Cuenca (frente a hacerlo en la misma ciudad de Cuenca) incrementan la probabilidad en 5,595 y 1,758 respecto de que su nivel de satisfacción sea alto respecto a medio, y medio frente a bajo.

Respecto a las variables de competencias, incrementar el nivel de desarrollo y alcance de cada competencia en un nivel superior respecto del inmediatamente inferior incrementa la probabilidad en 1,707 y 2,317 veces respecto a que el nivel general de satisfacción sea alto *vs* medio, y medio *vs* bajo.

5. CONCLUSIONES

La integración de la enseñanza universitaria en el EEES requiere un proceso de adaptación de las actividades formativas para orientarlas hacia las capacidades que el alumnado debe adquirir durante sus estudios. Con este objetivo, la presente actividad pretende afianzar algunas de las competencias genéricas y específicas más significativas del Grado en Administración y Dirección de Empresas, para lo cual se utiliza el cine como herramienta de aprendizaje.

La proyección de dos documentales que defienden posturas opuestas respecto a un mismo tema permite, entre otros aspectos, mejorar la comunicación oral a través de la posterior confrontación de ideas y, al mismo tiempo, el desarrollo individual del pensamiento crítico sobre la realidad económica. De forma más concreta, el tema económico propuesto en este trabajo ha sido el análisis de la situación medioambiental. El motivo es doble, por un lado, la estrecha relación que guarda con las áreas de conocimiento involucradas en la actividad y, por otro, la intención de cubrir un aspecto que despierta amplio interés en el alumnado y que ya no aparece como asignatura tras la adaptación del plan de estudios de la Licenciatura al Grado en Administración y Dirección de Empresas.

Respecto a la modelización econométrica utilizada, es relevante destacar el significado de las cuatro variables que han resultado estadísticamente significativas. Se puede concluir que los alumnos de cursos superiores muestran un mayor nivel de satisfacción en la realización de este tipo de actividades que los pertenecientes a cursos inferiores. La justificación puede venir dada desde varios ámbitos. En primer lugar, la formación recibida en cada curso. Conforme se va avanzando en el grado, el nivel de formación y conocimientos se incrementa, lo que permite por un lado tener y mostrar diferentes inquietudes respecto al ámbito económico, cuya respuesta se puede ver satisfecha en este tipo de talleres; por otro lado, esa mayor formación permite entender con mayores recursos y capacidades las distintas realidades descritas por la economía medioambiental en el presente caso.

A su vez, la variable lugar de residencia condiciona significativamente la satisfacción del alumno, lo cual revela un mayor nivel en aquéllos cuya residencia es distinta a la de Cuenca ciudad. Este resultado podría entenderse como un indicador de un mayor nivel de sensibilidad medioambiental existente en el ámbito rural frente al ámbito urbano, lo cual supone una línea abierta para futuras investigaciones.

Por último, la competencia genérica desarrollar la comunicación oral y la competencia específica comprender el entorno económico, con el resultado obtenido en el análisis, ofrecen la información de que aquellos alumnos que mayor desarrollo de dichas capacidades han percibido/han conseguido mediante la realización de este taller, son quienes mayor nivel de satisfacción general han mostrado. Ello pone de manifiesto no sólo que la actividad contribuye a desarrollar estas dos competencias, sino que el alumnado así lo percibe y lo valora., obteniendo ventajas comparativas tales como la comprensión más profunda de los conceptos o reforzamiento del aprendizaje y del razonamiento crítico (Salemi, 2002).

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Análisis y valoración de los nuevos enfoques aplicados en la adaptación de la asignatura ‘Taller experimental de prototipos’ al Espacio Europeo de Educación Superior

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Abstract

La asignatura obligatoria ‘Taller experimental de prototipos’ se imparte por primera vez en el cuarto curso del Grado en Ingeniería en Diseño Industrial y Desarrollo de Productos de la Universitat Jaume I. Esta asignatura pretende que el alumnado se ejercite en el desarrollo y experimentación de ideas y soluciones formales mediante el análisis de productos existentes y la elaboración de nuevas propuestas de diseño que puedan dar lugar a proyectos conceptuales de objetos cotidianos. Esta asignatura sustituye a ‘Taller de prototipos’, anteriormente impartida en segundo curso de la ya extinta titulación de Ingeniería Técnica en Diseño Industrial. Dado que en el nuevo plan de estudios ha cambiado de curso y que algunos contenidos han quedado desfasados debido a que lleva dos años sin impartirse, es conveniente monitorizar su implantación y adaptación al nuevo formato de enseñanza del Espacio Europeo de Educación Superior. El presente artículo describe las mejoras introducidas en la asignatura, fruto de la implementación de un proyecto financiado por la Unitat de Suport Educatiu de la Universitat Jaume I. La realización de tests para detectar carencias al comienzo y al final de curso, la preparación de nuevo material audiovisual y el uso de los recursos de la Web 2.0 para difundir el trabajo del alumnado son algunas de las novedades de esta asignatura en su adaptación al Grado Europeo. El artículo concluye valorando el impacto positivo y el alcance de estas mejoras respecto al rendimiento que el alumnado registró en la asignatura equivalente del anterior plan de estudios.

Introducción

El presente año académico entra en vigor el cuarto y último curso del Grado en Ingeniería en Diseño Industrial y Desarrollo de Productos de la Universitat Jaume I (UJI), por lo que todavía se hacen necesarios esfuerzos para ajustar las asignaturas ayudando así a mejorar la transición del plan antiguo al nuevo, enmarcado en el Espacio Europeo de Educación Superior (EEES). Para el correcto aprendizaje del alumnado los Grados necesitan de una coherencia interna y continuidad entre sus materias, y para ello se hace necesaria una coordinación entre las asignaturas relacionadas, especialmente si comparten competencias. En ocasiones sucede que estas asignaturas afines y continuadoras unas de otras pertenecen a áreas distintas, lo que puede dificultar más aún el diseño de una trayectoria clara y con garantías para el

alumno, debido a una posible falta de comunicación entre sus profesores. Es en estos casos cuando se hace indispensable asumir una coordinación frecuente entre el profesorado implicado con el fin de ajustar temarios, diseñar actividades, conocer el nivel previo de los alumnos y compartir experiencias de mejora docente.

La asignatura ‘Taller experimental de prototipos’ pretende que el alumnado se ejercite en el desarrollo y experimentación de ideas y soluciones formales mediante el análisis de productos existentes y la elaboración de nuevas propuestas de diseño (maquetas, modelos y prototipos conceptuales), que puedan dar lugar, finalmente, a proyectos sobre objetos cotidianos. En este proceso se consideran los factores básicos del diseño de productos así como la expresión comunicativa del producto frente al consumidor o usuario [1]. Esta asignatura sustituye en el Grado en Diseño Industrial a la asignatura ‘Taller de prototipos’, que se impartió por última vez en 2º curso de la titulación de Ingeniería Técnica en Diseño Industrial en el curso 2010-11. Es conveniente monitorizar con especial delicadeza su desarrollo este año, ya que algunos contenidos se han adaptado al nuevo formato de enseñanza del EEES.

Descripción de las mejoras planteadas

La asignatura se imparte ahora en el 4º y último curso del Grado. Como novedad, se ha creído interesante incorporar nuevas actividades y recursos que entronquen con la nueva trayectoria formativa que el alumno lleva recibiendo en el Grado, y que suponga la continuación a todas las mejoras introducidas en los dos últimos años en las asignaturas ‘Taller de modelos’ (2º curso del Grado) y ‘Presentación de productos’ (3er curso), muy relacionadas con ésta por orientar al alumnado también hacia la adquisición de competencias similares.

Diagnóstico de los puntos fuertes y débiles

Es necesario conocer las habilidades con las que el alumnado llega a cada asignatura, ya que saber las carencias que presenta ayudará al profesorado a reajustar el ritmo de las clases y la profundidad del temario, garantizando un mejor rendimiento del alumnado. Es por ello que para este curso se ha propuesto como novedad realizar un test anónimo para detectar carencias conceptuales y procedimentales al inicio del curso (sirvió para realizar ajustes de contenido) y al final (las conclusiones permitieron ajustar los contenidos del curso siguiente).

Ejercitación del manejo de imágenes digitales

En esta asignatura se propuso como tarea abierta a lo largo del curso que los alumnos fotografiaran todos sus trabajos y que optimizaran las imágenes para subirlas al Aula Virtual (una plataforma basada en Moodle), continuando su adiestramiento en la fotografía profesional de maquetas y creando un portfolio personal de todos sus trabajos.

Creación de nuevo material audiovisual para el alumnado

Otra de las necesidades que tenía la asignatura tras el paréntesis de dos años sin impartirse debido a la transición de la titulación antigua al Grado, es que algunos de los materiales audiovisuales habían quedado desfasados, o bien se hacían necesarios otros nuevos. Aunque el alumnado ya disponía de abundante información sobre metodología y técnicas gracias a manuales de producción propia [2], ciertos procedimientos de trabajo quedaban mejor entendidos a través del lenguaje audiovisual. Es por ello que para este curso se realizaron 5 nuevos vídeos didácticos sobre las técnicas de trabajo en el aula (uso correcto de la sierra de cinta para tubos, la sierra de calar de marquetería, la sierra de cinta para madera, la lijadora circular y el taladro de columna), filmados en las instalaciones de la UJI por el profesorado de la asignatura y la asistencia de un técnico de taller. De esta forma el alumnado iba a disponer en el Aula Virtual de material actualizado según las nuevas necesidades docentes, que podía utilizar como apoyo audiovisual durante el curso.

Trabajo con herramientas colaborativas

Otra de las nuevas aportaciones este curso está vinculada a la necesidad de acostumbrar al alumnado al uso de las herramientas colaborativas (Web 2.0). Tras el desarrollo del proyecto final de la asignatura (aprendizaje por proyectos), fotografiaron sus maquetas, las subieron a un blog de la asignatura junto con una explicación del proyecto y realizaron comentarios crítico-constructivos de los proyectos de sus compañeros (aprendizaje cooperativo / evaluación entre estudiantes). La evaluación del alumnado en esta actividad se realizó atendiendo a tres aspectos: las fotografías (elección adecuada del punto de vista, realización de los encuadres, control de la profundidad de campo, uso correcto del flash y control sobre las sombras), los comentarios en el blog (uso de la terminología adecuada, profundidad y validez objetiva de los razonamientos) y el grado de participación (en función del número de comentarios realizados y la respuesta a los mismos).

Durante el curso 2011-12 se implementó con éxito un proyecto de mejora en la asignatura 'Taller de Modelos', consistente en la creación de un blog similar al propuesto aquí, en el que los alumnos presentaban sus proyectos finales de asignatura y realizaban mutuamente comentarios crítico-constructivos sobre los mismos, desarrollando sus habilidades de razonamiento. El proyecto fue un éxito y mejoró las tasas de rendimiento del curso anterior [3]. Este mayor interés e implicación en la asignatura por parte del alumnado fue debido en parte a saber que su trabajo final iba a tener difusión internacional en un blog académico, proporcionando así al alumnado una meta añadida. De modo similar se llevó a cabo el curso pasado un proyecto de mejora en la asignatura 'Presentación de Productos', con resultados igualmente positivos [4]. Es por ello que la incorporación por primera vez de una actividad similar en la asignatura 'Taller experimental de prototipos' permitiría a los estudiantes desarrollar competencias en materias enriquecedoras y necesarias

como son la fotografía y las nuevas tecnologías que ofrece la Web 2.0 y les permitiría difundir sus proyectos, esperando de nuevo una respuesta positiva por parte de los alumnos y una mejora de la tasa de rendimiento.

Difusión de los trabajos

Además de la visibilidad que el blog otorgará a los trabajos en esta asignatura, se optó por ir un paso más allá y promover su difusión también por otras vías. Saber que el alumno podía ver expuestos sus trabajos en un espacio digital sin duda influiría positivamente en su implicación durante el curso. Es por ello que para este curso 2013-14 se realizó una experiencia piloto: una página web que recogería y presentaría una selección de los mejores trabajos de la asignatura. De esta forma se conseguiría dar más visibilidad a la actividad formativa del alumnado, al tiempo que se daría a conocer al público general la actividad creativa que se desarrolla en el Grado en Diseño Industrial de la UJI.

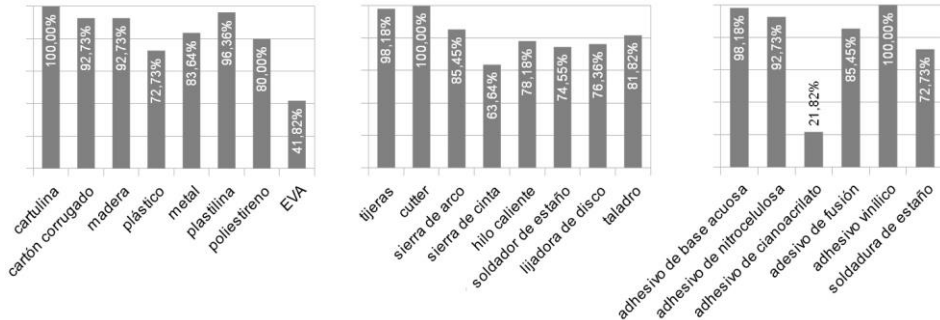
Resultados y valoración de las mejoras implementadas

Sobre el diagnóstico de los puntos fuertes y débiles

A fin de conocer cuáles eran al inicio del curso los conocimientos del alumnado en los materiales, técnicas de trabajo, herramientas y procedimientos de unión existentes, los estudiantes respondieron de forma anónima a tres preguntas en las que declaraban cual era su conocimiento y experiencia actual en diferentes materias: “¿Qué materiales habías trabajado con anterioridad?”; “¿Qué utensilios habías manejado con anterioridad?”; “¿Qué formas de unión habías utilizado con anterioridad?” De igual modo, conocer el nivel de habilidad inicial del alumnado para trabajar con diferentes materiales y herramientas permitiría al profesorado ajustar el contenido de las prácticas del curso. Para ello se les formuló una cuarta pregunta, en la que los alumnos tenían que valorar en una escala Likert de 4 puntos su habilidad para realizar tres tareas diferentes con cada uno de los materiales trabajados en cursos anteriores: “Reflexionando sobre tu experiencia anterior, califica la dificultad que te supondría en este momento trabajar correctamente cada material: 0=ninguna, 1=baja, 2=media, 3= alta (la técnica o el material que no hayas trabajado déjalo en blanco).”

El índice de participación en las encuestas fue del 76.39%. A través de las respuestas a la primera pregunta fue posible constatar que los alumnos ya conocían o habían trabajado con anterioridad la mayoría de los materiales, lo cual ayudó al profesorado a homogeneizar el ritmo de trabajo en las prácticas. Las respuestas sobre el conocimiento previo en herramientas permitió constatar que la experiencia del alumnado era alta en todas las herramientas. Las respuestas a la tercera pregunta permitieron saber que casi todos los tipos de unión que se iban a trabajar en esta asignatura ya eran conocidos previamente por la mayoría de los alumnos (Tabla 1).

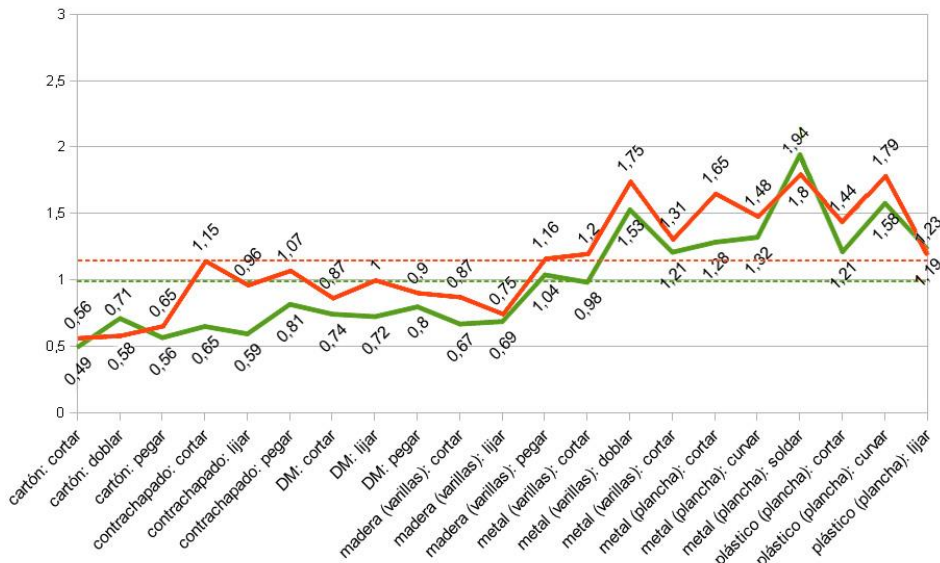
Tabla 1. Encuestas al alumnado



Izquierda: porcentaje de alumnos que habían trabajado previamente cada material; centro: porcentaje de alumnos que habían manejado previamente cada utensilio; derecha: porcentaje de alumnos que habían utilizado previamente cada modo de unión

En la cuarta pregunta, la dificultad que cada alumno creía tener al inicio del curso para trabajar con diferentes materiales y herramientas se valoró con un promedio de 1.15 puntos sobre 3. Los resultados indicaron que los metales y los plásticos eran percibidos como más difíciles de trabajar para los alumnos, y el cartón el material cuyo trabajo les resultaba más sencillo (Tabla 2).

Tabla 2. Nivel de dificultad medio percibido por los alumnos al comienzo (naranja) y al final del curso (verde) en cada una de las operaciones de manipulación (valoración de 0 a 3 puntos) y marcas de promedio.



Con el fin de valorar la evolución del alumnado se realizó otra encuesta a final de curso para determinar cuál era la percepción de cada alumno sobre la mejora de sus habilidades. La encuesta consistía por un lado en volver a responder a la cuarta pregunta, y por otro lado responder a la pregunta “Valora cual ha sido en general la mejoría experimentada en tus habilidades a lo largo del curso: 0=no he mejorado nada, 1=he mejorado un poco, 2=he mejorado mucho.” Las repuestas a la primera pregunta revelaron que la dificultad encontrada en el manejo de los materiales y herramientas había descendido sensiblemente respecto al inicio del curso, percibiéndose una dificultad más baja en 18 de las 21 operaciones (valor medio de 0.99 puntos frente a 1.15). La respuesta a la segunda pregunta reveló que el 100% de los alumnos había percibido una mejoría global de sus habilidades, valorando la mejoría media en 1.83 puntos sobre 2.

Sobre la ejercitación del manejo de imágenes digitales

El 84,72% de los alumnos matriculados realizó la subida de todas las fotografías de sus trabajos al Aula Virtual. En la mayoría pudo constatar una progresiva mejoría en la calidad de las mismas atendiendo a la iluminación, la elección del fondo, el encuadre y el control de las sombras.

Sobre la creación de nuevo material audiovisual para el alumnado

Los videos didácticos disponibles en el Aula Virtual fueron consultados durante el curso por los alumnos matriculados. Mediante una encuesta anónima, los estudiantes valoraron el interés del contenido y la utilidad para sus trabajos usando una escala Likert de 5 puntos. El 78% de los estudiantes consideraron los videos bastante interesantes (4 puntos, 54%) o muy interesantes (5 puntos, 24%).

Sobre el trabajo con herramientas colaborativas

La realización de un blog de la asignatura en el que presentar los trabajos de los alumnos pretendía, entre otros, lograr crear sinergias entre los alumnos de los diferentes grupos de la asignatura, incrementar la implicación del alumnado, fomentar la capacidad de análisis crítico-constructivo de los estudiantes, adquirir competencias prácticas y teóricas de nociones y técnicas de fotografía en general y de fotografía de producto en particular, proporcionar a los alumnos imágenes de buena calidad para realizar su Currículum Vitae con el objetivo de facilitar su futura inserción en el mundo laboral, fomentar en los alumnos el uso de nuevas tecnologías de la Web 2.0, promocionar internacionalmente el trabajo realizado por los alumnos, dar a conocer el Grado en Diseño Industrial y Diseño de Producto de esta universidad y crear una base de datos para la asignatura.

El proyecto se desarrolló entre los meses de noviembre y diciembre de 2013 siguiendo cuatro fases: creación del blog por parte del profesorado, fotografía de las

maquetas por parte del alumnado, subida de las fotografías al blog junto a una defensa conceptual de cada proyecto y la realización de comentarios crítico-constructivos de los proyectos de sus compañeros. El profesorado llevó a cabo un seguimiento continuo de la actividad del alumnado, y su valoración se añadió a la calificación final del alumno. Esta evaluación se realizó en base al rendimiento obtenido, la claridad de sus propuestas, y la objetividad, profundidad y rigurosidad de sus comentarios.

Para la creación del blog (www.blogger.com) se tomó como referencia la estética de la página web oficial de la Universitat Jaume I y se tramitó la solicitud para que el blog estuviera alojado como parte de la web de la propia universidad bajo la dirección <http://tallerexperimentaldeprototipos.uji.es>. Posteriormente, el alumnado fotografió en el aula los prototipos de sus proyectos finales de la asignatura bajo la dirección del profesorado, quien previamente explicó unas nociones básicas sobre fotografía. Para ello los alumnos tuvieron a su disposición un sencillo plató fotográfico compuesto por un fondo neutro, lámparas de luz fría para iluminación artificial, una cámara digital, un trípode y un flash. Las fotografías realizadas se subieron al Aula Virtual de la asignatura para que los estudiantes pudieran disponer de ellas.

Imagen 1. Ejemplos de fotografías tomadas por los alumnos bajo un entorno controlado.



De izquierda a derecha: colgador Mobility de Alejandro Robles, lámpara LARC de Raquel Riquelme y taburete 7 de Quique Rodrigo

A continuación, cada estudiante creó una entrada con 3 fotografías de su proyecto final y una breve explicación del mismo, en la que se detallaban sus intenciones y motivaciones principales. Para tal fin se habilitó para el alumnado un perfil preferente como autor, con la correspondiente clave de acceso privada. Posteriormente, cada estudiante tuvo que realizar un análisis crítico-constructivo de los proyectos de sus compañeros, con el fin de obtener un feedback de su trabajo con puntos de vista enriquecedores, de tal forma que permitiera la oportunidad de tomar conciencia de los aspectos tanto positivos como negativos del trabajo realizado en la asignatura. Se tuvieron en cuenta los aspectos formales que el alumno encontraba correctos en el diseño desarrollado, los aspectos mejorables (realizando un análisis constructivo), análisis de la funcionalidad de la propuesta, viabilidad técnica, calidad de la maque-

ta (análisis constructivo y sugerencia de posibles mejoras), similitudes con proyectos de otros alumnos y referencias a productos ya existentes en el mercado.

Para la evaluación de las fotografías se atendió a la elección del punto de vista y el fondo, la realización de los encuadres, el control de la profundidad de campo, la iluminación, el control sobre las sombras y el contraste con el fondo. Para la evaluación de los comentarios en el blog se valoró el uso de la terminología adecuada, el nivel de análisis realizado y la profundidad y validez objetiva de los razonamientos. Se consideró también el carácter constructivo de las observaciones realizadas, la fundamentación de las mismas y si se argumentaron debidamente los motivos de cada observación realizada.

Con el objeto de determinar el interés real de la actividad se pasó a los alumnos una encuesta anónima y voluntaria. Tenían que contestar a dos preguntas: “¿Te ha parecido interesante participar en el blog de la asignatura?” y “¿Crees que presentar los proyectos en un blog abierto, público e internacional te ha motivado para intentar mejorar la calidad de tu trabajo?”. Respondieron 55 alumnos de los 72 matriculados. La opinión mayoritaria en la primera pregunta constató el alto interés de la propuesta (muy interesante: 48%, medianamente interesante: 46%, poco interesante: 6%), y en la segunda pregunta la mayoría de los alumnos opinó que el formato de presentación fue motivante para mejorar el resultado (me ha motivado a dar el máximo de mí: 30%, me ha motivado a intentar mejorar: 57%, no me ha motivado: 13%).

Sobre la difusión de los trabajos

Una exposición virtual de los trabajos se realizó a través de la página web <http://model-making.wix.com/designworkshop>, construida mediante las herramientas del website www.wix.com, que permiten crear un espacio de navegación intuitiva y de fácil acceso. La activación y mantenimiento otorgó más visibilidad a los contenidos al permitir un acceso libre desde cualquier parte del mundo y aparecer en los principales motores de búsqueda, factor que potenció su difusión.

Imagen 2. Website con la exposición virtual de los trabajos



Valoración general de las mejoras

El resultado del proyecto de mejora educativa ha sido positivo en todos los aspectos. Los resultados de participación (+15.04%) y rendimiento (+1.52%) obtenidos en la asignatura han sido superiores a los obtenidos en el último curso en el que se impartió la asignatura en la antigua titulación, por lo que las nuevas actividades introducidas este curso han resultado adecuadas para adaptar satisfactoriamente la asignatura al Grado europeo.

Tabla 3. Estadísticas entre cursos (asignatura ‘Taller experimental de prototipos’)

	Curso 10/11	Curso 13/14	Variación
Alumnos matriculados	101	72	-29 alumnos
Nota media sobre 10 puntos (1ª convocatoria)	7.3	7.55	+0.25 puntos
Porcentaje de alumnos presentados sobre todos los matriculados (1ª convocatoria)	82.18%	97.22%	+15.04%
Porcentaje de alumnos aprobados sobre todos los presentados (1ª convocatoria)	92.77%	94.29%	+1.52%

En los cursos 2011-12 y 2012-13 no se impartió la asignatura debido a un reajuste del plan de estudios al implantar el Grado.

Futuras líneas de actuación en la asignatura

Aunque el alumnado ha experimentado una mejoría en las habilidades de trabajo con los materiales de principio a final de curso, sigue experimentando dificultades en curvar tanto varillas de metal como planchas de plástico y en soldar chapa de metal, por lo que para el próximo curso sería deseable proponer más actividades que permitieran a los alumnos reforzar estas habilidades.

De igual modo también sería deseable proveer al alumnado de los materiales de trabajo que va a necesitar a lo largo del curso. Uno de los aspectos negativos detectados en asignaturas similares era que los alumnos perdían mucho tiempo buscando el material y desplazándose hasta la tienda para comprarlo. En ocasiones sucedía que el alumno llegaba a clase sin haber encontrado el material de trabajo y tenía que ausentarse para ir a buscarlo. A fin de evitar este consumo innecesario de tiempo y recursos propios, y tras detectar que en esta asignatura ha sucedido lo mismo, para el próximo curso se plantea incentivar el cooperativismo mediante la gestión de compra y distribución de los materiales más adecuados y económicos para toda la clase. Esta gestión, que sería llevada a cabo por el profesorado, evitaría que el

alumnado perdiera tiempo buscando el material individualmente, le ahorraría el trabajo de llevarlo hasta clase, evitaría que se equivoque de producto y le beneficiaría con un precio más competitivo al ser adquirido al por mayor. Los alumnos fueron preguntados de forma anónima sobre la percepción de las ventajas de esta iniciativa, registrándose resultados favorables para su implantación: 55 de 72 alumnos respondieron a la pregunta, de los cuales sólo el 2% consideró que la iniciativa no sería útil; del resto, el 30% consideró que sería algo útil y el 69% que sería de mucha utilidad.

Agradecimientos

Además de las tareas del profesorado, la colaboración de los técnicos Adolfo Reina, Vicent Aparici y Fina Salvador en la asistencia durante el desarrollo de las maquetas y prototipos en el aula ha sido fundamental para llevar a cabo las mejoras en la asignatura y han servido para que el alumnado pueda alcanzar más eficazmente los objetivos de aprendizaje. Igualmente, la elaboración del nuevo material audiovisual no habría sido posible sin la estimable participación directa del técnico de taller Adolfo Reina en su desarrollo y realización. Los ejercicios llevados a cabo en esta asignatura han sido parte del proyecto de mejora educativa con referencia 2761/13, financiado por la Unitat de suport Educatiu de la Universitat Jaume I, a través del programa anual 'Ajudes per a projectes d'innovació educativa de la Universitat Jaume I del curs 2013/14'.

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LA PEDAGOGÍA APRENDIZAJE-SERVICIO: CONCEPTUACIÓN Y PRÁCTICA EN EL ÁMBITO UNIVERSITARIO

R. GONZÁLEZ and F.E. GARCÍA

Resumen

La pedagogía “aprendizaje-servicio” vincula la participación de los estudiantes en servicios que satisfacen alguna necesidad de la comunidad y su aprendizaje curricular, permitiéndoles aplicar lo aprendido en las aulas al servicio de la sociedad en contextos reales. El presente trabajo realiza una revisión teórica de esta pedagogía educativa para, a continuación, proponer una práctica que supone la puesta en marcha de un servicio de asesoría y *coaching* para emprender dirigido a desempleados que deseen crear su propio negocio.

1. INTRODUCCIÓN

Desde una filosofía educativa significativa e inclusiva, se rompe con la metodología tradicional que suponía un aprendizaje que se desarrollaba principalmente entre las paredes de las instituciones educativas, y se establecen relaciones fructíferas con la sociedad, en las que ambas partes salen beneficiadas. En esta línea, la pedagogía “aprendizaje-servicio” vincula la participación de los estudiantes en servicios que satisfacen alguna necesidad de la comunidad y su aprendizaje curricular, permitiéndoles aplicar lo aprendido en las aulas al servicio de la sociedad en contextos reales.

Sin embargo, la universidad aún se encuentra en una etapa inicial en la aplicación de este instrumento para desarrollar un conjunto de competencias generales y específicas, que solo pueden obtenerse a través de una práctica contextualizada. En este sentido, la experiencia educativa se desarrolla en la comunidad y, en consecuencia, se aprende de la comunidad. Al establecer sistemas de aprendizaje cooperativo en su desarrollo y resultados son colectivos, establecemos ciertos valores que les serán útiles para los alumnos a lo largo de su actual vida académica, y, de forma destacada, en su futura vida profesional y ciudadana [1].

El presente trabajo realiza una revisión teórica de esta pedagogía educativa para, a continuación, proponer una práctica que supone la puesta en marcha de un servicio de asesoría y *coaching* para emprender, dirigido a desempleados que deseen crear su propio negocio. Este asesoramiento se llevará a cabo por alumnos de la asignatura “Dirección Estratégica y Política de Empresa” del Grado en Administración y Dirección de Empresas de la Universidad Rey Juan Carlos en la Comunidad de Madrid.

Conceptuación del aprendizaje servicio

Ofrecer oportunidades a los jóvenes para que realicen actividades que los preparen para la ciudadanía, les permitirán una oportunidad de “degustar valores cívicos” [1:52]. Entre estos tipos de actividades, cabe destacar las que se realizan en el marco del denominado “aprendizaje-servicio”.

El aprendizaje-servicio puede definirse como el conjunto de actividades que combinan el servicio a la comunidad con el aprendizaje reflexivo de conocimientos, habilidades y valores, contribuyendo a más profunda comprensión de la realidad social que les rodea y con reconocidos beneficios pedagógicos por el papel fundamental que juegan los alumnos en su desarrollo [2;1]. En este sentido, uno de los rasgos que mejor definen la metodología del aprendizaje-servicio es la participación del alumnado en la toma de decisiones en todas las fases del desarrollo del proyecto. Esta actividad se desarrolla en grupos cooperativos que permiten alcanzar un aprendizaje activo y constructivo, de igual modo se facilita la comunicación entre los distintos agentes implicados –alumnos, profesores, beneficiarios y entidades implicadas– [1].

Las prácticas que vinculan aprendizaje y servicio solidario permiten a los estudiantes aplicar lo aprendido en las aulas, adquiriendo un especial carácter práctico al ponerlo al servicio de la comunidad, de esta manera se desarrollan y perfeccionan competencias en contextos reales, lo que facilitará la posterior inclusión del alumno en el mundo laboral [3]. Se logra de esta manera romper fronteras que, en muchas ocasiones aíslan el mundo educativo de la realidad social en el que se enmarca, con especial incidencia en el ámbito universitario.

A partir del trabajo de Tapia [3], podemos establecer tres grandes etapas para desarrollar un proyecto relacionado con el aprendizaje-servicio etapas:

- ✓ El diagnóstico y conocimiento de la realidad en la que se va a intervenir. A partir, de este análisis del entorno, se establecerán las principales líneas que dibujen nuestro plan de actuación.
- ✓ La ejecución de lo proyectado, y de adecuación de lo planeado a lo posible en un contexto determinado.
- ✓ El cierre y evaluación de lo actuado y de celebración de los logros. Cabe destacar en esta etapa la celebración de la actividad, que permite el reconocimiento de la labor realizada.

Estas etapas son las utilizadas para la propuesta de aprendizaje-servicio que se desarrolla en el siguiente apartado y cuyo desarrollo tendrá lugar en el próximo curso académico en la asignatura “Dirección Estratégica y Política de Empresa” en el Grado en Administración y Dirección de Empresas. Se iniciará la actividad con un

grupo situado en el campus de Fuenlabrada, si la experiencia tiene el éxito esperado, se extenderá al resto de grupos de la universidad.

2. DESARROLLO DE LA ACTIVIDAD APS

1era etapa: Diagnóstico y planificación:

Planificación trabajo en red

El presente trabajo propone la puesta en marcha de un servicio de asesoría y coaching para emprender para los desempleados de Fuenlabrada (localidad en el sur de la Comunidad de Madrid) que deseen crear su propio negocio. Este asesoramiento se llevaría a cabo por alumnos de 4º curso de LADE de la asignatura Dirección Estratégica de la Universidad Rey Juan Carlos (Madrid). Para ello, necesitaríamos del apoyo del ayuntamiento de la localidad (Fuenlabrada) como socio en este proyecto.

Ante el complicado panorama laboral y económico de nuestro país, numerosos desempleados se plantean la posibilidad de crear su propia empresa. La actual falta de ayudas económicas por parte de los distintos organismos institucionales ha ocasionado una falta de ofertas de cursos formativos y servicios de *coaching* para estos futuros emprendedores. Según los datos del Servicio Público de Empleo Estatal (SEPE), Fuenlabrada es de los grandes municipios de la zona Sur de Madrid con más desempleo. Ante esta situación emprender se ha convertido en una buena alternativa al desempleo en Fuenlabrada.

La actividad se realizaría en las aulas de la Universidad Rey Juan Carlos. La realización de la actividad en las aulas del campus de Fuenlabrada posibilita que no exista desplazamiento por parte de los alumnos universitarios y al estar sitas dichas aulas en la población origen de los destinatarios del APS también éstos se ven favorecidas.

Todas las tareas administrativas se realizarían en el ayuntamiento de Fuenlabrada. Cuentan con bases de datos de los ciudadanos de Fuenlabrada y con los medios para una correcta publicidad del proyecto. La complementariedad de ambas entidades (universidad y ayuntamiento) es necesaria para la correcta realización del proyecto.

El compromiso de ambas partes resulta fundamental para el éxito del proyecto. La Universidad Rey Juan Carlos se comprometería, por un lado, a facilitar el aprendizaje de los alumnos a través de una formación previa a la realización de la actividad, al reconocimiento de dicho aprendizaje en su progreso académico y a incluir la filosofía APSS en los programas académicos implicados y, por otro lado, a proporcionar las instalaciones para la realización del APS y el seguro de los alumnos uni-

versitarios que lo realizan (les cubriría el mismo que tienen por la realización de sus estudios universitarios).

El Ayuntamiento de Fuenlabrada se comprometería, por un lado, a facilitar la realización del servicio social realizando la correcta selección de los beneficiarios y el desarrollo de todas aquellas acciones de apoyo a dicho servicio y, por otro lado, a realizar las actividades administrativas relacionadas con el APS (publicidad de curso, matriculación y emisión de certificados).

Planificación pedagógica con el alumnado:

Existe un desconocimiento generalizado por parte de los alumnos de este tipo de proyectos APS. Por lo que será necesaria una formación previa y una campaña informativa, ya que la idea es que la participación de los alumnos sea voluntaria aunque con reconocimiento en su calificación final. Las actividades de formación previa al desarrollo de APS que se llevarán a cabo con el alumnado son:

- ✓ Jornada formativa de 5 días en turno de tarde por parte de los profesores reponsables del APSS en los siguientes aspectos:
- ✓ Aspectos jurídicos, contables, administrativos, recursos humanos, nóminas y seguridad social y revisión de las áreas funcionales.
- ✓ Los aspectos relacionados con estrategia ya habrán sido impartidos en la asignatura.

Además se realizarán de manuales por parte de los alumnos a través de la revisión teórica de los principales libros relacionados con la constitución de empresas. Esta actividad de investigación será supervisada por los profesores de la actividad APSS.

La actividad APSS se realizará en el mes de marzo de 2014. En esta fecha, los alumnos han adquirido la mayoría de conocimientos previos que se requieren y que están incluidos en la guía docente de la asignatura “Dirección Estratégica y Política de la Empresa”. Además es importante que la fecha de la actividad no esté muy cercana al mes de Mayo, ya que es durante este mes cuando se realizan los exámenes del segundo cuatrimestre.

Durante la última semana del mes de febrero de 2014 se realizará con los alumnos las jornadas formativas. Durante el mes de febrero los alumnos también realizarán el proceso de investigación para la realización de un manual de apoyo para los desempleados.

Al ser alumnos del turno de mañana, todas las actividades se realizarán en horario de tarde:

- ✓ Las jornadas formativas para los alumnos serán de cuatro horas diarias: De 16:00 a 20:00 hrs.

- ✓ Las actividades del APSS (entrevistas con los desempleados, semana formativa para ellos y revisión de los proyectos) tendrán lugar en un horario de tres horas diarias: de 16:00 a 19:00 hrs.

Los alumnos cuentan con una gran autonomía y responsabilidad en este servicio solidario. Son alumnos de los últimos cursos del grado y tienen la madurez académica necesaria para ello. Sin embargo, los profesores realizarán una continua labor de apoyo y al finalizar cada semana se realizarán una tutoría individual y grupal con los alumnos para asesorar a los alumnos en las dudas que tengan. De igual modo, los alumnos podrán contactar con los profesores en cualquier momento durante la realización de la actividad a través del correo electrónico.

Los profesores deberán recoger las sugerencias de los alumnos e incorporar aquellas más interesantes y que sean posibles a la actividad APSS actual o a futuras APSS. De esta manera el alumno será un actor principal en su aprendizaje.

3. EJECUCIÓN Y ADECUACIÓN DE LO PLANEADO:

Servicio solidario (calendarización y características principales)

El servicio solidario durará cuatro semanas durante el mes de marzo de 2014:

- ✓ Durante la primera semana los alumnos se organizarán en grupos y realizarán entrevistas con los desempleados para recopilar información sobre el proyecto empresarial que tienen en mente poner en marcha.
- ✓ En las semanas segunda y tercera se realizarán las clases teóricas-prácticas por parte de los alumnos hacia los desempleados. Se impartirán todos aquellos conceptos necesarios para la puesta en marcha de una empresa (jurídicos, administrativos, contables, funcionales, etc.).
- ✓ La cuarta y última semana los alumnos asesorarán a los desempleados en el desarrollo de sus proyectos (diseño y formulación) para la puesta en marcha de sus negocios. El resultado final será un plan de empresa completo que permitirá a los beneficiarios del servicio social salir de su actual situación de desempleo. Además, la formación recibida durante las dos semanas evitará el fracaso de la nueva empresa, ya que, el elevado número de fracasos de las nuevas empresas, se debe en gran medida a la falta de formación del emprendedor.

4. CIERRE Y EVALUACIÓN DEL PROYECTO:

Actividades concretas con objetivos educativos que se realizarán para evaluar la actividad de APSS con el alumnado

La evaluación se centrará en la técnica 360 grados o evaluación integral. Esta evaluación pretende dar a los alumnos una perspectiva de su desempeño lo más adecuada posible al participar en ella todos los agentes implicados: profesores, compañeros y los desempleados que han participado en el APPS. Para que esta evaluación funcione se debe realizar de forma confidencial.

La evaluación de los profesores se realizará principalmente a través de las tutorías individuales y grupales que se realizarán a lo largo de todo el proyecto, por lo tanto estamos hablando de una evaluación continua:

- ✓ La primera tutoría se realizará antes de la jornada formativa de los alumnos de forma individual y servirá para detectar posibles necesidades de cara a la formación y para concretar los objetivos que los alumnos tienen respecto a sus expectativas de aprendizaje.
- ✓ La segunda tutoría se realizará de forma grupal, una vez finalizada la formación y se establecerán las formas de trabajar y los papeles que desempeñarán cada miembro en el grupo.
- ✓ La tercera tutoría se realizará de forma individual y grupal, una vez finalizada la semana de entrevistas con los desempleados objeto del servicio social. Se recogerán las primeras impresiones de la actividad. También se resolverán las dudas y se escucharán las sugerencias de cara tanto a las dos semanas de docencia como a la semana de asesoramiento en el diseño de los proyectos de puesta en marcha de los negocios.
- ✓ Finalmente, la cuarta tutoría se realizará de forma individual y grupal y se evaluará tanto la semana de diseño de proyectos como el desarrollo completo de la actividad. En las tutorías individuales se entregará un cuestionario sobre todo el desarrollo de la actividad y sobre el aprendizaje del alumno.

La evaluación de los compañeros y los desempleados objeto del servicio social se realizará con un cuestionario una vez finalizada la actividad, se trata por tanto de una evaluación final. La evaluación de los compañeros se realizará respecto a sus compañeros de grupo y la de los desempleados respecto a los alumnos que les han asesorado y respecto a los alumnos que les han impartido la docencia.

De forma complementaria, los profesores apoyarán a los alumnos en el desarrollo de su actividad acompañándolos en los momentos iniciales de primeros días de las distintas fases del proyecto (presentándolos, apoyándolos en la resolución de dudas, etc.,). De igual manera se realizarán visitas sorpresas con el fin de poder observar el

desarrollo natural de la actividad. Todas las observaciones se registrarán en un diario de observación que servirán de apoyo tanto en las tutorías posteriores, para mejorar la actividad, como en la calificación final del alumno.

Por último, se completará esta observación de campo, realizando un video de la celebración de la actividad. Esta grabación permitirá recoger los testimonios de todos los agentes implicados, favoreciendo tanto la evaluación como el proceso de mejora necesario.

Objetivos y aspectos a evaluar:

- ✓ A través de las tutorías y el cuestionario de los desempleados se evaluará el conocimiento de la realidad social de los alumnos y su compromiso ético.
- ✓ Las tutorías individuales permitirán evaluar la capacidad de los alumnos para aplicar los conocimientos adquiridos a la práctica.
- ✓ Las tutorías y la evaluación de los compañeros permitirán evaluar la toma de decisiones y resolución de problemas de los alumnos y su trabajo en grupo.

Calendarización de las actividades de evaluación y tutorías:

Se establece una evaluación continua de la actividad principalmente a través de las tutorías individuales y grupales. Las tutorías se realizarán en el inicio, en el desarrollo y al finalizar la actividad. Tendrán lugar, por lo tanto, en los meses de febrero y marzo de 2015 en horario de tarde.

Los cuestionarios se realizarán al finalizar la actividad, es decir en la última semana de marzo de 2015. El cuestionario de los alumnos a sus compañeros de grupo, se realizará en la primera semana de abril de 2015 a través de campus virtual, plataforma de la asignatura.

5. PAPEL Y FUNCIONES DEL PROFESORADO RESPONSABLE DE LA ACTIVIDAD DE APSS RESPECTO A LA EVALUACIÓN

El papel del profesorado en la evaluación resulta fundamental en cuanto a su diseño y desarrollo y permite tanto la evaluación correcta del alumno como contribuye a la mejorar de la actividad para futuras ediciones al detectar posibles errores y puntos de perfeccionamiento. Además, la participación de los compañeros de los alumnos y de los beneficiarios del servicio social, permite llevar a cabo una evaluación más completa y objetiva que si sólo se realiza por parte del profesorado.

El proceso de evaluación será consensuado previamente por los profesores participantes en la actividad. De igual manera, tras finalizarlo, los profesores acordarán

si el proceso ha sido eficiente y, en caso contrario, se mejorarán aquellos aspectos que lo requieran.

De forma previa a la realización de la evaluación, los profesores informarán a los alumnos tanto del modo de evaluación, como del impacto de dicha evaluación en su calificación final de la asignatura.

Los profesores responsables diseñarán los cuestionarios y una vez completados por sus destinatarios, tratarán estadísticamente los resultados.

Respecto a las tutorías, tanto individuales como colectivas, se diseñarán y realizarán por los profesores, siendo mejoradas o modificadas durante el proceso si se requiere.

6. CONCLUSIONES

La educación superior constituye quizás uno de los ámbitos más propicios y naturales para el desarrollo de actividades en el marco pedagógico del “aprendizaje-servicio” [4:65]. El principal propósito de este trabajo es realizar una propuesta para la aplicación del Aprendizaje–Servicio en un proyecto desarrollado en una institución de educación superior, estableciendo previamente los principales conceptos teóricos. Por un lado, permitiría mejorar capacidades específicas de la asignatura implicada, tales como la aplicación de los conocimientos adquiridos a la práctica y la mejora en la toma de decisiones. Por otro lado, se trabajarían ciertas capacidades genéricas y transversales, a modo de ejemplo cabe destacar la capacidad de relación y el compromiso ético y ciudadano.

Por último, la implicación de las entidades involucradas, la educativa y la de acogida, resulta fundamental para un correcto desarrollo de esta tipo de acciones. Además, la participación de los alumnos y de los beneficiarios del servicio social en la evaluación final, permite que ésta se realice de forma completa y objetiva.

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Economía política: valoración de los alumnos ante la adaptación al Proceso de Bolonia

C Calafat¹, M.L. Martí y R. Puertas

Resumen

En el nuevo marco de Espacio Europeo de Educación Superior (EEES) se establece que el sistema de metodología docente debe centrarse en conseguir el desarrollo de habilidades por parte del alumno en un proceso de auto-aprendizaje guiado por el profesorado. Éstas hacen referencia a la capacidad de aprender, resolver problemas, manejar información o trabajar en grupos, entre otras. El docente adopta el papel de guía en el proceso de adquirirlas. En este contexto los docentes de la asignatura de Economía Política de primer curso de Gestión y Administración Pública han adaptado la metodología de enseñanza-aprendizaje para conseguir mayor participación de los alumnos y, con ello, mayor motivación y, por tanto, auto-aprendizaje. El objetivo de este artículo es analizar la percepción que tienen los alumnos de la asignatura antes los cambios planteados, siendo el resultado positivo para los estudiantes el cambio a una metodología de aprendizaje más dinámica.

1. Introducción

La asignatura de Economía Política se imparte en el primer cuatrimestre del primer curso del Grado de Gestión y Administración Pública (GGAP), con una carga docente de 6 créditos ECTS (European Credit Transfer System), 3 teóricos y 3 prácticos.

El llamado “proceso de Bolonia” trajo consigo diversos cambios que, de acuerdo con el Libro Blanco del Título de Grado en Economía y Empresa (ANECA,

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2005). Este proceso de reforma educativo implica cambios tanto a nivel estructural, curricular como organizativo, y se han materializado con la puesta en marcha obligatoria de las titulaciones de Grado. Las transformaciones organizativas afectan a las condiciones en las que se desarrollan los procesos de enseñanza-aprendizaje planteadas a los alumnos (Zabala, 2005). Las distintas metodologías introducidas, sin olvidar la lección magistral, se desarrollan otras alternativas, como el estudio de casos, el uso de las nuevas tecnologías de la información y de la comunicación (TICs), etc. Es necesario que los alumnos dominan las TICs y tengan la capacidad de localizar la información y procesarla para convertirla en conocimiento (Beltrán y Vega, 2003).

El objetivo fundamental del cambio del método docente en la asignatura de Economía Política es propiciar que los alumnos adquieran las capacidades necesarias para entender la realidad económica a través de los indicadores publicados en los institutos de estadística, e interpretar las consecuencias en las modificaciones de estos en su vida profesional e incluso personal. Además deberá aprender a distinguir entre los mercados de bienes y servicios, así como la toma de decisiones en la maximización de beneficios empresariales. Resulta necesario que los distintos contenidos, ya sean conceptuales, actitudinales o procedimentales, incluidos en la asignatura sean impartidos mediante distintas metodologías docentes (actividades/estrategias de aprendizaje), captando la atención y motivando a los alumnos. Sin olvidar, que el mayor estímulo para gran parte de los estudiantes universitarios es la nota obtenida en la asignatura, por ello, la forma de evaluación será una ayuda a considerar en todo el proceso de enseñanza aprendizaje.

Los alumnos, antes incluso de la implantación del EEES, demostraron serias dificultades para superar la asignatura, bien por el vocabulario económico utilizado, en muchas ocasiones desconocido hasta el momento, bien por las aplicaciones matemáticas requeridas. Con objeto de superar estas deficiencias, las nuevas metodologías activas se han ido implementando progresivamente, consistiendo principalmente en el uso de TIC's. A través de la plataforma docente de la UPV, en la que los alumnos realizan pruebas corregidas *in situ*, pudiendo detectar los errores cometidos así como los comentarios sobre la respuesta correcta. También se ha facilitado el estudio de las principales Macromagnitudes con datos reales de la economía española, facilitándoles el entendimiento de las noticias económicas difundidas a través de diversos medios de comunicación.

Estas metodologías deben ir acompañadas de nuevas formas de evaluación, dejando de utilizar únicamente el modelo de evaluación final, y siendo necesario encontrar formas de motivar a los estudiantes a lo largo de todo el periodo lectivo, primando la evaluación continua frente a una exclusivamente final (Salvador *et al.*, 2007).

En este contexto de cambio en el ámbito universitario, el objetivo del artículo se centra en analizar la valoración que hacen los alumnos de Economía Política de GAP, la cual actualmente se ha impartido durante tres cursos (2010/11, 2011/12 y 2012/13) con las características determinantes del proceso de Bolonia. La valoración se instrumentará a partir de un cuestionario “ad hoc” para la asignatura y del cuestionario general que diseña el Instituto de Ciencias de la Educación (ICE) para todas las asignaturas de la facultad. Los resultados permitirán a los docentes mejorar en aquellos aspectos no logrados y reforzar los valorados positivamente.

El resto del artículo se estructura de la siguiente forma. En la sección 2 se hace una descripción de la asignatura objeto de estudio. En la sección 3 se detalla la metodología de aprendizaje utilizada. En la sección 4 se describe el cuestionario “ad hoc” y el general, como herramientas necesarias para conseguir la valoración y las características de los estudiantes representativos de la muestra. En la sección 5 se detallan los resultados de los cuestionarios, que mostrarán las fortalezas y debilidades logradas hasta el momento. Por último, la sección 6, resume las principales conclusiones de la investigación.

2. Economía Política: descripción

La asignatura de Economía Política es una asignatura de formación básica del primer curso. La asignatura está dividida en dos grandes bloques: la microeconomía y la macroeconomía. Cada bloque consta de cinco temas. Mediante un primer tema introductorio se introducen los problemas básicos de la economía y se explican de forma detallada las diferencias entre el enfoque microeconómico y el macroeconómico.

La microeconomía tiene como objetivo principal determinar cuándo se maximiza el beneficio económico de una empresa, según el mercado en el que se encuentre. Para ello, se explican los tipos de mercado según el número de empresas que participan, clasificándolos desde los mercados en competencia perfecta hasta el monopolio. Posteriormente se explican conceptos necesarios para que los alumnos puedan determinar cuándo se obtiene el máximo beneficio según sus curvas de ingresos y costes. Para todo ello es necesario que los alumnos aprendan a manejar el modelo microeconómico, mediante las curvas de oferta y demanda para que puedan predecir el sentido de la variación de los precios y cantidades intercambiadas en el mercado. Sin embargo, en muchas ocasiones a las empresas y los analistas les interesa, no solo ver cómo variará el precio y la cantidad, sino en cuánto lo harán. Para ello es fundamental introducir el concepto de elasticidad, el cual permite que las predicciones económicas den un primer paso en el ámbito de lo cuantitativo. La elasticidad indica el grado de sensibilidad o respuesta de las cantidades (ofertadas o demandadas) -o variables dependientes en general- ante

cambios en las principales variables explicativas (precios, rentas, etc). Se trata de un concepto fundamental para comprobar en qué medida productores y consumidores se ven afectados por variaciones en alguno de los determinantes del equilibrio.

Posteriormente hay que distinguir las características de cada mercado, ya que no todas las empresas desarrollan su actividad en el mismo tipo de mercado. Las dos estructuras extremas y opuestas son la competencia perfecta y el monopolio. Entre ellas se encuentran formas intermedias (oligopolio y competencia monopolística) que se corresponden con la mayoría de los mercados de la economía real. La razón de explicar la competencia perfecta y el monopolio se debe más a su utilidad como referente para comprender la realidad existente que a su correspondencia con estructuras puras, actualmente en extinción.

La importancia de las características del mercado radica en la determinación de los niveles de producción y precios, limitando el margen de maniobra disponible por las empresas. En el caso extremo de la competencia perfecta, tan sólo se elige el volumen de producto que maximiza los beneficios, por el contrario, el monopolio puede fijar también el precio de venta. En ambos casos, conociendo los costes de las empresas y las características del mercado, la teoría económica pretende hacer predicciones referidas a sus decisiones productivas.

Por otra parte, la macroeconomía se ocupa del comportamiento global del sistema económico, por tanto, presenta una visión simplificada de la realidad. Para ello se elaboran modelos que pretenden ilustrar el funcionamiento de la economía en su conjunto, lo que requiere introducir supuestos simplificadores.

Los principales problemas macroeconómicos se suelen instrumentalizar mediante políticas macroeconómicas de demanda y/o oferta, y sus objetivos se suelen concretar en variables tales como la producción total de la economía (el PIB), la tasa de desempleo, el nivel general de precios (IPC), el déficit público, el desequilibrio exterior y el tipo de cambio. Las políticas macroeconómicas se entienden como el conjunto de medidas gubernamentales destinadas a influir sobre la marcha de la economía en su conjunto.

Para ello, en primer lugar se definen los indicadores y magnitudes básicas del sistema económico, tanto interiores como exteriores, para que puedan ser interpretadas. En segundo lugar desarrolla el modelo macroeconómico básico (oferta y demanda agregada) y todos sus componentes, para poder determinar sobre este modelo como puede influir la política fiscal (modificaciones del Saldo Presupuestario Público) y monetaria (modificaciones de la cantidad real de dinero en circulación) sobre el crecimiento de la producción y la inflación.

3. Metodología de aprendizaje en la asignatura

Las metodologías docentes activas pretenden que el aprendizaje deje huella en el individuo, en forma de conocimiento, habilidades y capacidades, y permita a los estudiantes enfrentarse a situaciones nuevas con una actitud creadora, adaptativa y de apropiación. Todo ello les facilitará su inserción en el mercado laboral, creando un entorno más competitivo. El proceso de enseñanza-aprendizaje debe ser un proceso progresivo, dinámico y transformador (Alfonso, 2004).

El profesor de la asignatura es el encargado de provocar un estímulo, con el fin de obtener la respuesta en el individuo que aprende, para que el alumno tenga las capacidades necesarias para la resolución de situaciones en su vida personal y profesional. Será necesario el aprendizaje entendido como la adquisición de un nuevo conocimiento, habilidad o capacidad, la retención pasajera debe convertirse en manifestación futura y contribuir, además, a la solución de problemas concretos. Por ello es esencial que el alumno sea participe de la asignatura, y sepa desde un inicio, cuales son los objetivos y competencias que le permite adquirir la asignatura.

Las profesoras de Economía Política, para la preparación del curso, publican el contenido de la guía docente donde queda expuesto tanto los contenidos como la metodología docente y evaluación que se seguirá para la superación de la asignatura. Esta guía docente se estructura en los siguientes apartados: Descripción general de la asignatura, Competencias, Conocimientos recomendados, Selección y estructuración de la Unidades Didácticas, Distribución de créditos, Evaluación y Bibliografía.

Las actividades de trabajo presencial programadas son las siguientes:

Clase presencial: Exposición de contenidos mediante presentación o explicación por parte del profesor, incluyendo demostraciones.

Clase práctica: Supone el aprendizaje basado en problemas. Enfoque educativo donde los alumnos abordan problemas reales en pequeños grupos y bajo la supervisión de un tutor.

Laboratorio: Actividades desarrolladas en espacios adaptados con equipamiento especializado (aulas de informática).

Tutoría: Periodo de instrucción realizado por un tutor con el objetivo de revisar y discutir los materiales y temas presentados.

Evaluación: Conjunto de pruebas escritas, orales, prácticas, proyectos, etc, utilizados en la valoración.

Mientras que las actividades de trabajo autónomo programadas son:

Trabajos teóricos: Preparación de seminarios, lecturas, investigaciones, memorias, etc. Todos ellos serán expuestos o entregados en las clases teóricas.

Trabajos prácticos: Elaboración de actividades a exponer o entregar en las prácticas.

Estudio teórico: Aprendizaje de los contenidos relacionados con la teoría. Incluye cualquier tarea no computada en el apartado anterior (preparar exámenes, trabajo en biblioteca, lecturas complementarias, hacer problemas y ejercicios, etc.).

Estudio práctico: Relacionado con la resolución de problemas adaptados a la vida real.

Actividades complementarias: Son tutorías no académicas y acciones formativas voluntarias relacionadas con la asignatura pero no con la preparación de exámenes o con la calificación (lecturas, seminarios, asistencia a congresos, conferencias, jornadas). También otras de gestión y auxiliares como pasar apuntes, gestiones de biblioteca, realización de fotocopias, etc.

La evaluación de la asignatura se realizará de la siguiente forma:

- Prácticas de laboratorio: En el horario de prácticas de laboratorio se realizan diversas pruebas que obligatoriamente deben ser entregadas al finalizar la sesión. La nota media de dichas actividades supone un 10% de la calificación final tanto del periodo ordinario como en la recuperación.

- Teoría y práctica de aula: A lo largo de periodo docente se realizan varios controles (test, preguntas de desarrollo y ejercicios) que son evaluados individualmente con una calificación máxima de 10 puntos. En caso de que el alumno obtenga una calificación inferior a 5 puntos en alguno de los controles se podrá recuperar dicha parte en la semana dedicada a recuperación. La nota final, supondrá un 90% de la nota de la asignatura, y será una media de todos los controles realizados siempre y cuando en ninguno de ellos se haya obtenido una calificación inferior a 4 puntos.

La bibliografía actualmente recomendada para la asignatura es manual editado por la editorial McGrawHill y elaborado por José Manuel "Economía. Teoría y práctica", ya que es un manual consolidado para la economía básica y se renueva periódicamente incorporando datos actualizados de la economía española. Actualmente se edita la 5ª edición, y los alumnos pueden consultarla de forma electrónica.

Además las profesoras de la asignatura proporcionan a través del poliformat cuestiones y ejercicios que actualizan todos los años. No se incorporan los resultados al inicio del curso para que el alumno intente realizarlos de forma autónoma, pero

se les proporcionan la corrección de las mismas dos semanas antes de cada parcial, para que se compruebe la solución correcta y se detecten los posibles errores.

Las metodologías activas que se han ido aplicado progresivamente en la asignatura se clasifican en dos grandes grupos. Por un lado los ejercicios en el aula y, por otro, las prácticas de laboratorio. En las primeras se han ampliado las actividades del trabajo presencial (clases teóricas, aprendizaje basado en problemas y uso de las TICs) y no presencial (aprendizaje basado en problemas y uso de las TICs).

El trabajo presencial en las aulas de informáticas, en grupos de 20-25 alumnos, se basa en el uso de la TICs, se permiten al alumno, por una parte, realizar cuestiones y problemas a través del poliformat y obtener la corrección inmediata al finalizar la sesión, y por otra parte, realizar seguimiento de las principales magnitudes económicas e interpretarlas. El trabajo no presencial, en que se incluyen actividades a través del poliformat que se corrigen y evalúan al finalizar el trabajo. Este tipo de actividades ayudan al alumno a que de forma autónoma pueda comprobar y corregir sus errores.

4. Descripción del cuestionario y muestra de estudiantes

La valoración de la asignatura se ha realizado a partir de un cuestionario “ad hoc” cumplimentado por los estudiantes de la asignatura. Está compuesto por 15 preguntas, relacionadas con los siguientes aspectos:

Temario y estructura de la clase

Evaluación de la asignatura

Proceso de estudio

Valoración general de la disciplina

Las preguntas llevan asociadas cuatro posibles respuestas con el objetivo tener homogeneidad en las contestaciones y poder establecer criterios y valoraciones más exactas.

El primer grupo de cuestiones relacionadas con el temario y la estructura de la clase pretenden identificar cuáles son los temas preferidos, así como su satisfacción en la forma de recibir la docencia. Las preguntas realizadas fueron las siguientes:

1. ¿Cuál es la parte de Economía Política que más te ha gustado?
2. ¿Cuál es la parte de Economía Política que menos te ha gustado?
3. ¿Cómo mejorarías las clases teórico/prácticas del aula?
4. ¿Te gustaría una mayor participación de los alumnos en el aula?

En las dos primeras preguntas, enfocadas a las preferencias de los alumnos por los temas a tratar en la asignatura, deben de elegir entre las siguientes materias: La Frontera de Posibilidades de Producción, la demanda y la oferta, elasticidades, producción y costes, competencia perfecta, mercados no competitivos, contabilidad nacional, las relaciones con el exterior, oferta y demanda agregadas, política fiscal y política monetaria.

Las preguntas 3 y 4 hacen referencia al funcionamiento de la clase, donde tienen la posibilidad de contestar que están totalmente de acuerdo con el procedimiento seguido, tal y como se ha explicado en la sección anterior. Además, el grado de respuesta oscila entre si les gustaría una clase con más aplicaciones a la vida real, más participación activa del alumno o más problemas.

En segundo lugar, el conjunto de preguntas sobre la evaluación trata de averiguar la conformidad del estudiante con el sistema actual, en caso negativo se le propone cambiar la ponderación del test y los problemas o la dificultad del examen. Las preguntas realizadas fueron las siguientes:

5. ¿Estás de acuerdo en la evaluación realizada?

6. ¿Cómo valorarías el grado de dificultad de los exámenes?

La preparación de la asignatura requiere saber cuánto cree el alumno que aprende en clase, así como sus hábitos de estudio, material utilizado y forma de resolver las dudas surgidas en el aprendizaje. Las preguntas realizadas fueron las siguientes:

7. ¿Cuál ha sido tu forma de aprendizaje?

8. ¿Cómo te has preparado la asignatura?

9. ¿Con qué frecuencia has estudiado la asignatura?

10. En el proceso de estudio te han surgido dudas ¿Cómo las has resuelto?

En primer lugar, se le plantea al estudiante que conteste entre un rango del 30% al 70% cuánto aprende asistiendo a clase. La intención es conocer cuál es el rendimiento en el aula y su grado de implicación en la misma. En la segunda pregunta se cuestiona qué herramientas utiliza para preparar la materia, si solo yendo a clase, con apuntes y manuales o tan solo con apuntes de un compañero. En la siguiente cuestión relacionada con la frecuencia de estudio se da la opción de un rato cada semana, o cuantos días antes del examen. Dada la insistencia por parte del profesor de que la asignatura no puede asimilarse en un solo día, es importante saber si los alumnos han captado el mensaje en su trayectoria de aprendizaje. Por último, se les pregunta sobre la forma de resolver sus dudas planteando la asistencia a tutorías, el estudio con otros compañeros, la consulta a manuales o, simplemente, las dudas se quedan sin resolver.

La valoración general de la materia se centra en una comparativa con otras asignaturas del curso y de Grado, centrandó el interés en su percepción sobre las competencias específicas que la asignatura pretende alcanzar y su vinculación con aspectos de su vida personal y laboral. Además se pregunta sobre la utilidad que ofrece para los alumnos disponer de la guía docente desde que se matriculan. Las preguntas realizadas fueron las siguientes:

11. En comparación con otras materias del primer cuatrimestre de 1º ADE ¿cómo valorarías la asignatura de Economía Política?
12. En relación con las otras asignaturas del Grado, la Economía Política ¿la definirías cómo?
13. ¿Crees que la asignatura es útil para la vida real?
14. Una vez finalizada la asignatura ¿Cuál de las siguientes competencias específicas crees que has logrado?
15. ¿Has encontrado útil la guía docente?

5. Resultados de la valoración de la asignatura

Realizada la encuesta a los alumnos los resultados muestran que, en general, se aprecia una satisfacción en la valoración de Economía Política. En relación con el temario, hay una preferencia por los temas relacionados con la microeconomía, de la primera a la quinta unidad didáctica, que puede deberse a la complejidad con las que se explican los modelos económicos, ya que los modelos explicados en la parte de la macroeconomía con tienen mayor número de variables y dificulta su comprensión. Es por ello, que los temas de política fiscal y monetaria son los peor valorados, al utilizar los modelos económicos que necesitan variables explicadas en temas anteriores, y los mecanismos de ajuste para llegar al equilibrio requieren relacionar todos los contenidos explicados en la parte de macroeconomía.

Respecto a la forma de impartir la docencia existe un 33% de los encuestados que están totalmente de acuerdo en la metodología de aprendizaje desarrollada, hecho que aporta satisfacción al profesor por su gran aceptación. A otro 38% le gustaría que hubiera más aplicaciones a la vida real, siendo en ocasiones difícil por ser una asignatura básica con modelos sencillos y, tan sólo, en los últimos temas sería posible, no obstante se debería hacer un esfuerzo por mejorar este aspecto. Además, los estudiantes están de acuerdo en su participación en clase, solo al 12% le gustaría aumentarla.

El sistema de evaluación es aceptado por la mayoría (62%), aunque 31% están de acuerdo con el nivel exigido. Estos resultados manifiestan que al alumno le gusta la evaluación continua aplicada porque le obliga a ir trabajando la asignatura a lo

largo de todo el cuatrimestre, aunque no están acostumbrados a preguntas en las que se relacionan contenidos de diversos temas.

La valoración del aprendizaje de la materia en la clase oscila entre un 60% y un 50%, esto supone que el rendimiento existente dentro del aula es considerablemente alto. El estudiante aprovecha el tiempo en clase y sale de ella con la mitad de la materia aprendida. Por otra parte, este rendimiento en la clase no viene acompañado por una preparación de la asignatura en casa de forma correcta, ya que sólo el 30% de los alumnos, aún utilizando tanto apuntes como los manuales recomendados para facilitar su asimilación, no logra por sí mismo relacionar y profundizar en los contenidos.

La frecuencia de estudio es correcta en el 34% de los encuestados, manifestando una dedicación periódica cada semana, siendo el 41% los que lo hacen tres días antes y el 19% los dos días previos. El profesor debería insistir en la necesidad de cambiar estos hábitos para conseguir un mejor aprendizaje.

La asistencia a tutorías es el punto más débil de toda la valoración, bien por su falta de tiempo libre para asistir a ellas, o bien por desconocer su utilidad, la gran mayoría no aprovechan adecuadamente este recurso. La disponibilidad del profesor es máxima y se insisten en su utilización en el aula regularmente, además se ofrece la posibilidad de asistir tanto individualmente como en grupos de varios alumnos. El sistema de tutorías que se ofrece es a demanda, dejando flexibilidad total para compatibilizar los horarios del alumno con los del docente, aún así la asistencia es baja. En la encuesta solo el 8% indican su utilización cuando tienen dudas, mayoritariamente (64%) toman la opción de estudiar con otros compañeros para resolverlas.

En comparación a otras materias del primer curso del Grado en ADE, el alumno está satisfecho con la asignatura de Economía Política, el 62% la consideran entre las dos más interesantes y solo un 5% manifiesta su insatisfacción. No obstante, la percepción de ser una materia útil para la vida real es elevada, ya que se les explican las repercusiones de las variaciones de la política fiscal y monetaria en aspectos directos en su vida cotidiana. Por otra parte, dentro de las competencias logradas está preferentemente la de ser capaz de aplicar los conocimientos a la práctica, comprender la intervención del sector público en la economía, sus características y efectos económicos, conocer los fundamentos de la economía y la metodología del análisis de las políticas públicas. Se ha apreciado que se debe reforzar más la comunicación oral y escrita en la lengua nativa, planificar eficientemente el trabajo. Además, casi el 50% se leyó la guía docente, hecho que revela una curiosidad inicial por conocer la metodología de aprendizaje.

Por último, el grado de dificultad comparado con las otras asignaturas del curso ha sido muy diferente según opinan el 73,7% de los estudiantes, incluso más del

50% la han calificado como la más fácil. Resulta un poco sorprendente porque es una asignatura que los estudiantes de bachiller que eligieron economía ya han estudiado, aunque la profundización de los contenidos es mayor. Esta dificultad, es para la mayoría, debida a no saber relacionar conceptos de diferentes temas.

En resumen, y tras el análisis de las respuestas del cuestionario “ad hoc”, se puede apreciar bastante satisfacción del alumno con la asignatura y la metodología de aprendizaje, aunque se tiene que trabajar más la capacidad de relacionar contenidos. Sin olvidar, la poca asistencia a tutorías debiendo ser estimulada por el profesor para próximos cursos.

Analizando los resultados del cuestionario general diseñado por el ICE (Tabla 1) se puede comparar e identificar las diferencias de los cursos antes del Plan Bolonia y después.

**Tabla 1. Resultados de la encuesta de opinión del alumno diseñada por el ICE.
Asignatura de Economía Política**

DIMENSIONES	LOU			Plan Bolonia		
	07/08	08/09	09/10	10/11	11/12	12/13
Conocimiento de la materia	6.14	7.66	7.66	8.65	6.64	7.79
Organización y planificación	5.73	6.98	7.24	7.82	6.27	7.59
Desarrollo/Metodología docente	4.91	6.45	6.43	6.81	5.56	6.73
Motivación/Interacción/Ayuda	6.24	6.40	6.28	6.98	5.53	6.89
Satisfacción general con la labor del profesor	6.22	7.22	7.60	8.13	6.51	7.63
Media global	6.04	6.91	6.98	7.62	6.05	7.29

Fuente: Elaboración propia

Los mejores resultados se observan en el primer año del cambio de Plan, donde la expectativa y la buena disposición de los estudiantes fueron fundamental para un correcto funcionamiento del curso. En el curso 08/09 se inició la puesta en marcha de las primeras estrategias activas de aprendizaje, y tuvo muy buena aceptación en los alumnos, mejorando significativamente el apartado de “Desarrollo /Metodología docente” y “Organización y planificación”, manteniendo buenas puntuaciones cada año, ya que con la entrada del Plan Bolonia, se van incrementando este tipo de estrategias. De las cinco dimensiones analizadas la “satisfacción general con la labor del profesor” es de las mejores puntuadas.

6. Conclusiones

La aplicación de nuevas metodologías docentes ha sido positiva para la asignatura de Economía Política tal y como muestran los resultados de las encuestas a los alumnos, tanto por parte del ICE como las elaboradas exclusivamente para la asignatura.

Las metodologías activas que progresivamente se van incorporando a la asignatura, han conseguido una mayor motivación de los alumnos, como se muestra el incremento de alumnos asistentes a las clases tanto de teoría como de prácticas de laboratorio, y por tanto, a los exámenes parciales. La asistencia a las tutorías está aumentando progresivamente, ya que las profesoras insisten en clase y les ofrecen la posibilidad de asistir tanto de forma individual como por grupos, pero no se utiliza de forma generalizada, ya que son pocos los alumnos que asisten, aunque cuando un alumno decide ir a una primera tutoría, comprueba su utilidad y realiza más a lo largo del cuatrimestre. Aunque este aspecto se reforzará en los cursos siguientes dedicando el final de una clase cada quince días para que los alumnos formulen preguntas, de forma voluntaria.

En los cursos siguientes se pretende ir realizando las modificando el desarrollo de las clases con mayores vinculaciones a aspectos de la vida real.

En resumen, los resultados obtenidos muestran que, pese a las dificultades de los contenidos, los alumnos valoran de forma positiva las metodologías de aprendizaje desarrolladas en la asignatura, convirtiéndose en las principales fortalezas de la asignatura.

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Gestión docente de la creatividad en la Escuela Politécnica Superior de Gandía: Creación de empresas y capacidad de trabajo en equipo.

Abstract

Este trabajo se centra en exponer el proceso de innovación que se ha puesto en marcha durante el curso académico 2013-2014 para los cuatro grados que se imparten en la Escuela Politécnica Superior de Gandía de la Universitat Politècnica de València.

Numerosos trabajos realizados en las últimas décadas han puesto de manifiesto la utilidad de las técnicas de creatividad para mejorar la generación de ideas (Michalko, 2000; Gray 2012), valorarlas (Kim, 2008; Ries, 2012) y plasmarlas en un plan de negocio (Osterwalder, 2011; Kawasaki, 2007; Christensen, 2011). Del mismo modo, la experiencia transmitida por diversos emprendedores es muy enriquecedora para poder seguir su ejemplo y no replicar los errores que cometieron en sus principios. En esta área de trabajo los docentes de la Escuela Politécnica Superior de Gandía creen que es necesario aprovechar las grandes posibilidades que nos brindan actualmente estas herramientas para enriquecer los ambientes de aprendizaje y que se asemejen al ámbito profesional.

La innovación docente surge al crear una asignatura optativa común para los cuatro grados, Creación de Empresas. Su objetivo consiste en, mediante el trabajo en equipo y la utilización de técnicas de creatividad, dar lugar a un modelo de negocio innovador, actual y distinto. En esta asignatura, alumnos de diferentes grados comparten el aula y comparten proyectos de negocio, de modo que aúnan distintos puntos de vista ante la resolución de problemas.

Una de las intenciones fundamentales de la apuesta por estas acciones que impulsan la innovación, la generación de nuevos negocios e ideas de negocio es la de dar salida mediante el emprendedurismo y el intraemprendedurismo; dada la difícil situación económica actual, esta es una vía de mejora de la economía también en general.

Introducción

La adaptación al Espacio Europeo de Educación Superior (EEES) implica un diseño de las asignaturas basado en competencias y objetivos de aprendizaje, que afectan tanto a la metodología de enseñanza-aprendizaje, como a la evaluación de los estudiantes. Tengamos en cuenta que los nuevos títulos de grado están estructurados en módulos o materias en cuyos objetivos de aprendizaje deben figurar «las competencias genéricas y específicas que los estudiantes deben adquirir durante sus estudios y que sean exigibles para otorgar el título» tal y como figura en el Real Decreto del 29 de octubre de 2007.

Por otro lado, los egresados, al optar a un empleo, son evaluados no sólo por sus conocimientos técnicos sino en gran medida por las competencias personales que puedan aportar para el desempeño de sus tareas, donde la creatividad e innovación (Fayós et al., 2011) adquieren mayor presencia cada día, valorándose el emprendedurismo y el intraemprendedurismo. Existen diversos estudios sobre las competencias personales de los egresados universitarios para integrarse en la sociedad del conocimiento y sobre el papel que desempeñan las universidades en el desarrollo de dichas competencias, como Accenture y la plataforma Universia (2007); Hoffman (2003) y ANECA (2007). Estos estudios hacen que desde la universidad investiguemos cómo desarrollar esas competencias en los estudiantes y, por tanto, como evaluarlas.

Qué entendemos por competencias, creatividad, innovación, emprendedurismo e intraemprendedurismo

La competencia, se resume por muchos autores en saber-hacer. Para Ardila (2004), existen variados usos para la expresión saber-hacer: uso creativo de vivencias y maneras de estar en el mundo, desempeños idóneos en la cotidianidad o como el dominio de una gramáticas básicas. Goñi (2005) define las competencias como la capacidad para enfrentarse con garantías de éxito a una tarea en un contexto determinado. Además, considera que la persona no es sólo capaz de realizar actividades mecánicas y repetitivas en el contexto en el que aprendió y que frente a la menor variación contextual se muestra incapaz de responder adecuadamente.

Si algo caracteriza a las sociedades actuales es la dificultad de prever todas las actividades que son necesarias para enfrentarse a los problemas que plantea el vivir, es difícil, porque son muchas y porque además cambian constantemente. Por esta razón, enunciar las competencias como capacidades es pertinente, Entendiendo de esta manera que el proceso instructivo es un proceso de conocimiento y no un proceso de acumulación (Goñi, 2005).

Siguiendo esto, las competencias son una combinación de atributos, habilidades y actitudes que se configuran como típicas del ejercicio de una profesión (jurídica, política, socióloga, técnica, etc.), que permiten una formación integral y que deben ser desarrolladas a lo largo del proceso de aprendizaje-enseñanza de los estudiantes a través de la aplicación de diferentes dinámicas. El estudiante debe tener una capacidad determinada, pero, además, saber ejercerla (Delgado et al., 2006).

En conexión con el concepto de competencia, Delgado et al. (2006) afirman que los resultados de aprendizaje son conjuntos de competencias que reflejan lo que el estudiante conocerá y será capaz de hacer al finalizar el proceso de aprendizaje. De ahí la importancia del diseño de cualquier asignatura en función de las competencias a las que debe contribuir, relacionando la metodología de enseñanza-aprendizaje con el resultado, que será conocer lo que el alumno es capaz de hacer a través de la metodología de evaluación (Santandreu et al., 2013).

Se llama creativa a una persona cuando de manera permanente obtiene resultados creativos, originales y prácticos. Halpern (1984) afirma que se puede definir como la habilidad de formar nuevas combinaciones de ideas para llenar una necesidad acuciante o resolver un problema y destaca una característica importante del pensamiento creativo: es un pensamiento estructurado, se puede aprender, de tal manera que tiende a llevarnos a resultados creativos. El criterio último de la creatividad es el resultado. Nosotros en la formación buscamos resultados; pues si la creatividad es tan demandada en la sociedad hoy en día como resultado enseñémosla y obtengamos resultados. Como dice el padre del pensamiento creativo, Bono (1995), el pensamiento creativo trata del cambio de conceptos y percepciones y de la generación de otros nuevos. Los productos finales son las ideas utilizables.

Para que los productos finales se transformen en ideas utilizables necesitamos el emprendedurismo y el intraemprendedurismo. Martínez (2003) considera dirección, supervisión y riesgo, como las funciones del empresario, y diferencia a este del emprendedor por el riesgo como el principal objetivo distintivo entre el emprendedor (entrepreneur) y el gerente. Sigue la definición del término intraemprendedor (intrapreneurship) considerándolo como un mecanismo (existente en las empresas) que puede también llenar el vacío entre la ciencia y el mercado. Según este autor, las empresas que poseen recursos financieros, habilidad administrativa y sistemas de distribución y marketing para comercializar exitosamente sus productos, poseen frecuentemente una estructura burocrática, el énfasis en beneficios a corto plazo y una gran estructura organizativa que inhibe la creatividad y el desarrollo de nuevos productos. Así mismo, las empresas que reconocen estas limitaciones y la necesidad de creatividad e invención, intentan establecer un espíritu intraemprendedor en sus organizaciones; es decir, emprendimiento dentro de una estructura administrativa existente. Enseñemos a nuestros alumnos desde la educación superior a trabajar así ya porque independientemente de su formación cuando se incorporen al mundo laboral solo tiene dos vías: una, montar una empresa, o dos, trabajar en una empresa. En cualquier caso su fin, su objetivo, su resultado, es la empresa.

Las competencias emprendedoras son el conjunto de conocimientos, habilidades y actitudes que le permiten al estudiante canalizar sus ideas e intereses en el marco de las tendencias cambiantes del entorno (Santandreu, 2013), basado en los conocimientos adquiridos, con el fin de formular proyectos que contribuyan a su propio desarrollo y al del entorno, teniendo en cuenta los criterios de relevancia y viabilidad (Gómez y Jacobsohn, 2007).

La importancia de articular el emprendimiento con los planes de estudio es un tema que actualmente se está tratando de implementar en la mayoría de las universidades. Afirman Gómez y Jacobsohn (2007) que las universidades, al incorporar temas de emprendimiento en el currículo de los programas profesionales, buscan los siguientes objetivos: incidir en el crecimiento económico de la comunidad; cubrir una demanda cada vez mayor de estudiantes que buscan crear sus propias organizaciones; aumentar la reputación para atraer a nuevos estudiantes de pregrado y postgrado; desarrollar un entorno económico y social más sano formando emprendedores con alta responsabilidad social; y reforzar la cultura emprendedora de su comunidad o país. En este contexto, se busca generar y desarrollar actitudes, conocimientos y habilidades para emprender exitosamente.

Las habilidades emprendedoras son el complemento de los conocimientos necesarios para crear y administrar nuevas empresas o mejorar las ya existentes. El desarrollo de las asignaturas debe ofrecer a los estudiantes la posibilidad de que desarrollen habilidades y competencias genéricas y específicas acordes con el sector empresarial (Canós, et al., 2011).

Según Gómez y Jacobsohn (2007), ello es posible si al estudiante se le confronta con situaciones de negocios reales y complejos, al resolver casos, al desarrollar planes de negocios y al poner en marcha actividades, negocios, empresas u organizaciones. En consecuencia, una educación basada en competencias se define como la convergencia entre los conocimientos de las disciplinas, las habilidades genéricas y la comunicación de las ideas. La simple aceptación del desarrollo de competencias como propósito central de la educación implica, como ya se ha sugerido, la reorientación de las prácticas de enseñanza, específicamente, la revisión, selección y organización cuidadosa de los contenidos y actividades curriculares (Bogoya et al., 2000).

Diseño creativo e innovador de la asignatura para fomentar el emprendedurismo y el intraemprendedurismo

Nuestro propósito se ha basado en diseñar una asignatura optativa para alumnos de cuarto curso, Creación de Empresas, que se oferta a los cuatro grados que se imparten en la Universitat Politècnica de Valencia en el Campus de Gandía. Dichos grados son el grado en gestión turística (GGT), el grado en comunicación audiovisual (GGCA), el grado en ciencias ambientales (GCCAA) y el grado en ingeniería de sistemas de telecomunicación, sonido e imagen (GISTSI). Los alumnos que asisten durante el semestre A pertenecen a GCCAA y GGT; en el semestre B, GGCA y GISTSI. Esta agrupación ha sido por motivos académicos de horarios. Nuestra intención era poder unir a los cuatro grados, con el objetivo de poder conseguir mediante la diversidad en la formación y experiencias una mayor creatividad y al mismo tiempo que los estudiantes formando grupo multidisciplinarios trabajen como en el ámbito profesional, ya que en este no decidirán ni a sus compañeros, ni su formación y experiencias.

Para ello se ha aplicado una metodología de enseñanza-aprendizaje participativa, donde el alumno se convierte en un agente activo y autónomo, y una evaluación formativa que incide en las posibilidades de innovación y creatividad que facilitan el desarrollo profesional de los estudiantes involucrados, los cuales ponen en común experiencias, incertidumbres y formación distintas. El objetivo es el desarrollo y fomento del emprendedurismo e intraemprendedurismo mediante la creación de un plan de negocio.

Las razones que justifican la elección de crear y ofertar esta nueva asignatura aplicando metodologías de creatividad e innovación se pueden sintetizar, expuesto todo lo anterior, en:

- Adecuar nuestra acción docente a los planteamientos metodológicos y de evaluación pautados por el Espacio Europeo de Educación Superior (EEES): competencias genéricas y transversales.
- Adecuar nuestra acción docente a la demanda profesional: competencias que permitan innovar.

Siguiendo y adaptando el esquema de la creatividad, Iglesias y Rodicio (2013), se presenta el diseño de la asignatura, Creación de Empresas, en la Tabla 1. Esquema creatividad-Diseño: Creación de Empresas.

Esquema creatividad	Diseño: Creación de Empresas
1º Actitud y aptitud creativa: la aptitud se entrena	1º Selección de metodologías de enseñanza-aprendizaje
2º Proceso creativo: técnicas y métodos	2º Selección de metodologías para fomentar el proceso creativo
3º Producto resultante: ideas, cosas nuevas, innovaciones	3º Selección de técnicas de evaluación
4º Sociocultural: expertos que evalúan	4º Resultados: expertos que evalúan

Tabla 1. Esquema creatividad-Diseño: Creación de Empresas.

Fuente: elaboración propia.

La actitud creativa es propia de la persona, está formada por el instinto de curiosidad, el inconformismo, la motivación, la iniciativa, la profundidad, la perseverancia y la autoestima, mientras que las aptitudes se pueden aprender y entrenar, existen técnicas y métodos para ello. En esta parte es donde entramos nosotros con la selección de técnicas para fomentar la creatividad dentro de las metodologías de enseñanza-aprendizaje.

Las unidades didácticas, son el conjunto organizado, integrado, secuencial y estructurado de objetivos, contenidos, metodologías, actividades y recursos didácticos, que tienen sentido por sí mismos y que facilitan a los estudiantes el aprendizaje (Guía docente de la UPV: criterios para su elaboración). Las unidades docentes en que se distribuye la asignatura son las que se muestran en la Figura 1. Unidades didácticas.

Unidades Didácticas:

1. Generación de ideas: creatividad/innovación. Visual Thinking.

1. Formando equipos de trabajo.
2. Definiendo los desafíos.
3. Herramientas de creatividad lineal.
4. Herramientas de creatividad intuitiva.
5. Gestión de ideas.

2. Modelo de negocio y modelo de operaciones.

1. Resumen ejecutivo.
2. Descripción del proyecto.
3. Mercado (Mapa de empatía y Curvas de Valor).
4. Valor diferencial y ventajas competitivas (Business model Canvas y Business model toolbox).
5. Equipo.
6. Estrategia y cadena de valor (Business modelCanvas y Business modeltoolbox).
7. Análisis de la situación (DAFO).
8. Momento actual-Hitos.
9. Aspectos económico-financieros.
10. Riesgos y otros.

3. Presentación.

1. Elevator Pitch (1 minutos).
2. Presentación formal (20 Minutos).

Figura 1. Unidades didácticas.

Fuente: elaboración propia.

El proceso creativo es la aplicación de reglas técnicas y métodos; en nuestro caso son las que se muestran en la Tabla 2. Unidades-Técnicas creativas. Se han seleccionado en función de los objetivos formativos a alcanzar con cada unidad.

Unidades	Técnicas creativas: proceso creativo
Generación de ideas	1-Mapa de contexto. 2-Desafío personal. 3-Desafío del grupo. 4-Palabras al azar. 5-Las profesiones.
Modelo de negocio	1-Mapa de empatía. 2-Curva de valor. 3-Business Model Canvas. 4-Business Model Toolkit. 5-Lego
Presentación	1-Elevator Pitch. 2-Defensa de tu plan de negocio ante un grupo de expertos

Tabla 2. Unidades-Técnicas creativas.

Fuente: elaboración propia.

El objetivo de la asignatura, como su nombre indica, es la creación de una empresa. Los alumnos, a través de la gestión del conocimiento y el trabajo en equipo multidisciplinar deben ser capaces de generar una idea de negocio, mediante distintas técnicas de creatividad, y plasmarla en un plan de negocio. Para poder trabajar este fin, se desglosa en objetivos por unidades.

Primera unidad: Generación de ideas. El objetivo es aplicar técnicas creativas para que el alumno pueda dar paso a sus actitudes y aptitudes creativas dando lugar a diversas ideas de negocio, productos, servicios, etc.

Segunda unidad: modelo de negocio. El objetivo es centrar una de las ideas y plasmarla en un plan de negocio, no convencional, al que vamos a llegar a su elaboración mediante la utilización de las técnicas creativas que se muestran en la Tabla 2. Unidades-Técnicas creativas, esperando conseguir el producto resultante que es la consecución de algo nuevo e innovador que se puede aplicar en la dimensión sociocultural y que será los expertos de esta quien lo evalúe.

En la tercera unidad: presentación. El objetivo es que los alumnos muestren sus resultados. Para ello deben presentar en un portafolio los resultados obtenidos con cada técnica creativa de forma individual, y además, presentar y defender un plan de negocio para que sea evaluado el trabajo en grupo y la exposición en grupo e individual.

Teniendo en cuenta todo esto, se elabora la guía docente de la asignatura, que consta de las siguientes partes, entrando solo en las partes relevantes para este trabajo que son:

1. Datos identificativos.
2. Competencias específicas y genéricas.
3. Conocimientos recomendados.
4. Selección y agrupación de contenidos.
5. Metodologías.
6. Evaluación.
7. Recursos y bibliografía.

De las metodologías de enseñanza-aprendizaje, consultadas en la web de la Universitat Politècnica de Valencia, se opta por (teniendo en cuenta las competencias a las que contribuir en cada grado y las demandadas en el ámbito profesional, los objetivos de las unidades y el sistema de evaluación) las actividades de carácter presencial y de trabajo autónomo que se muestran en las tablas 3 y 4, respectivamente:

ACTIVIDADES DE TRABAJO PRESENCIAL	
Clase presencial	Exposición de contenidos mediante presentación o explicación por parte de un profesor (posiblemente incluyendo demostraciones).
Trabajo en grupo	Sesión supervisada donde los estudiantes trabajan en grupo y reciben asistencia y guía cuando es necesaria.
Caso	Técnica en la que los alumnos analizan situaciones profesionales presentadas por el profesor, con el fin de realizar una conceptualización experiencial y realizar una búsqueda de soluciones eficaces.
Aprendizaje basado en proyectos	Situaciones en las que el alumno debe explorar y trabajar un problema práctico aplicando conocimientos interdisciplinares.
Presentación de trabajos de grupo	Exposición de ejercicios asignados a un grupo de estudiantes que necesita trabajo cooperativo para su conclusión.
Laboratorio	Actividades desarrolladas en espacios especiales con equipamiento especializado (laboratorio, aulas informáticas).

Tabla 3. Actividades de carácter presencial.

Fuente: www.upv.es.

ACTIVIDADES DE TRABAJO AUTÓNOMO	
Estudio teórico	Estudio de contenidos relacionados con las clases teóricas: Incluye cualquier actividad de estudio que no se haya computado en el apartado anterior (estudiar exámenes, trabajo en biblioteca, lecturas complementarias, hacer problemas y ejercicios, etc.).
Estudio práctico	Relacionado con las clases prácticas.

Tabla 4. Actividades de trabajo autónomo.

Fuente: www.upv.es.

Las técnicas de evaluación seleccionadas son las que se muestran en la Tabla 5. Técnicas de evaluación:

Mapa conceptual: Individual	Muestra la forma de relacionar los conceptos clave de un área temática.
Portafolio: descripción individual de las sesiones.	Conjunto documental elaborado por un estudiante que muestra la tarea realizada durante el curso en una materia determinada.
Proyecto: plan de negocio. Grupo	Es una estrategia didáctica en la que los estudiantes desarrollan un producto nuevo y único mediante la realización de una serie de tareas y el uso efectivo de recursos.
Caso: en grupo	Supone el análisis y la resolución de una situación planteada que presenta problemas de solución múltiple, a través de la reflexión y el diálogo para un aprendizaje grupal, integrado y significativo.

Tabla 5. Técnicas de evaluación.

Fuente: www.upv.es.

Se observa claramente una relación clara entre las metodologías de enseñanza-aprendizaje y el sistema de evaluación, ya que no se puede evaluar algo que no se enseña-aprende:

- 1-Un portafolio en el que se muestre las tareas realizadas durante el curso. 10%
- 2-Mapa conceptual que plasme la fase de creatividad. Generación de ideas. 20%
- 3-Herramientas visuales plan de negocio. 30%
- 4-Un proyecto final. Se divide en dos partes: plan de negocio 30% y presentación y defensa del proyecto mediante herramientas visuales 10%.

De la práctica a la teoría. De las técnicas creativas al aspecto formal

El objetivo de la asignatura es, a través de la práctica, llegar a la teoría mediante su identificación, aprendizaje y aplicación. Las sesiones de las clases están preparadas para combinar las técnicas de creatividad con los contenidos de cada unidad. Primero, se realiza la técnica de creatividad selecciona acorde con el objetivo de aprendizaje y seguidamente se identifica éste objetivo de aprendizaje conceptualmente, permitiendo esta combinación en el proceso de enseñanza-aprendizaje abarcar los conceptos, aptitudes y actitudes. En la elaboración y preparación de las sesiones los profesores han tenido en cuenta que los alumnos aprendan y trabajen con las técnicas de evaluación que se les iba a exigir como se observa en la Figura 1. Unidades didácticas.

El trabajo práctico realizado durante las sesiones por los alumnos lo plasman en el portafolio y en el proyecto dando lugar mediante el aspecto formal a poder evaluar el profesor si han alcanzado las competencias y pudiendo los alumnos llevar la asignatura prácticamente al día.

Para conseguir el objetivo la metodología de trabajo que se lleva a cabo es la de formar grupos multidisciplinares que combinen alumnos de los distintos grados. Como son ocho alumnos (cuatro alumnos del grado en gestión turística y cuatro alumnos del grado en ciencias ambientales), se forman dos grupos de trabajo de cuatro alumnos cada uno.

Además se invita a personas de fuera de estos grados (alumnos de máster, emprendedores, empresarios, etc.) a participar en la asignatura para conseguir un mayor aporte de ideas y creatividad. Después de este reclamo, se suman a dichos grupos una persona más relacionada con el ámbito profesional. Con esto los grupos quedan formados por cinco personas cada uno.

Otro aspecto importante para alcanzar el objetivo de la asignatura es su control y la distribución de las unidades por sesiones. Por dos motivos: uno, tenemos limitación temporal para impartir la asignatura y dos, las técnicas de creatividad deben ser controladas temporalmente para conseguir unos resultados eficaces y eficientes y además, en nuestro caso las combinamos y llevamos a los contenidos teóricos para su aplicación.

La asignatura tiene asignada 30 sesiones de 120 minutos, lo que implica un gran esfuerzo para el docente, debe diseñar cada sesión para sacar el máximo partido del alumno teniendo en cuenta, la capacidad de retención. La distribución que se llevó a cabo y que se cumplió prácticamente se muestra en la Tabla 6. Distribución sesiones.

SEPTIEMBRE	
VIERNES 6: Presentación de la asignatura.	VIERNES 13: Unidad 1 y formar equipos.
VIERNES 20: Unidad 1.	VIERNES 27: Unidad 1.
OCTUBRE	
VIERNES 4: Unidad 1.	VIERNES 11: Unidad 1.
VIERNES 18: Unidad 1.	VIERNES 25: Unidad 2.
JUEVES 31: Unidad 2.	
NOVIEMBRE	
VIERNES 8: Unidad 2.	VIERNES 15: Unidad 2.
VIERNES 22: Unidad 2.	VIERNES 29: Unidad 2.
DICIEMBRE	
VIERNES 13: Unidad 2.	VIERNES 20: Unidad 3.
PRESENTACIÓN / EXAMEN : 13 ENERO	
Exposición del plan de negocio: en grupo (presentación formal) e individual (elevator pitch)	

Tabla 6. Distribución sesiones.

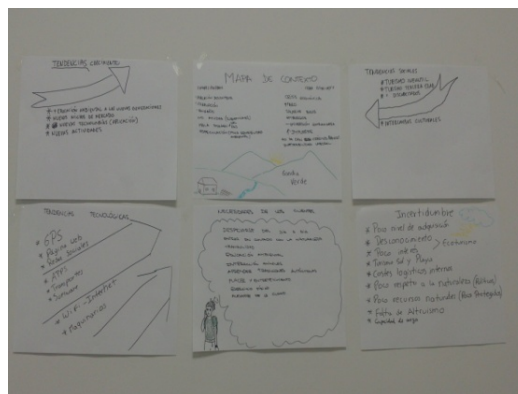
Fuente: elaboración propia.

Algunos resultados concretos de la aplicación del diseño de la asignatura

Durante la sesión 2 se forman los grupos. Estos se ponen a trabajar en la realización de un mapa conceptual. El resultado de esta tarea se muestra en las Fotos 1. Mapa conceptual:

Grupo 1

Grupo 2



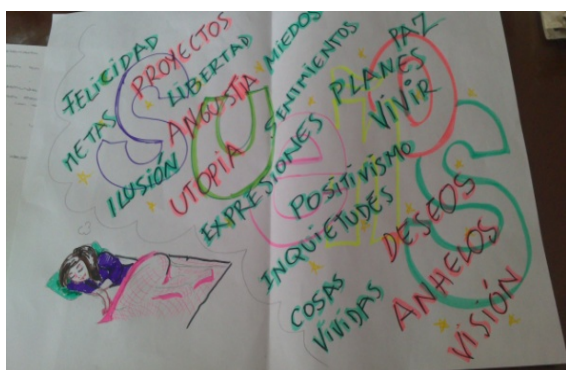
Fotos 1. Mapa conceptual

El mapa conceptual permitió situar a los alumnos en una temática en concreto, describiendo la situación actual en la que nos encontramos para montar una empresa.

Siguiendo la distribución de sesiones mostrada en la Tabla 6 y la combinación de técnicas creativas con las unidades mostrada en la Tabla 2. Se presentan, en las Fotos 2. Técnicas de creatividad y generación de ideas, los resultados del grupo 1 de la aplicación de una técnica de creatividad, palabras al azar y los resultados del grupo 2, realización de un mapa de empatía.

Grupo 1: la palabra “sueño” nos evoca

Grupo 2: mapa de empatía

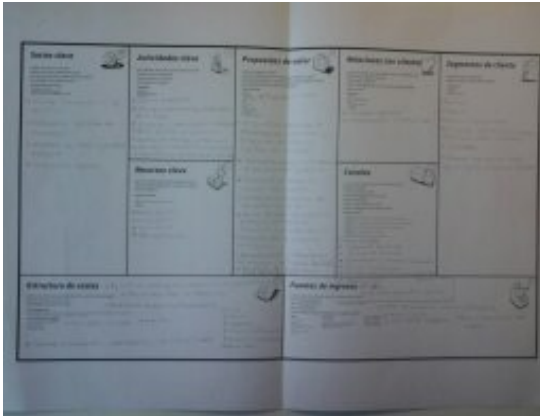


Fotos 2. Técnicas de creatividad y generación de ideas:

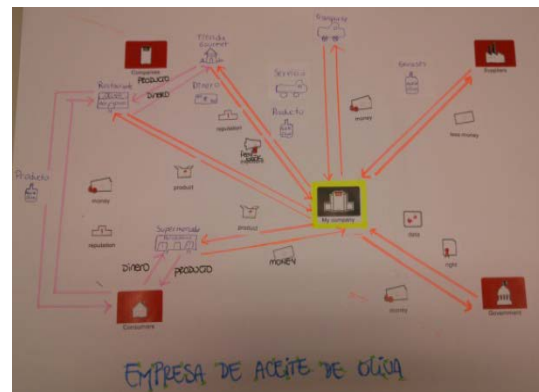
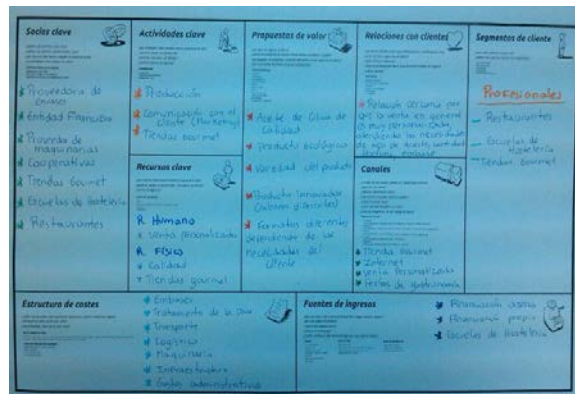
Con estas técnicas, los alumnos consiguen generar distintas ideas de planes de negocio y seleccionar una de ellas para continuar trabajando. Así el grupo 1 decide estudiar la posibilidad de crear una aldea rural y el grupo 2, una empresa de aceite especializado para la alta hostelería de forma que sus instalaciones puedan ser visitadas como reclamo turístico.

Una vez llegado a este punto, se realiza con ellos el Business Model Canvas, Business Model Toolbox y el Lego, correspondientes al aprendizaje-enseñanza de la unidad 2. Esto les va a permitir de una forma creativa poder llevar a cabo cada uno de los puntos del plan de negocio que deben entregar por grupos. Podemos ver los resultados en las Fotos 3. Business Model Canvas-Business Model Toolbox-Lego.

Grupo 1



Grupo 2



Fotos 3. Business Model Canvas-Business Model Toolbox-Lego.

Conclusiones

Los proyectos emprendidos nos permiten avanzar dando respuesta a las incertidumbres sobre la puesta en práctica de una formación adaptada a EEES y al ámbito profesional.

El hecho de reflexionar juntos, dialogar sobre lo que hacemos y afrontar los obstáculos que se presentan día a día en nuestras aulas nos enriquece como docentes al compartirlo con los demás. El trabajo en equipo y la reflexión compartida del grupo de profesorado han hecho más fácil el generar algo diferente e innovador. Se trata de establecer un compromiso de desarrollo profesional para la mejora de la calidad en la docencia universitaria.

En el proceso de innovación aquí presentado, el centro de interés de nuestra propuesta se ha basado en la metodología participativa y la evaluación formativa que se ponen en marcha en los nuevos títulos europeos de grado.

El uso de instrumentos alternativos a lo tradicional, como puede ser el portafolio, las técnicas creativas; pasar de la práctica a la teoría, han permitido mejorar la calidad de la participación del alumnado en las actividades individuales y grupales de la asignatura, generando cambios significativos en la forma de entender la enseñanza por el profesorado y el alumnado.

Se necesitan cambios que debemos ir articulando progresivamente, aunque en ocasiones suponga luchar con la tradiciones educativas y fomentar el cambio de paradigma desde la reflexión.

Como afirma Berge: Educar a un niño es esencialmente enseñarle a prescindir de nosotros.

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La empresa llevada a clase en el Grado en Telecomunicaciones.

Resumen

La asignatura de Economía de la Empresa en el sector de las Telecomunicaciones debe contribuir en el Grado en Telecomunicaciones en las siguientes competencias: Tomar decisiones, Analizar el impacto social y medioambiental de las soluciones técnicas, Aplicar elementos básicos de economía y de gestión, Trabajar en un equipo multidisciplinar multilingüe y Organizar y gestionar empresas.

Vamos a observar los buenos resultados obtenidos por los estudiantes con las metodologías utilizadas para que adquieran las citadas competencias, mediante la clase presencial, la resolución de casos, presentación de un proyecto, trabajo en grupo y presentación del trabajo en grupo.

Todas estas metodologías, se combinan de forma innovadora para que el alumno se sitúe como si estuviera en el mundo empresarial. Aplicándose desde el primer día de clase para que sean capaces de identificar y enlazar cada uno de los contenidos en los que se ha distribuido la asignatura desde el punto de vista teórico y práctico.

El sistema de evaluación nos permite ver si se ha alcanzando el objetivo y el grado en el que se ha alcanzado. Este sistema ha sido seleccionado teniendo en cuenta las competencias a alcanzar y las metodologías de enseñanza-aprendizaje y está compuesto por: prueba escrita de respuesta abierta, el proyecto y el caso.

Introducción

Nuestro entorno se ha transformado en todos sus contextos y esto plantea nuevas demandas y desafíos a los sistemas de educación superior. Son múltiples los cambios que ha experimentado nuestro entorno en las últimas décadas, hasta el punto de que se ha evolucionado desde la era industrial a la sociedad de la información. En la pasada década de los ochenta, los cambios experimentados en el terreno de la tecnología informática, así como la articulación de las economías nacionales en los procesos de integración y globalización, introdujeron a las instituciones de educación superior (encargadas de producir, divulgar y transferir conocimiento) en lo que respecta a la formación de recursos humanos profesionales, científicos y técnicos (Didriksson, 2000). Evidentemente, no es lo mismo preparar a los estudiantes para que consigan una formación especializada y única que los capacite para desarrollar un puesto específico de trabajo inmutable que formar a los estudiantes universitarios de manera técnica y polivalente para dotarles de las competencias necesarias que les van a permitir un desempeño eficaz en distintas ocupaciones a lo largo de su carrera profesional.

Esto implicó replantear los perfiles de los estudiantes universitarios, sus orientaciones curriculares, el tipo de carreras, su organización, la formación de los profesores, la manera en cómo se vinculan las instituciones a las demandas de la sociedad así como con los sectores de la producción, los servicios y el empleo. Al responder a estas demandas, entre las que se encuentran las empresas, las instituciones de educación superior adaptan la formación de los estudiantes universitarios para que sean profesionales idóneos, lo que les permite competir con otras empresas tanto nacionales como internacionales e implica trascender del énfasis en lo puramente conceptual y discursivo a la movilización de los saberes, que demandan habilidades de búsqueda, procesamiento, análisis y aplicación del saber de manera pertinente (Tobón, 2006; Santandreu, 2011)).

En general, las instituciones de educación superior tienen que hacer frente a las nuevas demandas y desafíos que presenta una compleja sociedad en cambio continuo y acelerado. No solo en el marco europeo sino prácticamente a nivel mundial los sistemas educativos superiores están experimentando en este momento importantes procesos de reforma tanto en el plano organizativo como principalmente en la dimensión curricular y pedagógica referida a los planes de estudios, las programaciones docentes y los nuevos enfoques de enseñanza-aprendizaje. Se trata, por tanto, de poner a la educación superior a la altura de los tiempos que corren. En conjunto, podemos considerar que las razones que justifican la inclusión del enfoque de competencias a partir de ahora en la enseñanza universitaria son las siguientes (López, 2011):

- ✓ Conseguir la coherencia e integración de todo el sistema educativo.
- ✓ Reorientar la misión de la educación superior en el siglo XXI.
- ✓ Conectar con el inestable mundo laboral.
- ✓ Abrir una puerta a la interdisciplinariedad.
- ✓ Renovar las metodologías docentes.
- ✓ Mejorar la evaluación del aprendizaje.
- ✓ Evaluar la práctica docente.
- ✓ Posibilitar la convergencia.

Acorde con los requerimientos anteriores, se plantea una educación basada en el desarrollo de competencias que implica una transformación profunda de la institución y de la enseñanza universitaria que viene avalada por una considerable serie de motivos: estructurales, teleológicos, pedagógicos, empresariales y de integración y que dote a los individuos de capacidades que les permitan adecuarse a los requerimientos que la disciplina en formación y posteriormente la sociedad y el ámbito laboral demandan. Estas competencias están referidas al conocimiento (lectura, escritura, lenguaje y lógica aritmética), al desempeño profesional (aptitudes y valores asociados al ámbito laboral) y técnico (habilidades y destrezas en el campo especializado), significan calidad e idoneidad en el desempeño, protagonismo de los estudiantes, planificación de la enseñanza a partir del aprendizaje y contextualización de la formación (Barrón, 2000; Tobón, 2006; Yániz, 2008).

La clave es diseñar y utilizar distintas estrategias e instrumentos que permitan documentar las evidencias del proceso y el resultado de la adquisición de las competencias por parte del alumnado. Esto conlleva una reformulación de los planes de estudio de cada carrera. La introducción de un nuevo enfoque basado en la práctica profesional demanda que implica una reconstrucción completa del programa de cada asignatura o módulo, lo que deriva en un cambio de perspectiva a la hora de diseñar cada una de las partes o elementos del programa: objetivos, contenidos, metodología, y evaluación.

La asignatura Economía de la Empresa en el sector de las Telecomunicaciones se ha diseñado teniendo en cuenta todo esto, dando lugar a una innovación educativa al llevar la empresa al aula.

Reflexiones seguidas para elaborar el diseño de la asignatura.

La formación universitaria parte de modelos basados en una concepción del conocimiento y de los contenidos como los objetivos primordiales del aprendizaje que cubría las necesidades del entorno del momento, centrado en el contenido de las asignaturas, soslayando el desarrollo de habilidades como desempeños efectivos y pertinentes, en relación con los aspectos conceptuales, metodológicos e instrumentales, limitando la posibilidad de realizar análisis posteriores sobre lo aprendido, reorganizar los conceptos y los procedimientos, así como generar nuevas formas de interacción con el saber desde la perspectiva disciplinar, Ruiz (2009).

Zabala y Arnau (2007) comentan que se viene de una escuela heredada basada en el saber, en un conocimiento académico desligado, la mayoría de las veces, de su función, donde se aprenden fórmulas, principios, conceptos, en los que se valora fundamentalmente la capacidad de reproducirlos y no tanto para aplicarlos. Esto implica saber mucho pero ser incapaz de utilizarlo y aplicarlo para resolver situaciones en las que este conocimiento que tenemos nos podría ser muy valioso.

Debido al acelerado cambio en el acceso, en la manera en como fluyen y como se provisionan los conocimientos y saberes (López, 2007; Meléndez y Gómez, 2008; Posada, 2004; Rodríguez, 2007; Villa y Villa, 2007; Yániz, 2008), los procesos de adquisición, clasificación, disponibilidad, uso y generación de la información y conocimiento da lugar a nuevas formas de utilización del lenguaje que requieran un cambio de concepción con respecto a los saberes (Orozco, 2000), cambiando el proceso de diseño de las asignaturas, pasando de un sistema lineal a uno circular, como se muestra en la Figura 1. Esquema diseño asignaturas:

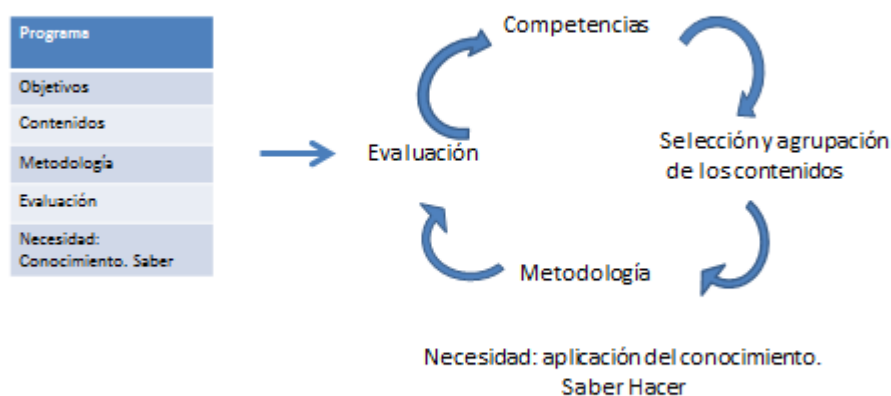


Figura 1. Esquema diseño asignaturas.
Fuente: elaboración propia.

Contexto de la asignatura.

La asignatura se imparte en primero del Grado en Ingeniería de Sistemas de Telecomunicación, Sonido e Imagen en la Escuela Politécnica Superior de Gandía. Es de formación básica, semestral, tiene una carga de 6 ECTS y se encuentra dentro de la materia de empresa.

Pretende cubrir las competencias genéricas y específicas que permitan al alumno desarrollar su actividad profesional en empresas del sector de las telecomunicaciones. Para ello se le formará en el conocimiento de los distintos tipos de empresa y cuáles son sus características, cómo es el proceso de su creación, cuáles son sus actividades, cómo se organizan, planifican, dirigen y controlan las distintas áreas o departamentos teniendo en cuenta su estrategia, cultura y entorno en el que se encuentran. Todo ello desde un enfoque teórico-práctico de la gestión de la información, conocimiento e innovación (Santandreu 2013).

Las competencias a las que debe contribuir se muestran en la Tabla 1. Competencias de la asignatura:

Materia	Competencia	Tipo	Nivel
Empresa	Tomar decisiones	Genérica	Indispensable (4)
Empresa	Analizar el impacto social y medioambiental de las soluciones técnicas	Genérica	Necesaria (3)
Empresa	Aplicar elementos básicos de economía y de gestión	Específica	Indispensable (4)
Empresa	Trabajar en un equipo multidisciplinar multilingüe	Genérica	Necesaria (3)
Empresa	(B.05) Organizar y gestionar empresas	Específica	Indispensable (4)

Tabla 1. Competencias de la asignatura.

Fuente: elaboración propia.

Contenidos de la asignatura.

Los contenidos de la asignatura mediante los cuales se debe contribuir a alcanzar las competencias, se explican con la selección y estructura de unidades didácticas que se muestra en la Figura 2. Unidades didácticas:

1.Marco conceptual de la empresa TIC.

La empresa como sistema.
La evolución de la teoría de la empresa.
La empresa desde la macro y la microeconomía.
Las áreas funcionales de la empresa.

2.La empresa TIC y su contexto.

Misión, visión, metas y objetivos.
El entorno.
Modelos de diseños organizativos.
Liderazgo y Mando.
Práctica aula informática: Buscar una empresa del sector en internet y aplicar cada uno de los puntos explicados en el tema.

3.Las funciones de Administración de Empresas: Planificación, Organización, Dirección y Control.

Planificación, organización, dirección y control.
El proceso de toma de decisiones.
Cultura y política.
Gestión de Recursos Humanos.
Práctica aula informática: Con la empresa seleccionada en la unidad 2, aplicar el proceso de toma de decisión y su proceso de planificación, organización, dirección y control, en función de la información recogida en la práctica anterior.

4.Crear una empresa TIC

Marco jurídico e institucional.
Legislación.
Tramitaciones administrativas.
Estudio del entorno económico, mercado y competencia.

5.La importancia de la Innovación en el sector de las Telecomunicaciones.

Gestión de la información y el conocimiento
Gestión de la innovación.
Comportamiento organizativo en empresas TICs.
Cambio y aprendizaje organizativo.
Creatividad.
Práctica de informática: Con los datos de las prácticas de las unidades 2 y 3. Establecer la importancia de la innovación en las empresas objeto de estudio.

6.Importancia de la información económica en las empresas TICs.

Indicadores económicos.
Análisis económico.
Control de resultados.
Práctica de informática: Valoración de activos y pasivos de la empresa estudiada.

Práctica de campo.

Visita centro emprendedores de la UPV

Figura 2. Unidades didácticas:

Fuente: elaboración propia.

Metodología y Evaluación.

Identificadas las competencias a las que debemos contribuir; seleccionadas y estructuradas las unidades didácticas que nos van ayudar a ello tenemos la primera parte de nuestro ciclo de diseño formativo enseñanza-aprendizaje, como se muestra en la Figura 3. Competencias-Unidades:

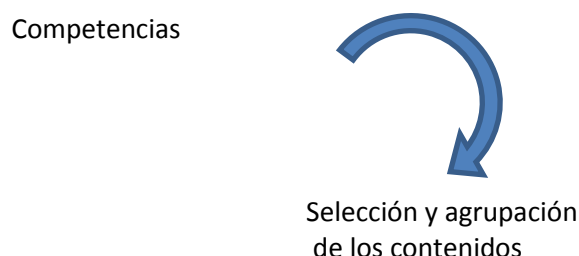


Figura 3. Competencias-Unidades.

Fuente: elaboración propia.

En la segunda parte del ciclo formativo (Figura 4. Metodología-Evaluación), debemos seleccionar la metodología que va a permitir que nuestros alumnos adquieran parte de esas competencias y el sistema de evaluación que nos permita valorar el grado en que han sido adquiridas por los alumnos, completando el ciclo que dará lugar proceso de enseñanza-aprendizaje.

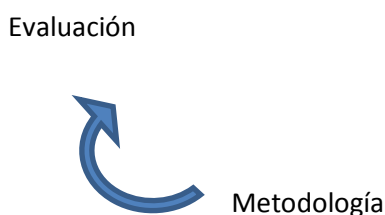


Figura 4. Metodología-Evaluación.

Fuente: elaboración propia.

Teniendo en cuenta que con estas competencias nuestros alumnos deben estar capacitados para aplicar el conocimiento en el ámbito profesional que es la necesidad real demandada, la metodología enseñanza-aprendizaje seleccionada pretende llevar ese ámbito profesional real a la clase.

Además hemos de ser conscientes de que independientemente del grado en el que estudien nuestros universitarios donde van a desarrollar y aplicar esos estudios es en la empresa, como trabajador o como empresario. De ahí la importancia desde la universidad de enseñarles a trabajar en el aula como en el ámbito profesional (Santandreu, 2013).

Lo importante para el docente en todo el proceso de preparación de la asignatura es alcanzar el objetivo de contribuir a la formación de las competencias genéricas y específicas del grado. Este proceso implica principalmente la selección de la metodología de enseñanza-aprendizaje que va ayudar a alcanzar el objetivo y la selección de la metodología de evaluación que permita valorar el grado de alcance las competencias. Por esto se propone que el proceso sea circular teniéndose en cuenta que todo, la metodología, la selección y estructuración de las unidades y la evaluación deben contribuir y valorar el alcance de las competencias.

En nuestro caso en concreto, la metodología y el sistema de evaluación que consideramos que nos van a ayudar a alcanzar los objetivos que se han ido comentando se muestran en la Figura 5. Metodología –Evaluación seleccionadas:

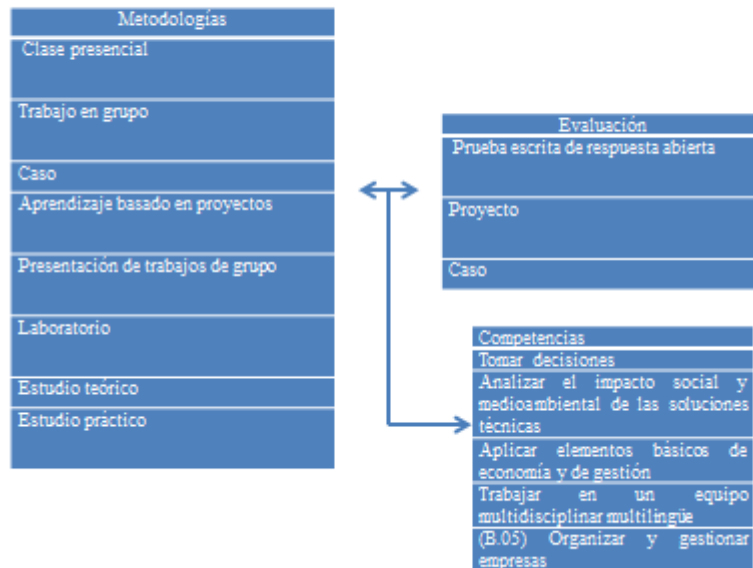


Figura 5. Metodología-Evaluación seleccionadas.

Fuente: elaboración propia.

La justificación de esta selección y cómo se aplica en concreto en la asignatura se explica a continuación.

En las clases presenciales y de laboratorio se transmite a los alumnos los contenidos teórico-prácticos de cada unidad didáctica. El docente selecciona varias empresas de distintos sectores y al mismo tiempo que explica los conceptos teóricos (como pueden ser a modo de ejemplo: misión, visión y objetivos, los identifica en las empresas dando lugar a su análisis y relación del concepto con la realidad y demostrando que estos conceptos tienen su aplicación y la importancia de la correcta aplicación de ellos. Al mismo tiempo, de forma individual y en grupo, se resuelven **casos** actuales donde, los alumnos, deben aplicar y ven aplicados los conocimientos que se va adquiriendo cada vez con mayor dificultad. Esto nos va a permitir:

- 1- Contribuir a:
 - a. Analizar el impacto medioambiental de las soluciones técnicas.
 - b. Aplicar elementos básicos de economía y de gestión.
- 2- Que los alumnos sean capaces de superar la prueba escrita de respuesta abierta.

Desde el inicio de las clases, los alumnos forman grupos de 3 a 5 personas y seleccionan una empresa con la que van a trabajar todo el año.

Al finalizar cada unidad estos grupos realizan pequeñas presentaciones de los conceptos vistos en clases aplicados e identificados en su empresa. Esto nos permite ver al finalizar cada unidad y antes de empezar la siguiente unidad si los conceptos principales han quedado claros. Permite:

- 1- Contribuir a :
 - a. Tomar decisiones.
 - b. Analizar el impacto medioambiental de las soluciones técnicas.
 - c. Aplicar elementos básicos de economía y de gestión.
 - d. Trabajar en un equipo multidisciplinar y plurilingüe (se permite las exposiciones en castellano, valenciano e inglés).
- 2- Al finalizar el curso deben ser capaces mediante el aprendizaje basado en proyectos y las presentaciones realizadas de presentar un **proyecto** final y una presentación final para su evaluación lo que ha permitido conocer, adquirir y aplicar la competencia de organizar y gestionar empresas.

El estudio teórico y práctico son actividades de carácter autónomo que debe realizar el alumno y que va a reforzar cada una de las competencias a las que se debe contribuir excepto la de trabajar en un equipo multidisciplinar y plurilingüe.

Conclusiones.

La mejor manera de llevar la empresa al aula es trabajar con ella desde el primer día utilizando distintas metodologías que permitan enseñar y mostrar a los alumnos que los contenidos de las unidades didácticas se están aplicando en la vida real y más concretamente en el ámbito laboral. Que cuando se llevan a cabo por las empresas y se aplican estas obtiene mayores y mejores resultados, son más eficaces y eficientes.

Con este diseño el aprendizaje no se para en la adquisición del conocimiento y valoración de este sino que se es capaz de adquirirlo y aplicarlo para resolver diversas situaciones, además de poder valorar esta adquisición y aplicación.

Llevando la empresa al aula y enseñándoles a relacionarse y a trabajar como en el ámbito profesional, se contribuye mejor a las competencias que deben adquirir y por lo tanto formar profesionales más demandados por el ámbito profesional y con más seguridad en el momento de enfrentarse a este ámbito laboral. Estamos disminuyendo la brecha entre la oferta al ámbito profesional y las necesidades de demanda del ámbito laboral.

Este diseño permite con las metodologías utilizadas la constatación de interacción con el alumno, el profesor y con la empresa. Además, permite una evaluación continua del proceso del alumno, porque va adquiriendo confianza y seguridad en su formación de forma progresiva que le va a permitir superar la evaluación con mejores resultados de aprendizaje (prueba escrita, caso y proyecto), debido a que han estado trabajando sobre ello. Esto repercute en unas calificaciones mejores y más elevadas que la de años anteriores con el sistema tradicional de educación.

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APLICACIÓN DEL PUZZLE DE ARONSON PARA TRABAJAR EL APRENDIZAJE COLABORATIVO Y EL DESARROLLO DE COMPETENCIAS GENÉRICAS DE LOS ESTUDIANTES

E. GUIJARRO, E. BABILONI and M. FERNÁNDEZ-DIEGO

Resumen.

El puzzle de Aronson es una técnica de aprendizaje colaborativo cuya principal característica es que son los propios alumnos, trabajando en equipo, los que hacen de tutores del aprendizaje de sus compañeros siendo, a la vez, tutorizados por ellos. Este trabajo analiza la aplicación de esta técnica en la asignatura Gestión de Recursos Humanos del grado en Gestión y Administración Pública, así como los aprendizajes y resultados docentes obtenidos. La utilización del puzzle de Aronson fomenta el aprendizaje colaborativo de los alumnos, además de desarrollar competencias genéricas de la titulación tales como "demostrar compromiso ético en el trabajo" que difícilmente se pueden adquirir y/o evaluar con otras metodologías docentes.

1. INTRODUCCIÓN

La incorporación de las universidades españolas al Espacio Europeo de Educación Superior (EEES) ha supuesto una modificación en las aulas universitarias. La principal novedad radica en considerar al alumno el epicentro del proceso enseñanza-aprendizaje, haciendo que sea él, de forma autónoma, quien aprenda. Esto supone que el profesor debe convertirse en guía del aprendizaje, cambiando su tradicional rol de transmisor de conocimiento, y con ello modificar también el modo de preparar e impartir las clases. Además, la adaptación al EEES ha supuesto un profundo cambio curricular de los planes de estudio que se adaptan a las exigencias del mercado laboral, desarrollando para ello el aprendizaje basado en competencias profesionales.

Como consecuencia de todo ello, cada vez se pueden encontrar más muestras de la utilización de metodologías denominadas activas en las aulas. Los profesores universitarios han adaptado estas metodologías, formando parte del proyecto curricular de sus asignaturas. Así, por ejemplo, se utilizan vídeos, casos, discusiones, portafolios, aprendizaje basado en problemas, etc. como herramientas habituales de enseñanza. Sin embargo, estas metodologías suelen emplearse, en realidad, para motivar e implicar al estudiante en el proceso de enseñanza-aprendizaje, sin reflexionar en porqué utilizar cada una de ellas y, sobre todo, qué competencia ayuda a desarrollar y evaluar.

Los nuevos grados universitarios están diseñados en competencias, lo que significa que al finalizar los estudios los discentes deben "ser capaces de" desempeñar las funciones propias de una ocupación. Esto supone adaptar los programas antiguos por objetivos a programas por competencias, subordinando los contenidos disciplinares a dichas competencias. Esta adaptación implica un modo absolutamente distinto de organización curricular, de modo que las asignaturas deben ayudar a la adquisición de competencias. Por tanto, las metodologías de enseñanza-aprendizaje son, en realidad, herramientas para el desarrollo y adquisición de competencias, que facilitan además su evaluación. La gran dificultad de esto radica en la elección de la metodología más adecuada, sobre todo en el caso de las llamadas competencias genéricas o transversales, en las que se desarrollan habilidades muy amplias y relacionadas más con el "saber hacer" (habilidades) y el "saber estar" (comportamiento) propio de una profesión que con el "saber" (conocimiento) propiamente dicho. Una solución válida en estos casos es el empleo de metodologías de aprendizaje colaborativo, que permiten trabajar habilidades como el trabajo en equipo, la responsabilidad con el trabajo, la gestión del tiempo, el compromiso y trabajo ético, etc. consideradas en la mayoría de los grados como competencias genéricas.

En este trabajo se analiza el caso del grado en Gestión y Administración Pública, concretamente la asignatura obligatoria Gestión de Recursos Humanos, en la que se emplea el Puzle de Aronson, técnica de aprendizaje colaborativo, para el desarrollo de competencias genéricas del título, difícilmente abordables con otras metodologías. Se muestra cómo las distintas fases por las que pasan los estudiantes en la puesta en marcha de esta técnica facilita y ayuda al desarrollo de las competencias genéricas del grado.

2. EL APRENDIZAJE COLABORATIVO

Su principal característica es que son los propios alumnos, trabajando en equipo, los que hacen de tutores del aprendizaje de sus compañeros siendo, a la vez, tutorizados por ellos. De este modo, se produce una interdependencia positiva al trabajar juntos, ya que cada cual podrá alcanzar sus objetivos si los demás consiguen los propios. Los alumnos no dependen excesivamente del profesor, sino que son ellos los constructores de su propio aprendizaje y, fundamentalmente, del de sus compañeros. Por ello, se encuadra dentro de las metodologías de aprendizaje significativo, puesto que considera al estudiante el verdadero protagonista de su propio proceso de enseñanza-aprendizaje (Bisquerra, 2006).

Dentro de este tipo de aprendizaje existen diversas técnicas (véanse (Barkley, 2007) y (Servicio de Innovación Educativa de la UPV, 2008) para una descripción detallada de cada una de ellas) que se diferencian en el grado de autonomía del estudiante. Su utilización en las aulas tiene un doble beneficio en el proceso de enseñanza-aprendizaje: (i) fomenta que los estudiantes aprendan cooperativamente, y (ii) per-

mite alcanzar objetivos de aprendizaje diversos, no solo referidos a los contenidos, sino también orientados al desarrollo de habilidades y destrezas interpersonales vinculados a la adquisición de competencias (Prieto, 2007).

De hecho, los cinco elementos claves distintivos del aprendizaje colaborativo están directamente relacionados con el desarrollo de competencias interpersonales (Johnson, Johnson y Holubec, 1999), generalmente consideradas competencias genéricas en los planes de estudios. Estos cinco elementos se resumen en:

1. *Cooperación*. Los estudiantes están vinculados entre sí para realizar una tarea. Si todos consiguen sus objetivos individuales, se logrará el objetivo final de la tarea existiendo una interdependencia positiva entre ellos. Por tanto, el éxito de un estudiante depende de que todos en el equipo tengan éxito. Como consecuencia, los estudiantes se apoyan mutuamente y comparten metas, recursos y logros.
2. *Responsabilidad individual*. Los estudiantes son responsables de manera individual de la parte de tarea que se le ha asignado. Pero, al mismo tiempo, son también responsables del resultado final del grupo, lo que complementa el concepto de cooperación.
3. *Comunicación*. Los miembros del equipo deben trabajar conjuntamente y aprender de sus compañeros para lograr los objetivos previstos. Esto requiere intercambiar información y materiales, ayudarse mutuamente, discutir sobre los distintos puntos de vista, explicar a los demás la tarea asignada, ofrecer retroalimentación y todo aquello que implique comunicarse para lograr resultados de mayor calidad.
4. *Trabajo en equipo*. Los estudiantes aprenden a resolver los problemas de forma conjunta, desarrollando habilidades de liderazgo, comunicación, confianza, toma de decisiones, resolución de conflictos y todo tipo de habilidades sociales necesarias para el buen funcionamiento del grupo.
5. *Autoevaluación del grupo*. Los equipos deben tener la oportunidad de evaluar el proceso de aprendizaje seguido por el grupo, analizando qué acciones han sido útiles y cuáles no. El resultado de esta evaluación aporta información valiosa para identificar qué cambios deben realizarse para mejorar su trabajo en el futuro.

3. EL PUZZLE DE ARONSON: UNA HERRAMIENTA COLABORATIVA PARA DESARROLLAR COMPETENCIAS GENÉRICAS

Existen diversas técnicas de aprendizaje colaborativo, pero una de las más empleadas es el puzzle de Aronson o rompecabezas (Aronson, 1978). Éste ha sido aplicado en multitud de campos, aunque suele emplearse en niveles de enseñanza secundaria obligatoria o universitaria, pues requiere una serie de capacidades y habilidades sociales de los alumnos para llevarlo a cabo con éxito. Las grandes ventajas de esta metodología radican, precisamente, en la cooperación que existe entre los alumnos, lo cual permite, entre otras cosas (Martínez y Gómez, 2010):

- Mejorar el aprendizaje colaborativo.
- Fomentar una actitud positiva entre los miembros del grupo.
- Aumentar el rendimiento académico.
- Favorecer el aprendizaje significativo y autodirigido.
- Fomentar el estudio continuado de una materia, de forma que el alumnado no memoriza, sino que madura el conocimiento.
- Desarrollar la solidaridad y el compromiso cívico entre el alumnado.
- Desarrollar habilidades sociales para relacionarse con el grupo y exponer de forma asertiva el propio punto de vista.
- Presentar de forma ordenada los resultados del aprendizaje en grupo.
- Fomentar la autonomía en el aprendizaje.
- Atender la diversidad de intereses, valores, motivaciones y capacidades del alumnado.
- Responsabilizar a cada miembro del grupo de una tarea para conseguir el objetivo propuesto.
- Convertir al alumno en tutor del proceso.
- Trabajar el consenso.

Analizando estas ventajas se observa que la mayoría de ellas hacen referencia a las habilidades relacionadas con el "saber hacer" y "querer hacer" comunes a todas las ramas profesionales, y que se recogen como competencias genéricas o transversales en las diversas titulaciones. De ahí que esta metodología sea una estrategia válida para trabajar, no sólo el trabajo colaborativo entre estudiantes, sino también el desarrollo de competencias genéricas.

Esta técnica es especialmente útil para trabajar las áreas de conocimiento en las que los contenidos son susceptibles de ser "fragmentados" en diferentes partes. Para su aplicación en las aulas, deben seguirse las siguientes fases (Martínez y Gómez, 2010), (Babiloni, Guijarro y Palmer, 2013), que se resume de forma gráfica en la Figura 1:

1. *Explicación de la metodología del Puzzle de Aronson al gran grupo.* Se explica a los alumnos en qué consiste y se les motiva en la puesta en marcha. Además, se explica la temática que se va a tratar con dicha metodología y se reparte el material necesario, que estará dividido en subtemas.

2. *Configuración del grupo puzzle o grupo nodriza.* Los alumnos se agrupan formando los denominados "grupos nodrizas". Aunque no existe un consenso claro en

el número de alumnos óptimo por grupo, se recomienda que el tamaño sea de cuatro o cinco estudiantes. Lo que sí es necesario es que los grupos tengan tantos componentes como número de fracciones se hayan hecho de la tarea. Es importante dar tiempo para que el grupo se conozca, dialogue e incluso cree unas normas de funcionamiento. Una vez constituido, cada miembro del grupo selecciona un subtema.

3. *Diseño y puesta en marcha del grupo de expertos.* Una vez que cada persona ha seleccionado su parte, se reúnen todos los miembros de los diferentes grupos que tengan en común el mismo subtema. En este nuevo grupo, que recibe el nombre de “grupo de expertos”, los miembros mantienen entre sí una relación temática. Cada grupo de expertos desarrolla la sub-tarea que le ha sido asignada, realizando un informe final grupal como expertos de la temática tratada.

4. *Reencuentro en el grupo puzle o nodriza.* Finalizada la tarea de cada grupo de expertos, éstos regresan de nuevo a su grupo puzle o nodriza y cada experto comparte y explica la información de su subtema con el resto de miembros del grupo original. De este modo, cada componente del grupo nodriza se forma en el resto de subtemas a través de sus compañeros (en este punto se trabaja el aprendizaje colaborativo) de forma que, al final, todos los sujetos son expertos de todas las subtemáticas.

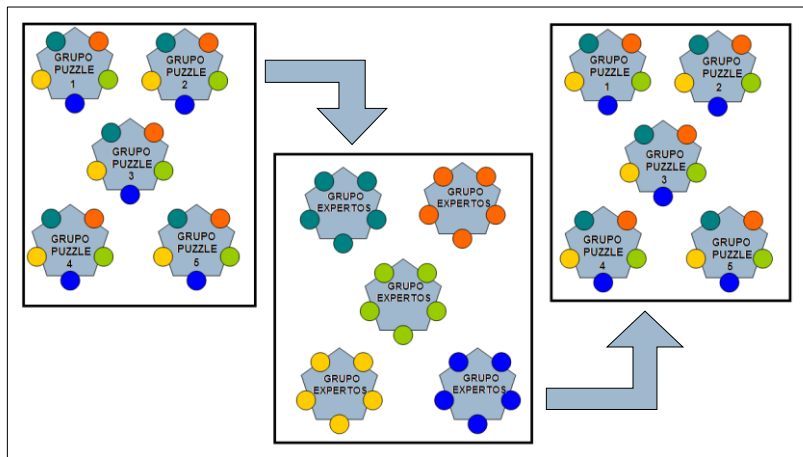


Figura 1: Representación gráfica de la puesta en marcha del puzle de Aronson

4. APRENDIZAJE COLABORATIVO Y DESARROLLO DE COMPETENCIAS GENÉRICAS MEDIANTE EL PUZLE DE ARONSON EN LA ASIGNATURA GESTIÓN DE RECURSOS HUMANOS

El Puzzle de Aronson se emplea en la asignatura Gestión de Recursos Humanos para realizar una práctica de aula correspondiente al Bloque 3. Concretamente, los alumnos trabajan el modelo de cuerpos y puestos dentro de la Administración Pública española. Este tema contiene una fuerte carga legislativa y teórica, lo que permite que pueda fraccionarse en partes más sencillas para facilitar así el aprendizaje de los alumnos.

La elección del puzzle de Aronson para la realización de esta práctica tiene una doble justificación: por un lado, facilita el aprendizaje de un tema complejo y denso mediante el trabajo colaborativo de los estudiantes. Pero además, por otro lado, permite desarrollar algunas de las competencias genéricas de la titulación que difícilmente se pueden trabajar con otras metodologías.

Es importante que los profesores diseñen y seleccionen las metodologías de aprendizaje pensando en el conjunto del proyecto curricular de su asignatura. De este modo se logra que el aprendizaje sea significativo y que los alumnos perciban que no se trata de un conjunto de actividades y metodologías desconexas entre sí, sino que forman parte de un proyecto meditado y planificado. En este sentido, la aplicación del puzzle de Aronson encaja perfectamente en la planificación de la asignatura Gestión de Recursos Humanos ya que durante todo el cuatrimestre los alumnos realizan un portafolio en grupos de 5 miembros en el que se recogen los resultados de aprendizaje de las diversas prácticas de aula realizadas.

De este modo, se aprovechan los grupos constituidos para el portafolio que configuran los grupos nodriza en el puzzle de Aronson. Esto permite mejorar y afianzar la confianza del grupo y también aumentar la responsabilidad en la resolución de la práctica lo que, a su vez, mejora el aprendizaje colaborativo. Cada uno de los componentes del grupo de portafolio (para esta práctica, grupo puzzle) se convierten en experto de una de las partes en la que se divide el tema tratado en la práctica de aula. La Tabla 1 resume las cinco partes en las que se divide el trabajo.

Práctica Aula Puzzle de Aronson	
Tema: la estructuración del sistema español de Función Pública	
Sub-tarea 1	Determinar los antecedentes del modelo de cuerpos y su importancia
Sub-tarea 2	Definir los rasgos estructurales de los modelos de cuerpos y de puestos
Sub-tarea 3	Determinar los rasgos fundamentales del modelo de la Ley 30/84

Sub-tarea 4	Determinar los rasgos fundamentales del modelo del Estatuto Básico del Empleado Público (EBEP)
Sub-tarea 5	Extraer las diferencias entre el modelo de la Ley 30/84 y el del EBEP

Tabla 1: Sub-tareas del puzzle de Aronson en Gestión de Recursos Humanos

Por tanto, esta práctica permite de forma evidente mejorar el aprendizaje de los estudiantes mediante la colaboración y cooperación entre ellos, aprovechando además las sinergias producidas por el hecho de que los alumnos trabajan en grupos constantes durante toda la asignatura.

Por otra parte, y como se ha explicado, la selección de esta metodología se fundamenta también en la necesidad de buscar metodologías de enseñanza-aprendizaje adecuadas para el desarrollo de las competencias genéricas de la titulación. En la Tabla 2 aparecen las competencias que se adquieren tras estudiar Gestión de Recursos Humanos. Como puede observarse, la mayoría de ellas son genéricas (identificadas con una G) siendo únicamente dos competencias específicas (E).

IDENTIFICADOR	COMPETENCIA
001 (G)	Gestionar la información
002 (G)	Planificar eficientemente el trabajo
003 (G)	Comunicarse de forma oral y escrita en su lengua nativa
005 (G)	Aportar soluciones creativas en la resolución de problemas
006 (G)	Resolver con acierto problemas multidisciplinares
007 (G)	Trabajar en equipos multidisciplinares
008 (G)	Adaptarse a nuevas situaciones
009 (G)	Trabajar en entornos diversos
010 (G)	Aprender autónomamente
011 (G)	Trabajar aplicando criterios de calidad
012 (G)	Demostrar compromiso ético en el trabajo
013 (G)	Aplicar los conocimientos a la práctica
014 (E)	Conocer los distintos regímenes de empleo público
015 (E)	Conocer los sistemas de organización, planificación y gestión de los recursos humanos en las administraciones públicas

Tabla 2: Competencias genéricas (G) y específicas (E) adquiridas con la asignatura Gestión de Recursos Humanos [Fuente: guía docente de la asignatura].

Obviamente, el puzzle de Aronson por sí solo no es suficiente para el desarrollo de todas las competencias genéricas de la asignatura. Sin embargo, sí es evidente que los resultados de aprendizaje que se obtienen tras la realización de esta práctica encajan con la mayoría de ellas. En este trabajo se presenta una relación entre las distintas fases y etapas en las que se divide el puzzle de Aronson y las competencias genéricas que se trabajan en cada una de ellas (Tabla 3). Por un lado, los alumnos deben comunicarse de forma oral y escrita (003) tanto en la discusión de los grupos de expertos cuando realizan conjuntamente la sub-tarea asignada como al regresar a los grupos puzzles cuando explican su parte a los compañeros. Por otra parte, al romper los grupos y constituir los nuevos grupos de expertos, los alumnos deben adaptarse a nuevas situaciones (008), trabajar en entornos diversos (009) y en equipos multidisciplinares (007). La propia resolución de la sub-tarea en el tiempo asignado por el profesor y con la información y documentación disponible requiere, por su parte, que los estudiantes gestionen adecuadamente la información (001), planifiquen el trabajo de forma eficiente (002) y aporten soluciones creativas en la resolución del trabajo (005). Complementariamente, el hecho de convertirse en experto de una parte de la práctica y ser el responsable del aprendizaje de los compañeros de dicha parte permite desarrollar las competencias relacionadas con el trabajo ético y de calidad (011 y 012). Por último, toda la práctica en sí fomenta el aprendizaje autónomo del estudiante (010) ya que no es el profesor quien explica el contenido sino que son los propios alumnos los que de forma activa y autónoma adquieren el aprendizaje.

Competencias genéricas	Fase del Puzzle de Aronson
001-Gestionar la información	- Realización de la sub-tarea en el grupo de expertos
002-Planificar eficientemente el trabajo	- Realización de la sub-tarea en el grupo de expertos - Control del tiempo asignado para resolver la sub-tarea
003-Comunicarse de forma oral y escrita en su lengua nativa	- Realización de la sub-tarea en el grupo de expertos - Explicación de la sub-tarea a los compañeros del grupo puzzle
005-Aportar soluciones creativas en la resolución de problemas	-Realización de la sub-tarea en el grupo de expertos

007-Trabajar en equipos multidisciplinares	-Rotura de grupos y creación de nuevos grupos
008-Adaptarse a nuevas situaciones	-Rotura de grupos y creación de nuevos grupos
009-Trabajar en entornos diversos	-Rotura de grupos y creación de nuevos grupos
010-Aprender autónomamente	-Trabajo como experto de la sub-tarea asignada
011-Trabajar aplicando criterios de calidad	-Realización de la sub-tarea en el grupo de expertos -Responsabilidad con el grupo puzzle sobre la correcta realización de sub-tarea
012-Demostrar compromiso ético en el trabajo	-Realización de la sub-tarea en el grupo de expertos -Responsabilidad con el grupo puzzle sobre la correcta realización de sub-tarea

Tabla 3: Relación entre las fases del Puzzle de Aronson y las competencias genéricas que se desarrollan.

5. CONCLUSIONES

La adaptación de las titulaciones al EEES ha modificado el modo de planificar las asignaturas ya que éstas, por un lado, deben facilitar la adquisición de competencias profesionales demandadas por el mercado laboral y, por otro lado, deben facilitar el aprendizaje activo por parte del estudiante. Para lograrlo, la estrategia seguida por muchos docentes es la combinación de diversas metodologías de aprendizaje activas. Sin embargo, la elección de cuál de ellas utilizar y en qué momento del proyecto curricular aplicarla suele ser una decisión poco meditada y basada, fundamentalmente, en lograr una mayor motivación por parte del alumno y con ello un aprendizaje autónomo.

El problema es que, en aras de lograr esa mayor implicación del estudiante en su proceso de enseñanza-aprendizaje, no suele considerarse que la elección de la metodología ha de lograr al mismo tiempo el desarrollo de las competencias del título. Bajo esta perspectiva, seleccionar la mejor técnica de aprendizaje se complica, más aún si se consideran las competencias genéricas o transversales. Una estrategia es utilizar el aprendizaje colaborativo para el desarrollo de competencias genéricas, ya que las ventajas de su aplicación están relacionadas con el desarrollo de habilidades

y destrezas interpersonales, coincidentes con la mayoría de competencias transversales de las titulaciones.

En este trabajo se presenta un análisis de las competencias genéricas desarrolladas con el puzzle de Aronson, técnica colaborativa, en la asignatura Gestión de Recursos Humanos. Como aportación adicional de este trabajo, la Tabla 3 muestra cómo las distintas fases de su puesta en marcha ayudan a los estudiantes a desarrollar estas competencias.

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DESARROLLO Y ELABORACIÓN DE UN DICCIONARIO DE COMPETENCIAS PARA EL GRADUADO EN GESTIÓN Y ADMINISTRACIÓN PÚBLICA

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Resumen.

En este trabajo se realiza un Diccionario de Competencias del grado en Gestión y Administración Pública. Un Diccionario de Competencias es el documento utilizado en las organizaciones para definir y cualificar las competencias profesionales, genéricas y específicas de la misma. En este sentido, el Diccionario propuesto en este artículo define las competencias específicas que todo egresado en Gestión y Administración Pública debe tener. La aportación principal consiste en definir los niveles que integran cada competencia de manera que pueda servir para diseñar estrategias de aprendizaje vinculadas a la consecución de los mismos.

1. INTRODUCCIÓN

El proceso de construcción del Espacio Europeo de Educación Superior, EEES, implica la nueva organización de las enseñanzas universitarias en sus diferentes niveles. En base a ello, el Ministerio de Educación y Ciencia hizo públicos, con fecha 26 de septiembre, 21 de diciembre de 2006 y 15 de febrero de 2007, tres documentos de trabajo con las directrices generales para la elaboración de títulos universitarios de Grado y Máster de acuerdo con las directrices del EEES. Asimismo, el 29 de octubre de 2007 se aprobó el RD 1393/2007 por el que se establece la estructura de las enseñanzas universitarias españolas (Grado, Máster y Doctorado). A partir de este momento, el diseño los nuevos Grados se realiza según las competencias que un egresado debe tener para el desempeño de su profesión. Las competencias quedan definidas en el plan de estudios y a través de los módulos y materias se van adquiriendo como resultado del proceso de aprendizaje. Al finalizar los estudios de Grado, se incorpora un Suplemento Europeo al Título establecido por el RD 1044/2003, de 1 de Agosto de 2003 que explica las competencias adquiridas con el fin de que un graduado pueda acceder a titulaciones de Máster y posteriormente de Doctorado en cualquier universidad del EEES (Ministerio de Educación, Cultura y Deporte, 2003).

El concepto de competencia se ha desarrollado en las últimas décadas de manera notable y con un creciente impacto en diferentes contextos laborales y educativos. En la Psicología Organizacional, las competencias son abordadas a partir del estudio de los comportamientos habituales de los recursos humanos al servicio de las organizaciones, los rasgos de personalidad y los distintos niveles de desempeño,

entre otras características (Spencer y Spencer, 1993). McClelland (1973) fue el primero en definir el término “competencia” como el indicador de conducta observable que se presupone necesaria para el desempeño de un puesto de trabajo. Según Yáñez y Villardón (2006) una competencia es el conjunto de conocimientos, habilidades y actitudes necesarios para desempeñar una ocupación dada y la capacidad de movilizar y aplicar estos recursos en un entorno determinado, para producir un resultado definido. Partiendo de esta definición, parece adecuado definir las competencias que un graduado debe tener para el desempeño de aquellos puestos de trabajo para los que se ha diseñado el título. Por tanto, proporcionar la formación adecuada para que el alumno pueda adquirir estas competencias se sitúa como el objetivo principal de la actuación docente, de ahí la importancia de un diseño de situaciones de aprendizaje concreto que favorezcan la adquisición de competencias definidas en el perfil del egresado.

Dentro de las competencias es común distinguir entre las competencias genéricas, que son aquellas que forman parte del perfil de egresado de todas o la gran mayoría de los grados (Gonzalez y Wagenaar, 2003); y las competencias específicas que son aquellas ligadas al desempeño de una profesión y, por tanto, propias de cada grado (Tobón, 2006).

La base de datos donde se recoge la definición y niveles de consecución de las competencias profesionales en una organización se conoce con el nombre de Diccionario de Competencias. A pesar de que en la actualidad los grados identifican las competencias que deben tener sus egresados y organizan sus materias según éstas, no hay un Diccionario de competencias dónde se recoja toda esta información. El objetivo de este trabajo es la elaboración de un Diccionario de competencias específicas del Graduado en Gestión y Administración Pública (GAP) de la Facultad de Administración y Dirección de Empresas (FADE) de la Universitat Politècnica de València (UPV).

Este artículo se organiza como sigue: tras la sección de Introducción, se contextualiza el grado en Gestión y administración Pública. A continuación, se presenta una lista de competencias específicas elaborada por los autores. En la siguiente sección se presenta, para cada competencia específica, su definición y niveles de consecución. La última sección del artículo se dedica a resaltar las conclusiones principales del trabajo así como las líneas de investigación futuras.

2. EL GRADO EN GESTIÓN Y ADMINISTRACIÓN PÚBLICA

Los estudios sobre Gestión y Administración Pública tienen su origen atendiendo a una necesidad que aparece en la Ley 30/1984, de 2 de agosto, de medidas para la reforma de la Función Pública, donde se prevé la existencia de un cuerpo encargado de las tareas relativas a la gestión administrativa y financiera de las Administracio-

nes Públicas. La implantación de dicho cuerpo requiere la formación de cuadros intermedios de profesionales especialmente preparados para la función que han de cumplir en las Administraciones Públicas (AAPP).

En el curso 2010/2011 se pone en marcha el título de grado en Gestión y Administración Pública en la FADE de la UPV según las directrices del EEES. El objetivo general de este grado es que los estudiantes adquieran las habilidades y conocimientos necesarios para ocupar puestos de trabajo de gestión técnica y de mando relacionados con las AAPP bien desarrollando su actividad profesional en la propia Administración o bien en organizaciones privadas que colaboren estrechamente con la misma. Se trata, pues, de dotar a las AAPP de empleados cualificados para desarrollar tareas de gestión y de proveer a las empresas privadas que trabajen con y para las AAPP de gestores que conozcan su casuística y que faciliten la relación con ella.

El grado en GAP, autorizado por el Consejo de Universidades e implantado siguiendo el procedimiento publicado para tal propósito según la Orden 86/2010 de 15 de noviembre de la Consejería de Educación (DOCV 25/11/2010), es elaborado por la Comisión creada ex profeso por la FADE y basa la definición de las competencias del egresado en GAP en el Libro Blanco del Título de Grado en Ciencias Políticas y de la Administración, Sociología y Administración Pública y en las directrices propuestas por la CIGAP (Conferencia Interuniversitaria de Gestión y Administración Pública) a nivel nacional.

El grado en GAP tiene un total de 240 créditos ECTS repartidos en cuatro años. De acuerdo a lo establecido por el RD 1393/2007, el título consta de un primer módulo de formación básica (60 créditos ECTS) perteneciente a la rama de conocimiento Ciencias Sociales y Jurídicas. Las materias de este bloque se desarrollan en los dos primeros cursos académicos. Además, se definen un total de 108 créditos ECTS de carácter obligatorio repartidos en dos grandes bloques que se desarrollan a lo largo de los cuatro cursos:

- las materias incluidas en el acuerdo de la CIGAP, i.e. Administraciones Públicas, instrumentos de gestión, gestión jurídico-administrativa, gestión económico-financiera y gestión de recursos humanos; y
- las materias propias, que incluyen poderes, órganos e instituciones constitucionales, derecho del trabajo y de la seguridad social, dirección estratégica de organizaciones públicas y economía de la Unión Europea.

Se incorporan también 63 créditos ECTS de materias optativas, de entre los que 18 créditos ECTS pueden ser reconocidos por la realización de prácticas en empresa. Los restantes 45 créditos optativos se reparten en dos grandes bloques: materias optativas comunes (18 créditos) y materias de intensificación a elegir entre los bloques de Economía y Gestión, y Derecho y Administración Pública (27 créditos).

Por último, el alumno realiza un Trabajo Fin de Grado para completar sus estudios, al que le corresponde una carga de 9 créditos ECTS.

Actualmente, los estudios de grado en GAP aportan una formación integral del estudiante en aspectos teóricos y prácticos que le proporcionan conocimientos del entorno jurídico, administrativo, político, financiero, económico y social en que se circunscriben las AAPP; y una formación multidisciplinar que capacita a los graduados de GAP a afrontar la exigencia permanente de eficacia y eficiencia en el entorno y peculiaridades de la función pública. Por tanto, el grado en GAP forma profesionales con un perfil complejo, de ahí la dificultad y necesidad de establecer un Diccionario de competencias específicas del graduado en GAP.

3. LAS COMPETENCIAS ESPECÍFICAS DEL GRADUADO EN GAP

Como ya ha sido explicado en la sección de Introducción, las competencias específicas son aquellas relacionadas con el perfil de profesional en el que desarrolla su actividad el egresado del grado en GAP. Además, están directamente relacionadas con el conocimiento concreto en una materia. Atendiendo a la especificidad de la graduación y a la gran variedad de salidas profesionales que pueden tener los graduados en GAP, la definición de las competencias específicas en este trabajo se ha determinado según las directrices de la CIGAP celebrada en 2006. En esta conferencia se realiza el estudio sobre las Competencias en el ámbito de la Gestión y Administración Pública a iniciativa del Grupo de Innovación Docente de Gestión y Administración Pública de la Universitat de Barcelona. El objetivo del estudio es el de establecer las competencias vinculadas al ejercicio profesional de la Gestión y Administración Pública. Para ello se desarrolla un trabajo interdisciplinar, requiriendo la participación de académicos de distintas áreas de conocimiento y de profesionales vinculados con los diferentes ámbitos de la gestión pública. A pesar de todo, el documento aprobado por la CIGAP, solo sirve de orientación para la definición de las competencias en los nuevos grados en Gestión y Administración Pública.

En este trabajo, se han formulado las competencias específicas según las recomendaciones de la CIGAP. Para cada una de ellas, se ha definido: (1) la denominación de la competencia; (2) su definición; y (3) los distintos niveles de consecución necesarios para el alcance de la competencia. Cabe destacar que, una competencia específica puede ser abordada desde distintas asignaturas de una o varias materias. A continuación se presenta el listado de competencias específicas, definición y niveles elaborado en este trabajo para el graduado en GAP.

Ser capaz de comprender los presupuestos teóricos básicos

Definición. Diferenciar e identificar las distintas clasificaciones jurídicas de unos presupuestos. Identificación de los aspectos jurídicos esenciales de las diferentes fases del ciclo presupuestario. Distinción de los principios jurídicos aplicables al ciclo presupuestario. Diferenciar los distintos órganos de control jurídico de la ejecución presupuestaria.

Nivel 1. Comprensión de conceptos básicos de las disciplinas relacionadas.

Nivel 2. Identificación y síntesis de los aspectos fundamentales de la Gestión y Administración Pública.

Nivel 3. Realización de mapas conceptuales.

Ser capaz de analizar el marco legal que regula la actividad financiera del sector público

Definición. Distinguir las distintas clasificaciones de los ingresos públicos. Reconocer el régimen jurídico aplicable a cada uno de ellos. Elaboración de un mapa conceptual del Poder Financiero de los distintos entes públicos. Elaboración de un Plan local de Tesorería. Reflexión acerca de las consecuencias financieras que conlleva para la Administración elegir una u otra operación financiera.

Nivel 1. Conocer y saber aplicar las bases del régimen jurídico de las Administraciones Públicas y el procedimiento administrativo común.

Nivel 2. Conocer el entorno del trabajo con Internet.

Ser capaz de analizar los fundamentos teóricos y prácticos de la economía política

Definición. Reconocer el régimen jurídico y los aspectos de un presupuesto público y saber gestionarlo.

Nivel 1. Analizar y gestionar las operaciones de tesorería y las operaciones financieras que lleven a cabo las Administraciones Públicas.

Nivel 2. Aplicar los principios económicos y el régimen jurídico de los ingresos de las Administraciones.

Nivel 3. Realizar las operaciones de la contabilidad pública.

Nivel 4. Analizar los indicadores contables y financieros.

Ser capaz de identificar la dimensión política, económica y social de la Unión Europea

Definición. La comprensión de las bases económicas, sociales e institucionales del proceso de construcción de la Unión Europea, además de la evaluación de los efectos económicos de las políticas europeas sobre España.

Nivel 1. Comprensión de los conceptos jurídicos principales que determinan la integración económica en la Unión Europea.

Nivel 2. Capacidad de identificar y manejar las principales fuentes documentales jurídicas europeas, particularmente las poyadas en las nuevas tecnologías.

Nivel 3. Resolución de ejercicios de síntesis y análisis del marco jurídico, competencial e institucional europeo aplicado a un ámbito material concreto.

Nivel 4. Resolución de problemas de moderada complejidad mediante la aplicación de los principios y normas sustantivas básicas del sistema jurídico de la Unión Europea.

Nivel 5. Capacidad para fundamentar con rigor y valorar críticamente situaciones y fenómenos relacionados con el proceso de integración europea.

Ser capaz de conocer y aplicar el marco legal que regula la estructura de las AAPP

Definición. Basado en el estudio conceptual sobre los principales conceptos del Derecho constitucional y los fundamentos de la soberanía y de la proyección internacional, tanto de los órganos como del ordenamiento jurídico.

Nivel 1. Conocer la organización de las Administraciones Públicas en el Estado Español.

Nivel 2. Conocer el régimen jurídico, competencial y financiero de los distintos niveles de Administración.

Nivel 3. Aplicar las bases del régimen jurídico de las Administraciones Públicas y el procedimiento administrativo común.

Nivel 4. Comprender la organización y el régimen jurídico y financiero de la Unión Europea

Nivel 5. Conocer el marco constitucional español y los fundamentos del sistema jurídico.

Nivel 6. Conocer los derechos y garantías de los ciudadanos.

Ser capaz de analizar la estructura y organización de las AAPP

Definición. Reconocer los diversos niveles territoriales de la soberanía en España y sus implicaciones con un nivel más alto como es el Derecho Comunitario Europeo y el Derecho Internacional Público.

Nivel 1. Capacidad para fundamentar con rigor y valorar críticamente situaciones y fenómenos relacionados con la organización de las Administraciones Públicas.

Nivel 2. Determinar la posición de cualquier texto normativo en el complejo sistema de fuentes actual.

Ser capaz de poner en práctica los principios básicos y las herramientas de gestión de Recursos humanos

Definición. Profundizar en la gestión de recursos humanos tanto en el ámbito privado como en el público.

Nivel 1. Identificación de los distintos tipos de personal de las Administraciones Públicas y la comprensión de sus características diferenciadoras.

Nivel 2. Conocimiento del régimen jurídico de la función pública.

Nivel 3. Conocer y profundizar en el sistema integrado de gestión de recursos humanos dentro de las organizaciones públicas y privadas.

Nivel 4. Conocer la estructuración y planificación del empleo público español y el Estatuto Básico del Empleado Público (Ley 7/2007, de 12 de abril).

Ser capaz de identificar las propuestas teóricas sobre el análisis de las políticas públicas

Definición. Saber aplicar e interpretar el análisis de las políticas públicas en el marco de la gestión pública.

Nivel 1. Aplicación del análisis teórico de las políticas públicas al estudio de casos concretos.

Nivel 2. Resolución de problemas y supuestos de gestión de políticas públicas y servicios públicos.

Ser capaz de conocer e identificar las instituciones y normas reguladoras que ordenan las AAPP

Definición. Capacidad para fundamentar con rigor y valorar críticamente situaciones y fenómenos relacionados con la organización de las Administraciones Públicas.

Nivel 1. Conocer la organización de las Administraciones Públicas en el Estado Español.

Nivel 2. Conocer el régimen jurídico, competencial y financiero de los distintos niveles de Administración.

Nivel 3. Saber aplicar las bases del régimen jurídico de las Administraciones Públicas y el procedimiento administrativo común.

Nivel 4. Comprender la organización y el régimen jurídico y financiero de la Unión Europea

Nivel 5. Conocer el marco constitucional español y los fundamentos del sistema jurídico.

Nivel 6. Conocer los derechos y garantías de los ciudadanos.

Ser capaz de entender, interpretar y elaborar contabilidad pública

Definición. Tener conocimientos necesarios para conocer y entender la elaboración de los presupuestos de las administraciones públicas, y su papel como instrumento de plasmación de la voluntad de los responsables de éstas en lo que a materias económicas y financieras se refiere.

Nivel 1. Interpretación de la información recogida en las Cuentas Anuales Públicas.

Nivel 2. Elaboración de un informe sobre la actividad financiera de la Administración utilizando los indicadores financieros y contables.

Nivel 3. Conocimiento y comprensión del ciclo contable público.

Nivel 4. Comprender la estructura, la organización y el funcionamiento de las Administraciones públicas en sus distintos niveles.

Nivel 5. Comprender la planificación y la gestión administrativa.

Nivel 6. Comprender la planificación y la gestión de los recursos económico - financieros de las administraciones públicas.

Nivel 7. Operar con datos de investigación cuantitativos y cualitativos.

Nivel 8. Comprender el entorno económico y la dimensión económica del sector público.

Nivel 9. Capacidad para planificar, implantar, evaluar y analizar políticas públicas.

Nivel 10. Comprender el marco legal de la actividad que realizan las Administraciones públicas.

Ser capaz de analizar e interpretar información estadística

Definición. Búsqueda y estudio de los textos relacionados con la información y documentación administrativa. Conocer las técnicas estadísticas principales para el análisis de datos, mejora de procesos y ayuda en la toma de decisiones.

Nivel 1. Conocimiento de medidas estadísticas y fundamentos de probabilidad.

Nivel 2. Realización de análisis descriptivos de datos.

Nivel 3. Interpretación y extracción de conclusiones a partir de la resolución de problemas.

Nivel 4. Operar con datos de investigación cuantitativos y cualitativos.

Ser capaz de manejar programas informáticos aplicados a la gestión pública

Definición. Capacidad de identificar y manejar las principales fuentes administrativas y financieras, particularmente las apoyadas en las nuevas tecnologías.

Nivel 1. Uso de las fuentes de información y de los medios tecnológicos en la Administración Pública.

Nivel 2. Elaboración de solicitudes y recursos telemáticos.

Nivel 3. Acceso autónomo a las fuentes de información y a los medios telemáticos de comunicación con la Administración.

Nivel 4. Ser capaz de organizar y gestionar grandes volúmenes de información en bases de datos

Ser capaz de conocer los fundamentos teóricos de la administración electrónica

Definición. Poseer conocimientos básicos teóricos sobre la gestión de la información en las administraciones públicas.

Nivel 1. Base conceptual de documentos y soportes.

Nivel 2. Conocer la tipología instrumental e institucional de documentos, sistemas, fuentes y acceso a la información administrativa.

Ser capaz de relacionar las distintas disciplinas que configuran la gestión y la Administración pública

Definición. Comprender las principales teorías y enfoques de la Ciencia política y de la Administración.

Nivel 1. Aplicación del análisis teórico de las políticas públicas al estudio de casos concretos.

Nivel 2. Resolución de problemas y supuestos de gestión de políticas públicas y servicios públicos.

Nivel 3. Comprender el marco legal de la actividad que realizan las Administraciones públicas

Nivel 4. Conocer el entorno del trabajo con Internet.

Ser capaz de Conocer y utilizar las TIC (tecnologías de la información y de la comunicación) aplicables a la gestión pública

Definición. Conocer de forma general las posibilidades que ofrecen las nuevas tecnologías informativas y comunicativas que son de posible aplicación al ámbito público.

Nivel 1. Capacidad de identificar y manejar las principales fuentes administrativas y financieras, particularmente las apoyadas en las nuevas tecnologías.

Nivel 2. Acceso autónomo a las fuentes de información y a los medios telemáticos de comunicación con la Administración.

Nivel 3. Ser capaz de organizar y gestionar grandes volúmenes de información en bases de datos.

Nivel 4. Uso de las fuentes de información y de los medios tecnológicos para acceder a ellas.

Nivel 5. Elaboración de informes, trabajos, proyectos apoyándose en tablas y representaciones gráficas adecuadas.

Nivel 6. Acceso y uso de bases de datos, comunicación vía Internet, búsqueda de información online.

4. CONCLUSIONES

En este trabajo se ha llevado a cabo un Diccionario de Competencias específicas para el Graduado en Gestión y Administración Pública de la UPV. Una de las aportaciones principales de este trabajo consiste además en definir para cada competencia específica, los distintos niveles que conforman el alcance de la misma.

En este artículo se establece una base de datos de competencias específicas de la titulación que conforman un Diccionario de Competencias para el graduado en GAP. De este modo se facilita la elaboración de estrategias de aprendizaje y sobre todo de evaluación destinadas a la adquisición de los distintos niveles de competencia específica del grado en Gestión y Administración Pública, con las peculiaridades que ésta plantea.

Como investigaciones futuras relacionadas con este trabajo, los autores se plantean ampliar el Diccionario para incluir las competencias genéricas del grado en GAP, así como determinar desde qué materias se abordarán las distintas competencias y sus niveles.

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MEJORA DE LOS SERVICIOS TECNOLÓGICOS DE LA UNIVERSIDAD POLITÉCNICA DE VALENCIA MEDIANTE EL USO DEL CONCEPT MAPPING.

C. PONS-MORERA, L. CANÓS-DARÓS and I. GIL-PECHUÁN

Resumen.

En este trabajo analizamos la opinión de los alumnos del Master de Ingeniería Acústica de la Universidad Politécnica de Valencia sobre los servicios tecnológicos docentes que la misma ofrece o podría ofrecer. Con este fin, se han tratado los datos empleando análisis multivariante y de escalamiento dimensional, englobados en la denominada técnica del concept mapping, técnica cuyo uso está cada día más en alza como método para discernir los puntos clave de una organización o los resortes que darán lugar a una mejora competitiva. Entre otros resultados, se demuestra que los alumnos dan la mayor importancia al uso libre de laboratorios para desarrollar proyectos innovadores.

In this paper we analyze the opinion of the students of the Master of Acoustic Engineering at the Polytechnic University of Valencia about educational technology services it offer or could offer. For this purpose, the data were treated using multivariate analysis and dimensional scaling, which are part in the so-called concept mapping technique, technique which use is increasingly rising as a method to discern the key points of an organization or keys that would lead to improved competitive. Among other results, we show that the students give the highest importance to the free use of laboratories to develop innovative projects.

1. INTRODUCCIÓN

Podemos definir *concept mapping* como una representación gráfica que combina información cualitativa y cuantitativa, y que refleja el resultado de un pensamiento grupal, con indicación de las agrupaciones de las ideas por su similitud o cercanía así como la importancia relativa de las mismas.

La primera referencia encontrada respecto al término es de Trochim y Linton y data del año 1986, los cuales indican que el *concept mapping* estructura el proceso de conceptualización de tal forma que las ideas manifestadas en la dinámica de grupo acaban representadas en un mapa perceptual, el cual permite ver cómo éstas ideas están relacionadas unas con otras y, de manera opcional, ver qué ideas son más importantes, relevantes o apropiadas. Posteriormente Trochim, en 1989, afina su definición dándole mayor relevancia a que se trata de una representación gráfica de un pensamiento grupal.

El presente estudio pretende ayudar a la mejora de los servicios que ofrecen las universidades, donde se trabaja continuamente en nuevos servicios y proyectos tecnológicamente innovadores (Clavero, J. et al, 2009).

Para responder a los objetivos planteados, el documento ha sido estructurado en tres partes. Se inicia con la presente introducción; posteriormente se describe la metodología seguida en la investigación, de acuerdo al modelo de concept mapping desarrollado por Trochim (1989) en 6 pasos, y finalmente, se exponen las conclusiones obtenidas a la vista de los resultados del método.

2. METODOLOGÍA

Para el análisis se ha seguido la metodología de *concept mapping*, entendida como un proceso inductivo y estructurado de colección de datos en grupo (Burke et al. 2005), cuyos fundamentos se basan en la psicología cognitiva y organizacional, que permiten delimitar conceptos y sus interrelaciones a través de un *brainstorming*, su ordenamiento y calificación (Rosas, 2005), para luego ser representadas en un mapa perceptual y así evidenciar la relación de la ideas manifestadas, además de su importancia y relevancia (Trochim y Linton, 1986; Trochim, 1989).

Paso 1. Preparación

En primer lugar, hemos definido el objetivo que se pretende investigar para posteriormente escoger a los sujetos que participarán en el proceso. La forma mas habitual de trabajar es formular una pregunta consensuada entre los investigadores que conducen el experimento, que nos indique claramente que información deseamos obtener.

Posteriormente, deberemos determinar quiénes serán los integrantes del grupo, ya que su participación tiene un efecto directo y relevante en los resultados a obtener. Si bien se recomienda incluir una amplia variedad de personas, a fin de enriquecer el abanico de puntos de vista, existen estudios que demandan cierta homogeneidad de los participantes; por lo que dependiendo de los objetivos del estudio se puede optar por un muestreo aleatorio de selección.

Respecto al número de participantes cabe indicar que no existe un límite estricto sobre el número de personas que deberían conformar el grupo, sin embargo, se sugiere que los mismos oscilen entre 10 y 20 personas, ya que dadas las experiencias de Trochim (1989), estas cantidades son las aconsejables. No obstante, otros investigadores como Valle et al. (1997) realizan experimentos similares a base de cuestionarios con una muestra de 614 alumnos en la Universidad de A Coruña o con una muestra de 300 alumnos en la Universidad del País Vasco según los estudios de Palomares, et al. (2007). En nuestro caso de análisis, diecisiete alumnos

acudieron al experimento, por lo que estamos dentro del límite establecido por Trochim (1989) como un grupo manejable.

Finalmente, dentro de la etapa de preparación, se debe establecer la escala de puntuación para calificar las diversas declaraciones que se obtengan en la generación de ideas. Cabe indicar que cada idea será calificada por separado y de forma individual.

En el caso que nos ocupa, se presenta una aplicación de la metodología realizada con los alumnos de la asignatura Gestión de la Innovación y la Tecnología que se oferta en el plan de estudios del Master de Acústica de la Universidad Politécnica de Valencia (UPV), Campus de Gandía.

Por parte de los investigadores se realizó una labor de documentación sobre la metodología a emplear, así como de la bibliografía al respecto, emplazando a los alumnos del citado master a realizar el presente experimento en una de las habituales clases del curso, siendo la pregunta que se consensuó por los investigadores: ¿Qué servicios docentes de la Universidad Politécnica de Valencia consideras que podrían mejorarse con la aplicación de tecnologías innovadoras?.

La escala escogida para la investigación resultó ser una escala Likert 1-5, contestando a la pregunta: ¿Cómo de útil considera cada ítem por separado?. Considerando las siguientes valoraciones: 1.- Totalmente prescindible. 2.- Prescindible. 3.- Ni prescindible ni importante. 4.- Importante. 5.- Muy importante.

Paso 2. Generación de ideas

El segundo paso debe comenzar planteando a los sujetos participantes el objetivo de la dinámica de grupos. Asimismo, debe darse una visión de conjunto de las etapas que conforman el proceso.

Este paso comienza solicitando a los participantes que, mediante la técnica del *brainstorming*, generen ideas que respondan al concepto que quiere investigarse. El objetivo principal de esta fase es la obtención del máximo número de ideas, que serán depuradas al final de la fase.

Como alternativas *brainstorming*, en los experimentos realizados por Nabitz et al. (2007) parten de un modelo previo, que es el objeto de análisis y Simpson (1994) trabaja con un *focus group* a distancia mediante el uso de cuestionarios. Otros trabajos analizados relacionados con el *concept mapping* (Bigné et al, 2002; Rosas y Camphausen, 2007; Rosas, 2005; Toral et al, 2006; Trochim, 1989; Trochim y Linton, 1986; Miranda-Gumucio, et al., 2013) sí que utilizan la técnica del *brainstorming*.

Centrándonos en nuestro caso de estudio, durante quince minutos se les expuso a los alumnos que iban a formar parte de una sesión de *brainstorming* con la finalidad de mejorar los servicios docentes de la Universidad Politécnica de Valencia.

Paso 3. Estructuración de ideas

Con las ideas surgidas en el segundo paso se procede a indagar cómo están relacionadas estas ideas entre sí y su ponderación respecto al tema tratado. Para ello, en primer lugar, se les solicita a los sujetos participantes que puntúen cada idea por separado de forma individual respecto a la escala Likert definida en el primer paso.

Elaboradas tantas tablas de puntuación de ítems como sujetos tengamos en el experimento, se procede a elaborar una tabla refundida de ítems ponderados en base a la suma de la valoración individual de cada ítem dividido por el número de sujetos participantes.

En segundo lugar se les solicita que agrupen las ideas fruto del *brainstorming*, según su propio criterio respetando las reglas de no agrupar todas las ideas en un único grupo, no hacer tantos grupos como ideas y tener en cuenta que cada idea sólo puede ir en un grupo.

El análisis comienza con la construcción de una matriz de similitud $S_{N \times N}$ para cada uno de los participantes, donde N es el número total de ideas surgidas en la sesión de *brainstorming*. En la intersección de las ideas i, j ($S_{i,j}$) se colocará un 1 si las ideas fueron colocadas por el participante en el mismo grupo, mientras que un 0 indicará que no fueron incluidos en el mismo grupo. A continuación se suman todas las matrices de similitud individuales $S_{N \times N}$ para obtener la matriz refundida, también llamada matriz de agrupaciones. Esta matriz de agrupaciones tiene tantas filas y columnas como ideas han surgido del *brainstorming*, sin embargo, el número presente en cada intersección oscilará entre 0 y M , indicando el número de participantes entre el total de M participantes que han puesto el par de ideas en el mismo grupo independientemente del criterio seguido por cada persona para realizar la agrupación. El valor de la diagonal principal de la matriz será igual al número total de participantes que han tomado parte en esta fase de la investigación (Trochim, 1993).

A continuación se muestra la lista consensuada de un total de 16 ideas o ítems representada en la tabla 1.

Tabla 1.

Resultado del brainstorming.

1	Uso de web 2.0 para interactuar alumnos y profesores. Tutorías guiadas. Implementación en la plataforma poliformat.	2	Soporte audiovisual en clases para explicar mejor la asignatura.
3	Intranet empresas-UPV. Parte del temario recomendado por las empresas.	4	Repositorio de apuntes y trabajos de alumnos, supervisado por profesores.
5	Cineforum películas relacionadas con las asignaturas, con el fin de debatirlas después.	6	Clases impartidas por especialistas mediante videoconferencias.
7	Uso libre de las aulas de prácticas con el fin de que los alumnos desarrollen nuevos e innovadores proyectos en su tiempo libre.	8	Laboratorio naval para el estudio de la acústica submarina, con fines docentes.
9	Laboratorio acústico para el estudio de nuevos materiales y aplicación de ideas.	10	Añadir idiomas en la web de la UPV. (alemán, francés, etc.)
11	Jornadas informativas a los estudiantes para mostrar los servicios tecnológicos que ofrece la UPV.	12	Escaneado de los libros con el fin de la consulta online por parte de los alumnos.
13	Pulsadores alumnos, para contestar en tiempo real a las preguntas realizadas en clase y obtención de estadísticas. (Buzz Playstation)	14	Tutorías a través de Skype o similar.
15	Uso de la pizarra digital, para mejorar la asimilación de contenidos y facilitar la docencia al profesor.	16	Grabar clases en video y/o audio y subirlas al poliformat.

Fuente: Elaboración propia.

Con posterioridad, se reparte la información de la tabla 1 a cada sujeto donde, de forma individual, debían puntuar cada idea por separado en base a la citada escala Likert 1-5.

Una vez rellena la tabla 1 por todos los sujetos participantes se procede a su recogida, entregándose a cambio a cada participante tantas tarjetas como ideas se han generado entre todo el grupo, es decir, dieciséis tarjetas por sujeto.

En este momento se explica a los participantes que deben agrupar las tarjetas en base a su similitud o cercanía, sin indicar en ningún momento cuantos grupos máximos o mínimos pueden hacer y se les indica de nuevo que deben realizarlo de forma individual.

Los investigadores, ya sin el grupo de estudio, proceden a realizar una nueva tabla refundida sumando todas las puntuaciones individuales obtenidas y dividiéndolas por el número de participantes, de forma que al final se dispondrá de una nueva tabla con las puntuaciones totales ponderadas grupales de cada ítem.

Con la obtención de las tablas refundidas mencionadas, que expresan la realidad del experimento, finalizaremos este paso, dando por cumplido el objetivo de estructuración de las ideas.

Paso 4. Análisis del concept mapping

En esta etapa (Trochim, 1989) se hace una representación de las ideas obtenidas, para lo cual se siguen tres fases.

En primer lugar, se hace un análisis que localiza cada afirmación como un punto separado en el mapa de valoración por puntos. Este análisis se realiza a través de la matriz de disimilaridad combinada que se somete a un escalamiento multidimensional de dos dimensiones. Los puntos que representan cada impacto se distribuyen en el espacio de manera que las distancias entre pares de puntos tengan la máxima relación posible con la similaridad atribuida por los gestores. De este modo, dos impactos similares están representados por puntos cercanos y viceversa (Fernández, 1991).

Si los items están más cerca unos de otros significará que han sido agrupados con mayor frecuencia. Si dos ideas están separadas significa que pocos sujetos han pensado que pueden estar en el mismo grupo de ideas.

En el *concept mapping*, el análisis de escalamiento multidimensional crea un mapa de puntos que representan el conjunto de declaraciones generadas en la lluvia de ideas sobre la base de la matriz de similitud que resultó de la tarea de clasificación.

El segundo análisis que se lleva a cabo para representar el dominio conceptual se denomina análisis de conglomerados (Anderberg, 1973; Everitt, 1980). Este análisis

sis se utiliza para las declaraciones individuales del grupo en el mapa de cluster que probablemente reflejan conceptos similares.

En el mercado pueden encontrarse un elevado número de aplicaciones bajo la denominación de mapas mentales o mapas conceptuales (Tramullas, J., et al, 2009); en el caso que nos ocupa, se introducen los datos en el programa informático SPSS para la realización del escalamiento multidimensional, de forma que definimos los 16 ítems como variables económicas numéricas, etiquetadas por los 17 sujetos participantes.

Obtenemos como resultado un primer esbozo de lo que será nuestra representación del *concept mapping*.

Para la realización del segundo análisis que indica el método, procedemos al análisis cluster o de conglomerados.

En cuanto al número de clusters probaremos con tres clusters, puesto que la mayoría de los sujetos participantes agruparon los ítems en tres grupos, obteniendo los siguientes clusters expresados en la tabla 2.

Tabla 2.

Clusters resultantes.

CLUSTER 1	CLUSTER 2	CLUSTER 3
1:Uso de web 2.0.	4:Repositorio de apuntes.	7:Uso libre de las aulas.
2:Soporte audiovisual.	10:Añadir idiomas web.	8:Laboratorio naval.
3:Intranet empresas-UPV.	11:Jornadas informativas.	9:Laboratorio acústico.
5:Cine-forum películas.	12:Escaneado de los libros.	
6:Clases videoconferencia.		
13:Pulsadores alumnos.		
14:Tutorías por Skype.		
15:Pizarra digital.		
16:Grabar clases en video.		

Fuente: Elaboración propia.

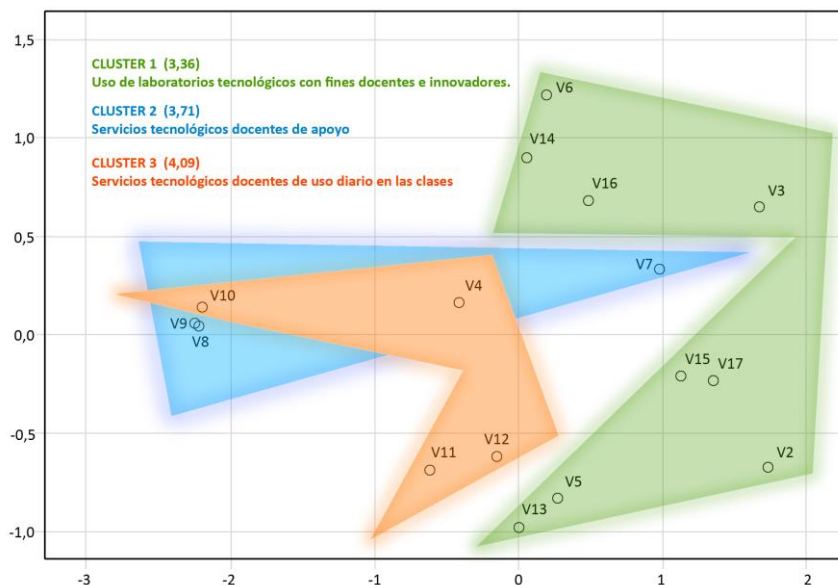
Habiendo analizado la totalidad de los resultados obtenidos, observamos un total de seis escenarios: combinaciones de tres y cuatro clusters con los métodos vincula-

ción inter-grupos, vecino más próximo y método de Ward que, en base a criterios de coincidencias de resultados y de interpretación lógica de los mismos, se escoge la agrupación obtenida de 3 clusters por el método de vinculación inter-grupos.

Para la conclusión del análisis final del método en este paso, se procede a elaborar un *concept mapping*, agrupando los ítems en tres clusters ponderados, esto es, sumando el valor de los ítems ponderados de cada cluster obtenidos en la tabla refundida, para dividirlos después por el número de ítems que contiene dicho cluster. Obtenemos la figura 1, donde el número de cada cluster (1,2,3) aparece acompañado de su valor ponderado.

Figura 1.

Concept mapping.



Fuente: Elaboración propia.

Paso 5. Interpretación de los mapas

Tal y como hemos visto en el apartado anterior, hemos agrupado los ítems en tres clusters. El primer cluster es el formado por los siguientes nueve ítems: 1: Uso de web 2.0 para interactuar alumnos y profesores. Tutorías guiadas. Implementación en poliformat, 2: Soporte audiovisual en clases para explicar mejor la asignatura, 3: Intranet empresas-UPV. Parte del temario recomendado por las empresas, 5: Cineforum películas relacionadas con las asignaturas, con el fin de debatirlas después, 6: Clases impartidas por especialistas mediante videoconferencias, 12: Sistema de

Información Geográfica respecto de tramites administrativos con privilegios internos, pero con acceso restringido al ciudadano, 13: Pulsadores alumnos, para contestar en tiempo real a las preguntas realizadas en clase y obtención de estadísticas. (Buzz Playstation), 14: Tutorías a través de Skype o similar, 15: Uso de la pizarra digital, para mejorar la asimilación de contenidos y facilitar la docencia al profesor, 16: Grabar clases en video y/o audio y subirlas a la plataforma poliformat.

El segundo cluster, está constituido por los siguientes 4 ítems: 4: Repositorio de apuntes y trabajos de alumnos, supervisado por profesores, 10: Añadir idiomas en la web de la UPV. (alemán, francés, etc), 11: Jornadas informativas a los estudiantes para mostrar los servicios tecnológicos que ofrece la UPV, 12: Escaneado de los libros con el fin de la consulta online por parte de los alumnos.

Por último, el tercer cluster es el formado por los tres ítems finales: 7: Uso libre de las aulas de prácticas con el fin de que los alumnos desarrollen nuevos e innovadores proyectos en su tiempo libre, 8: Laboratorio naval para el estudio de la acústica submarina, con fines docentes, 9: Laboratorio acústico para el estudio de nuevos materiales y aplicación de ideas. Analizando el mapa perceptual ponderado, vemos que los ítems 8 y 9 están muy próximos, observando que el séptimo ítem no queda tan próximo, pudiéndose explicar por una transposición plana de los puntos en el espacio.

Vistos los ítems que forman cada cluster, se ha bautizado a los tres clusters resultantes.

Comenzamos etiquetando el tercer cluster, el primero en formarse, como: Uso de laboratorios tecnológicos con fines docentes e innovadores. Viendo la figura 1, vemos que el presente cluster tiene una puntuación ponderada de 4.09 sobre 5, el mas alto de los tres cluster resultantes. Este cluster mantiene sus ítems en todos los métodos utilizados, por lo que se entiende que están íntimamente relacionados.

El segundo cluster, con una puntuación de 3.71 sobre 5, podría ser denominado Servicios tecnológicos docentes de apoyo.

Por ende, el cluster N° 1, claramente puede denominarse Servicios tecnológicos docentes de uso diario en las clases, con una puntuación ponderada de 3.36 sobre 5.

Paso 6. Utilización de los mapas

En el sexto paso, se toman los mapas como una representación gráfica de una explicación de un grupo de expertos sobre un concepto concreto, significando una representación teórica de las opiniones de los expertos al respecto.

En el caso que nos ocupa, los *concept mapping* elaborados serán utilizados para mejorar los servicios docentes en el Master de Ingeniería Acústica de la Universi-

dad Politécnica de Valencia, dándole prioridad en la medida de las posibilidades económicas a las ideas mas representativas.

3. CONCLUSIONES

El *concept mapping* es una herramienta muy interesante y esta siendo aplicada en numerosos estudios con el fin de identificar los puntos clave de un sistema u organización. En el presente trabajo definimos la experiencia realizada con los alumnos de la asignatura de *Gestión de la innovación y la tecnología*, que se oferta en el plan de estudios del Master de Ingeniería Acústica de la Universidad Politécnica de Valencia y proponemos una metodología para la obtención de la información de carácter tanto cualitativo como cuantitativo.

Analizando las puntuaciones ponderadas de los ítems, podemos indicar que las ideas a las que los alumnos les dieron mas importancia son la número 7: Uso libre de las aulas de prácticas con el fin de que los alumnos desarrollen nuevos e innovadores proyectos en su tiempo libre y la número 9: Laboratorio acústico para el estudio de nuevos materiales y aplicación de ideas, con sendas puntuaciones ponderadas de 4.41 sobre 5.

Se observa que los alumnos identifican el tercer cluster como el de mayor importancia, por lo que el uso de laboratorios para desarrollar proyectos docentes e innovadores, son percibidos como uno de los mejores usos de las tecnologías para la docencia.

Procede indicar que la aplicación de la metodología indicada con los alumnos ha sido profundamente satisfactoria. Al disponer de sujetos con formación académica y de un aula con suficientes ordenadores y un proyector, se pudieron complementar digitalmente las tablas expuestas, lo cual simplifico en gran medida la sesión de *brainstorming*.

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Agradecimientos

Trabajo parcialmente financiado por los proyectos CORSARI MAGIC DPI2010-18243 y TIN2008-06872-C04-02/TIN.

¿LA COMPOSICIÓN Y LA DINAMIZACIÓN DE EQUIPOS SON FACTORES IMPORTANTES PARA EL ÉXITO DEL TRABAJO COLABORATIVO? EXPERIENCIA CON EQUIPOS ORGANIZADOS SEGÚN LOS ESTILOS DEL APRENDIZAJE PREFERENCIAL COMPLEMENTARIO

M. DÍAZ-ROCA y F. J. GIL-CORDEIRO

Resumen

La investigación sobre la influencia de una metodología de enseñanza-aprendizaje denominada MAPC (Metodología orientada a los estilos del APC) en la docencia universitaria se inicia en el curso académico 2008-2009. En este trabajo se comparan los resultados académicos obtenidos al aplicar la MAPC a los alumnos de la asignatura de Programación III del Grado de Ingeniería Informática, curso 2012-2013, con los resultados de los alumnos de esta misma asignatura del curso actual, 2013-2014, una cohorte que no aplicó la MAPC y que se ha utilizado como grupo de control. La MAPC se basa en dos aspectos fundamentales: la conformación de equipos según los estilos del APC y la dinamización del trabajo colaborativo desde la funcionalidad de cada estilo. Los resultados muestran un menor rendimiento académico en el curso actual frente a los buenos resultados del curso pasado con la MAPC. En un clima de libre elección y asociación los estudiantes se organizan en subgrupos de interés o individualmente, primando la autonomía personal frente a la socialización del aprendizaje, y favoreciendo la pérdida de control en el proceso de aprendizaje de muchos alumnos y, consecuentemente, peores resultados académicos.

1. INTRODUCCIÓN

La necesidad de adaptarse al EEES implica un cambio de metodología en la educación superior que consiste en transformar el eje orientado a la enseñanza del profesor en el eje orientado al aprendizaje del alumno [1]. En la última década se ha producido un auge en la publicación de experiencias educativas en esta línea que abordan diversos aspectos como pueden ser estilos de aprendizaje, trabajo colaborativo o evaluación del aprendizaje [2], [3].

La metodología centrada en el aprendizaje para la adquisición de competencias, hace necesario e imprescindible el conocimiento de la forma de aprender de cada

alumno con la apreciación de la existencia de diferentes estilos de aprendizaje. De este modo, se pretende conseguir una atención individualizada por perfil que motive al estudiante, le aporte confianza en sus capacidades, fortalezca su autoestima y favorezca su autonomía. Y además, se intenta aproximar y mejorar la relación enseñanza del profesor y aprendizaje del alumno. La clave del cambio metodológico está en fomentar la calidad del aprendizaje al avanzar en el conocimiento de los propios estilos y manejar habilidades de pensamiento de orden superior [4].

Algunos autores, como Felder y otros [5], [6], [7], [8] mencionan varios modelos de estilos de aprendizaje que han sido objeto de estudio en la educación de ingeniería, los más conocidos son la teoría de Jung del tipo psicológico [9], utilizada como fundamento para el indicador de tipo de Myers-Briggs [10] que incorpora el enfoque centrado en la personalidad [11], y el de Kolb [12], [13] centrado en el aprendizaje [11]. Otros dos modelos, también, usados en la educación universitaria son: el de los cuatro cuadrantes cerebrales de Herrmann [14] basado en que cada hemisferio del cerebro realiza unas actividades concretas, y el de Dunn y Dunn [15] centrado en el aprendizaje [11]. Desde la Brain-based Programming se propone, también, que en el aprendizaje se debe tener en cuenta el funcionamiento del cerebro a la hora de captar y almacenar la información [16]. En los estudios mencionados realizados en el ámbito de la educación superior [17] no hay conclusiones definitivas respecto al modelo a utilizar, incluso existen detractores [18] cuyas afirmaciones han sido rebatidas [19] y, por tanto, la discusión sigue abierta.

El modelo de estilos de aprendizaje utilizado en este trabajo es el APC (Aprendizaje Preferencial Complementario) [20], [21], [22], [23], los diferentes estilos se definen en base a la forma de aprender, observable en cualquier ámbito, en particular, en el de la ingeniería y de las ciencias, ya que cada estudiante busca uno de los siguientes aspectos: el denominador común (establecer vínculos), los parecidos, las diferencias, las carencias (encontrar lo que falta), lo superfluo o el exceso (eliminar lo que sobra), las asociaciones (causa-efecto) o las separaciones (definir lo unitario). El APC está centrado en la personalidad y el aprendizaje e identifica al individuo en su totalidad sin utilizar divisiones bipolares.

En trabajos previos [20], [21], [22], [23], [24], [25], [26] se han mostrado los resultados y conclusiones de la investigación acerca de la eficiencia en el proceso de enseñanza-aprendizaje de la aplicación de la MAPC (Metodología basada en los estilos del APC), esta investigación se llevó a cabo desde el curso 2010 al 2013 en varias asignaturas del Grado en Ingeniería Informática de la Escuela de Ingeniería Informática de la Universidad de Las Palmas de Gran Canaria. Estas experiencias se han centrado en la conformación de equipos según los estilos del APC y en la dinamización del trabajo colaborativo desde la funcionalidad de cada estilo.

Este trabajo se centra en la comparación de los resultados académicos obtenidos por los alumnos de la asignatura de Programación III del Grado de Ingeniería Informá-

tica del curso actual 2013-2014, y los obtenidos por los alumnos de esta misma asignatura en el curso 2012-2013. La diferencia entre ambos está en que los equipos de trabajo del curso actual se han formado siguiendo las normas de matrícula de la Universidad y no según la MAPC, los alumnos se distribuyeron libremente en grupos heterogéneos de estilos y de cantidad según les permitió el aplicativo. A su vez, la dinamización del trabajo colaborativo se hizo respetando la libre elección y asociación.

2. APRENDIZAJE PREFERENCIAL COMPLEMENTARIO, APC

El APC se puede explicar en función de los posibles roles que suele desempeñar una persona en un ámbito profesional. Para distinguir los estilos de aprendizaje se puede utilizar la demanda de necesidades que el individuo expresa en el sentido de su discurso, tal como se entiende éste según la “teoría del sentido” [27], [28]. Al igual que Gardner, en la teoría de las inteligencias múltiples [29], [30], el APC considera dos principios básicos del aprendizaje: una preferencia de la persona por un estilo de aprendizaje concreto, que se mantiene toda la vida, y una complementariedad entre los diferentes estilos de aprendizaje de las personas.

Se puede decir que una persona cuando aprende actúa desarrollando alguno de los posibles roles [22], cuya sinopsis es [23]:

- **Orientador:** Aprende planificando el camino a seguir para llegar a una nueva realidad.
- **Racionalista:** Aprende asociando lo nuevo con una experiencia recordada buscando la evolución.
- **Creativo:** Aprende buscando parecidos, es decir, establece paralelismos y confirma que hay una estructura común.
- **Perfeccionista:** Aprende buscando diferencias, cambios, y obtiene una temporalización (calendario) del trabajo para repartir el esfuerzo y llegar a un objetivo.
- **Constructivista:** Aprende buscando la clasificación basada en las definiciones de las formas.
- **Metódico:** Aprende buscando rarezas, intentando completar la colección, enumerada según una escala en la que cada elemento aporta algo que no existía anteriormente.

- Estratega: Aprende buscando el juego y estudiando la conducta de los jugadores para entender su estrategia.

Cada estilo del APC se caracteriza por sus verbos de acción [31], [32]. El matiz con el que se consideran estos verbos es el etimológico [20], [21].

3. METODOLOGÍA ORIENTADA A LOS ESTILOS DEL APC, MAPC

Uno de los pilares básicos de la MAPC es que cada estilo tiene una forma o método de llegar a la solución de un problema. Cada método se va completando al captar los elementos necesarios que van aportando los demás, y se va mejorando con la exposición pública.

Al inicio del semestre la primera tarea es distribuir a los alumnos en equipos de forma que en cada equipo estén presentes los diferentes estilos del APC.

A lo largo del semestre, cada tema se inicia con la explicación teórica del profesor, incluyendo ejemplos ilustrativos y videos aclaratorios, en esta fase el docente muestra su estilo de enseñanza que coincide con su estilo de aprendizaje. Se publican actividades para presentar y discutir en las sesiones de trabajo colaborativo. Los alumnos individualmente preparan previamente estas actividades y al mismo tiempo ejercitan su propio método.

En las sesiones de trabajo colaborativo los alumnos exponen a sus compañeros de equipo los pasos realizados para llegar a la solución. De este modo, el trabajo colaborativo implica que el estudiante aprende enseñando y aprende de sus propios compañeros con la ventaja de la influencia de los estilos de aprendizaje, el alumno consolida el suyo frente a la diversidad presente en el equipo y colabora en la consolidación de los demás.

El profesor hace un seguimiento más preciso de cada estudiante durante las sesiones de trabajo colaborativo. El conocimiento del estilo de aprendizaje de cada alumno permite al profesor, por un lado, identificar sus dudas claramente, corregir sus errores y atender a su demanda aproximando su forma de enseñar a la del alumno, y por otro, proponerle una cooperación más estrecha con algún estudiante del equipo que lo complementa. Además, puede beneficiar a los estudiantes con diferentes perfiles si los tiene en cuenta durante sus explicaciones. De esta forma el profesor dinamiza al equipo con tratamiento individual y colectivo.

La MAPC, en definitiva, se sustenta en un sistema con un enfoque de trabajo colaborativo y una evaluación continua basada en resultados de aprendizaje y adquisición de competencias [21], [22], [23], [25], [26].

A continuación se destacan los dos aspectos fundamentales de la MAPC que distinguen las experiencias que se comparan en este trabajo, la composición y la dinamización de equipos.

Composición de los equipos

La tarea preliminar consiste en identificar el estilo del APC de los estudiantes para distribuirlos en varios equipos. La identificación se lleva a cabo vía web con un cuestionario y, si es necesario, en caso de un resultado ambiguo, con una entrevista personal. El equipo ideal para realizar trabajo colaborativo estaría formado por siete alumnos con los diferentes estilos del APC. Cuando la distribución de estilos no alcanza el ideal, se definen criterios adicionales para la conformación de equipos ajustada a la disponibilidad de los perfiles existentes en la clase. Se busca la presencia de al menos un alumno de cada estilo por equipo, y en caso de no existir, se completa con orientadores hasta un máximo de siete, esto es posible debido a que habitualmente hay abundancia de orientadores [22], [24].

Dinamización de equipos

La dinamización de equipos se lleva a cabo en la fase de trabajo colaborativo desde la funcionalidad de cada estilo. El orientador debe dirigir el equipo, identificar los diferentes ejercicios, enfocar las soluciones alternativas de cada ejercicio y lograr que cada componente del equipo participe activamente. El racionalista debe asociar el nuevo conocimiento con una experiencia previa y desarrollar el razonamiento seguido en las soluciones. El creativo debe buscar soluciones generando ideas. El perfeccionista debe trabajar con los elementos y las ideas hasta alcanzar el objetivo de finalizar la tarea y corregir errores. El constructivista debe mecanizar la obtención de la solución, imitando los ejemplos y aplicando las herramientas encontradas en ellos a otras situaciones prácticas. El metódico debe seguir el método paso a paso, completándolo si es necesario. El estratega debe establecer criterios para aligerar la carga cognitiva y justificar las decisiones tomadas.

El profesor debe abordar la dinamización prestando atención a cada equipo presente en el aula, ya que debe aprovechar el momento más adecuado para atender al orientador, apreciar al racionalista, escuchar al creativo, considerar al perfeccionista, recompensar al constructivista, tener en cuenta al metódico y elogiar al estratega. Las reuniones de tutoría de cada equipo con el profesor proporcionan un entorno de comunicación para el intercambio de fortalezas y debilidades del proceso y la posibilidad de encontrar soluciones a cualquier eventualidad.

Diferencias entre la metodología del curso 2013-2014 y la del curso 2012-2013

El estudio se centra en la asignatura de Programación III del Grado de Ingeniería Informática, durante el curso 2012-2013 se aplicó la MAPC a un total de 54 alumnos y en el curso 2013-2014 se aplicó una metodología tradicional a un total de 57 alumnos. Esta situación permitió utilizar este último grupo como grupo de control para analizar la eficacia de la MAPC.

El aplicativo de matriculación de la Universidad realizó el reparto en siete grupos de prácticas al inicio del curso 2013-2014, de forma automática, a partir de las preferencias horarias de los alumnos indicadas en la solicitud de matrícula. Las consecuencias en la composición de los equipos fueron la disparidad del número de miembros y la coincidencia de los estilos de aprendizaje de sus componentes. En un mismo equipo hubo varios alumnos con el mismo estilo y otros equipos carecían del mismo. Y, por otro lado, la dinamización del trabajo en equipo la hicieron de forma autónoma, sin organización, se hicieron subequipos que se asociaron con otros subequipos (fuera de clase), muchos alumnos no participaron manteniendo una actitud pasiva, y las exposiciones las hacían siempre los mismos alumnos.

4. ANÁLISIS DE RESULTADOS

A partir del reparto realizado por el aplicativo de la Universidad, cuatro grupos constituyeron cuatro equipos, los otros tres se dividieron en dos equipos cada uno, debido al excesivo número de estudiantes para conformar un solo equipo (máximo admitido era de 8 alumnos), constituyendo un total de 10 equipos. La distribución de alumnos en siete equipos, realizada según la MAPC, fue más uniforme en el curso 2012-2013, figura 1.

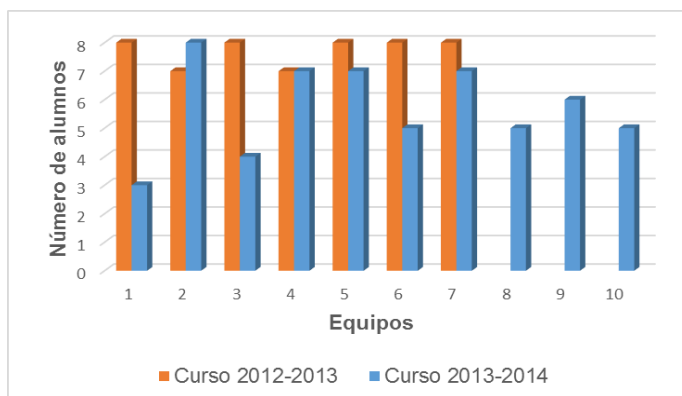


Figura 1: Comparación de distribuciones de alumnos por equipo

Los mejores resultados académicos se obtuvieron en el curso 2012-2013. El número de no presentados fue de 6 en el 2012-2013 frente a 11 en el 2013-2014. El número de suspensos fue de 1 en el 2012-2013 y de 12 en 2013-2014. El número de no aptos está formado así por los suspensos y los no presentados, tabla 1

Tabla 1: Frecuencias obtenidas según curso y calificación

		Curso	
		2012-2013	2013-2014
Calificación	Aptos	47	34
	No aptos	7	23

Un análisis de dependencia de los factores curso y calificación mediante un test chi-cuadrado establece que hay dependencia entre aptos y no aptos y el curso al que pertenecen ($p=0.001$). La estimación del riesgo relativo para la cohorte de los aptos determina que $RR=1.459$, $IC=(1.151, 1.849)$, esto significa que tienen más probabilidad de aprobar los alumnos del curso 2012-2013 que los del curso 2013-2014. El odds ratio de la prueba fue $OR=4.542$, $IC=(1.749, 11.794)$, y por tanto, la razón entre aptos y no aptos por curso es cuatro veces y media mayor en el curso 2012-2013 que en el curso 2013-2014.

Hay diferencia significativa en las notas medias. La media del curso 2012-2013 fue 7.83 con una desviación típica de 2.93 y la del curso 2013-2014 fue 5.85 con una desviación típica de 3.92. La prueba t para igualdad de medias, asumiendo desigualdad de varianzas, establece que las medias son diferentes con una significación $p=0.003$.

La diferencia fundamental está en que hay un mayor número de alumnos con notable y un menor número de suspensos y no presentados en el curso 2012-2013, figura 2. Existe una analogía en el número de alumnos a los que no les afecta la metodología utilizada, son los que han obtenido la calificación de matrícula de honor y sobresaliente.

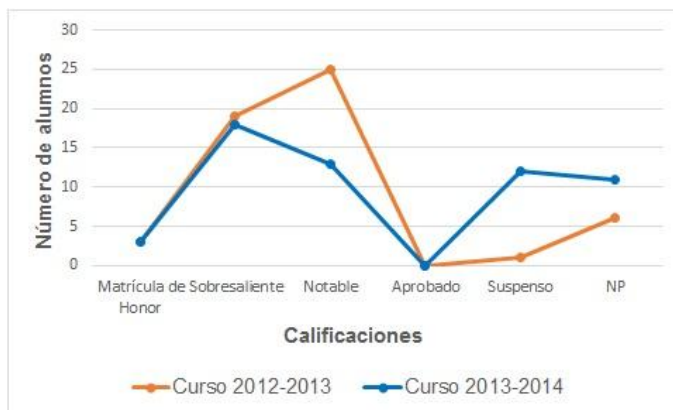


Figura 2: Comparación de calificaciones detalladas

La realimentación informal de los estudiantes muestra mayor satisfacción del alumnado en el curso 2012-2013 [26] que en el curso 2013-2014. Cabe destacar dos aspectos, además de los ya citados que están directamente relacionados con la no aplicación de la MAPC, que influyeron negativamente en la valoración del curso 2013-2014: el mayor esfuerzo realizado por los alumnos que habitualmente hacían las exposiciones y, la frecuente búsqueda de compañeros fuera del equipo para intentar mejorar resultados.

5. CONCLUSIONES

Los resultados académicos con la aplicación de la MAPC en el curso 2012-2013 fueron mejores que con la metodología tradicional del curso 2013-2014, en la que se permitió libertad de organización a los alumnos. La carencia de organización en los equipos conlleva malos resultados aun cuando el número de componentes sea pequeño.

Los dos aspectos metodológicos fundamentales de la MAPC como son la composición de equipos y su dinamización están fuertemente relacionados, y la intervención del profesor en la dinamización de los equipos depende de que estos se formen según los estilos del APC.

Si no es posible que los profesores lleven a cabo la formación de los equipos, como el proceso de identificación está automatizado, existe la posibilidad de que el aplicativo de la Universidad tenga en cuenta los estilos del APC en su distribución de grupos de prácticas.

Agradecimientos

Este trabajo forma parte de un Proyecto de Innovación Educativa, código CPIE2013-05, que tiene como fuente principal de financiación a la Universidad de Las Palmas de Gran Canaria y que está parcialmente financiado por el Departamento de Informática y Sistemas.

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TÉCNICAS DE DIAGNÓSTICO, COACHING EDUCATIVO, Y DINÁMICAS DE GRUPO PARA LA MEJORA DE LA DOCENCIA EN ESTUDIANTES UNIVERSITARIOS.

FIDEL RODRÍGUEZ LEGENDRE Y YOLANDA CEREZO LÓPEZ

Resumen.

Esta investigación tiene como objeto presentar una serie de técnicas dirigidas a incrementar la interacción entre los estudiantes universitarios con el fin de lograr un concepto más efectivo de sí mismos y de los grupos de alumnos con los cuales realizan su vida académica. En este sentido, se pretende lograr una mayor integración grupal además de estimular las líneas motivacionales del alumno para el aprendizaje, aplicando las técnicas del coaching "cognitivo" (EE.UU), del coaching "dialógico" (España) y dinámicas de grupo. Para tal fin, se establecieron tres fases dirigidas a diagnosticar las características del grupo, aplicar las técnicas con base en sus especificidades –en cuanto a sus formas de interacción sub-grupal, y conductas potenciales- y una fase final de recopilación de información, balance y conclusiones.

1. INTRODUCCIÓN

La presente investigación estuvo dirigida a lograr un mayor conocimiento de los alumnos respecto de sí mismos, así como del grupo del cual formaban parte, procurar una mayor integración, optimizar el rendimiento, y motorizar la motivación entre los estudiantes. El grupo se seleccionó por la diversidad de los alumnos y la importancia de su rendimiento al estar cursando estudios en una titulación doble: los estudiantes de ADE+MARKETING de la Universidad Francisco de Vitoria. Este grupo estaba conformado por un total de 29 estudiantes de los cuales 8 formaban parte del programa "Eramus" y los restantes eran españoles. El proyecto se desarrolló durante el primer semestre como parte de la asignatura "Sociología del Consumo". La colaboración se estableció entre el docente de la asignatura y la dirección de la doble titulación. Los diagnósticos, propuestas y balances periódicos se planificaron y desarrollaron por ambos con el objetivo de implementar una estrategia colaborativa que permita aunar objetivos institucionales y docentes.

Es interesante destacar que dentro de la asignatura, se tiene como principal objetivo estudiar el contexto social en el cual los actores sociales despliegan sus acciones dirigidas al consumo, tomando como punto de referencia fundamental las variables sociológicas y psicosociales que afectan al consumidor como sujeto, y al análisis de los aportes de la sociología al mundo del marketing y de la empresa. Bajo este marco se realizan reuniones de planificación para desarrollar un marco teórico-práctico que permitirá obtener en el alumno un aprendizaje significativo mediante la aplica-

ción de las técnicas identificadas como claves para la dirección del título para el mejor conocimiento del alumno y el grupo. Los resultados obtenidos permitirían aumentar el conocimiento del resto de profesores del grupo para mejorar su motivación y rendimiento académico. Se presenta en las siguientes secciones: la fase de diagnóstico, las técnicas que se aplicaron y los diagnósticos en base a la información recogida y por último las conclusiones.

2. DIAGNÓSTICO

Se realizaron un conjunto de reuniones de planificación en las que se determinó el uso de un test sociométrico y un “eneagrama” al grupo con los siguientes objetivos:

- 1) Medir las potenciales interacciones para detectar los sub-grupos y sus potenciales interacciones con dos tipos de funciones:
 - a. Actividades académicas
 - b. Liderazgo estudiantil
- 2) Detectar el potencial perfil de conducta.

Técnicas sociométricas Las preguntas que ayudaron a realizar el sociograma fueron: a. ¿A qué persona del grupo escogería usted para realizar actividades académicas? y b. ¿A qué persona del grupo escogería usted para plantearle problemas relacionados con el funcionamiento del curso y de la universidad?

Los resultados se muestran en el siguiente gráfico (Ver Fig.1)¹:

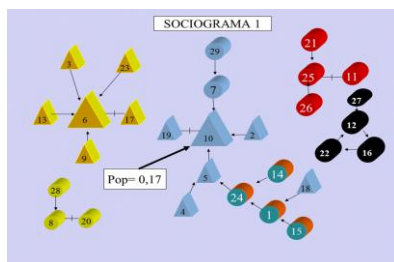


Fig.1 Interacciones individuales para la actividad académica

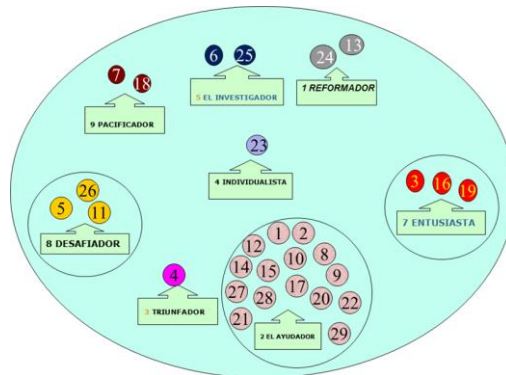
¹ Es importante aclarar que por razones de confidencialidad, hemos sustituido los nombres y los apellidos de los estudiantes, por números, tanto para el sociograma como para el “eneagrama”. Para la representación del sociograma se han utilizado los símbolos convencionales: para los hombres un triángulo, para las mujeres un círculo, las flechas para representar la escogencia de un individuo respecto de otro, y para las elecciones recíprocas, una línea horizontal atravesada en el medio con una pequeña línea vertical.

Estos resultados nos permitieron organizar nuevos grupos de trabajo rompiendo los que aparecen en el sociograma en la búsqueda y el diseño de estrategias para establecer nuevas relaciones entre alumnos que hasta el momento no hubiesen tenido contactos para la realización de tareas u otras actividades.

El “eneagrama”

El modelo y el procesamiento de información on-line ofrecido por los investigadores Russ Hudson y Don Richard Riso adscritos al *The Enneagram Institute*,² nos permitió detectar el potencial perfil de conducta [1] que podrían tener los alumnos del grupo en estudio.

La aplicación de esta herramienta aportó la siguiente distribución, de acuerdo con los 9 “eneatipos” del modelo Riso-Hudson: 2 reformadores, 15 ayudadores, 1 triunfador, 1 individualista, 2 investigadores, 3 entusiastas, 3 desafiadores y 1 pacificador (Ver Fig. 2).



² Es importante aclarar que el “eneagrama” es un recurso utilizado en algunas empresas con el objeto de desarrollar habilidades profesionales, formar equipos de trabajo, motivar a los colaboradores, y es concebido como una guía de la potencial conducta de un individuo, aportando información orientativa respecto de los procesos cognitivos, emotivos y las posibles formas de actuación. Además, establece nueve tipos de personalidad denominados “eneatipos”. Para profundizar en este tema ver Balart, M., Fernández Leandro, “La autoconciencia del directivo: un factor clave para el coaching” en *Mentoring & Coaching Universidad y Empresa*. 2008 N° 1, pp. 219-232. En el caso específico de la presente investigación hemos acudido al test on-line ofrecido por los investigadores Russ Hudson y Richard Riso. En esta propuesta se establecen 9 “eneatipos”: reformador, ayudador, triunfador, individualista, leal, entusiasta, desafiador, y pacificador. (Para mayor información respecto de esta propuesta, ver <http://www.eneagrama.com/>).

Fig.2 “Eneagrama” de los 29 estudiantes del grupo distribuidos en los “Eneatipos”.

Esta información completó la información para la confección de grupos, combinando los datos del sociograma N° 1, y del “eneagrama” (ver Fig.3).

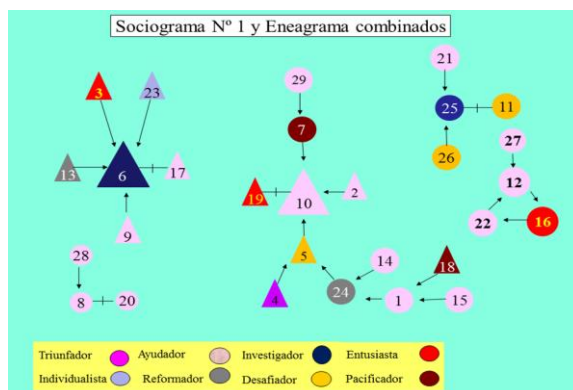


Fig.3 Combinación del sociograma n° 1 y del “eneagrama” de los 29 estudiantes distribuidos en grupos, conservando la identificación del “eneatipo” correspondiente.

3. APLICACIÓN DE TÉCNICAS DE COACHING EDUCATIVO “DIALÓGICO”³

El modelo del coaching dialógico es concebido como un proceso de acompañamiento que persigue desplegar las potencialidades del individuo mediante *...el incremento de la responsabilidad, el compromiso con la acción y la construcción de relaciones de encuentro con el entorno* [2]. En el proceso de “aclimatación” de esta corriente al área de la educación universitaria⁴, el aula de clase es concebida como un espacio sistémico compuesto por una red de elementos interrelacionados y donde los cambios en uno de sus componentes, afectan al conjunto del sistema, al tiempo que la interacción registrada dará lugar a una “atmósfera micro-social” denominada “Entre” [3].

³ El coaching dialógico es una propuesta del Instituto de Desarrollo Directivo Integral (IDDI) de la Universidad Francisco de Vitoria. Parte de las técnicas que han sido utilizadas para esta investigación, fueron impartidas en el curso “Coaching Dialógico para docentes. El aula como lugar de encuentro”, realizado entre el 8 de junio y el 19 de octubre de 2013 en la Universidad Francisco de Vitoria. Uno de los principios básicos de esta corriente del coaching parte de concebir a la persona *...no como una realidad aislada y acabada, sino como un ser que ha de desarrollar y potenciar su identidad y capacidades en la relación constructiva y dialógica con la realidad, con los demás y con el mundo* [Para ampliar los planteamientos centrales ver Susana Alonso, *Coaching Dialógico*, Madrid, (LID-editorial), 2013].

⁴ Es importante aclarar que el coaching tiene su origen en el área de la empresa.

La experiencia del docente y la dirección, co-liderando el grupo, determinó la aplicación de diferentes técnicas que permitían un mejor conocimiento de cada estudiante en cuanto a su potencialidad académica, una conciencia más clara respecto de los otros miembros del grupo y una mayor conciencia de la “atmósfera micro-social” (“Entre”).

A continuación se describen las técnicas aplicadas: dinámica de las etiquetas, identificación de la personalidad mediante colores y el círculo constructivo de identificación de las opiniones del sistema sobre el individuo; técnicas de coaching “cognitivo” en la etapa de la “conversación planificada” entre docentes; y finalmente las técnicas y dinámicas de grupo para la integración y para el proceso de aprendizaje.

-Dinámica de la etiqueta: cada miembro de un subgrupo seleccionado (y que forma parte del grupo general de alumnos), debe jugar un rol, para lo cual le es colocada una “etiqueta” donde se describe una “supuesta” personalidad o rol dentro del micro-grupo, pero con la particularidad siguiente: la persona a la cual se le coloque una “etiqueta” en la frente, no debe saber qué rol o “etiquetado” le ha sido asignado, aunque sí podrá saber el rol o “etiquetado” de los otros miembros del grupo. También deberá interactuar con cada miembro, tomando en cuenta el “etiquetado” que le ha sido asignado a ese miembro. El objetivo final consiste en entender que más allá del “etiquetado” que un alumno pueda tener en el aula de clase, se hace necesario conocer más profundamente a cada miembro del grupo, ya que una valoración menos prejuiciada, dará lugar a una construcción más positiva del “Entre”.

La dinámica fue planteada en función de un escenario, en el cual se iban a incorporar algunos contenidos impartidos en la asignatura de “Sociología del Consumo”, con el objeto de concentrar la atención de los participantes en el proceso de discusión a ser realizado, y donde el problema del etiquetado (que es el objeto central de la dinámica), no debía convertirse en el centro de atención de los participantes. De tal forma, el “escenario ficticio” consistió en una discusión de grupo de 8 empleados de una empresa de marketing y publicidad, quienes debían tomar una resolución respecto de un “spot publicitario” para su aprobación o rechazo.

-Dinámica de identificación de la personalidad con colores: consiste en entregar un texto donde se describe la personalidad de una persona, asociada a un color específico. Para su realización, se entrega a cada alumno una hoja con la interpretación de varios colores en relación con distintos rasgos de personalidad. Seguidamente, el profesor debe leer la hoja con las descripciones, e indicar a los alumnos que acudan a una zona del aula donde estarán colocadas varias cartulinas, y se ubiquen junto al color con el cual se identifican (asociado a una personalidad específica).

-Dinámica de identificación de la personalidad de un estudiante por el resto del grupo: esta dinámica es consecuencia de la actividad anterior, y consiste en que un alumno, a partir de una actividad que lleve a cabo, sea identificado o asociado a un

tipo de personalidad utilizando los diversos colores. Para tal fin, fueron seleccionados 8 alumnos, quienes de manera individual, debían hacer una presentación de un producto de consumo, y tratar de persuadir a los demás alumnos sobre los beneficios, y calidad del mismo. Finalmente, dependiendo de los rasgos, gestualidad y forma de exposición realizado por el alumno, el resto de los estudiantes debe identificar la personalidad característica asociada al color relacionado.

-Círculo constructivo de identificación de las opiniones del sistema sobre un individuo: consiste en entregar un folio a cada miembro del grupo. Seguidamente, cada alumno debería colocar su nombre y apellido, y entregar la hoja al alumno que tenía a su derecha. El estudiante que recibe la hoja, debe escribir alguna opinión respecto de la persona cuyo nombre aparezca en la hoja. Esta acción debe repetirse hasta que se complete el círculo, e inmediatamente, el responsable de la actividad debe pedir la hoja a cada alumno.

4. APLICACIÓN DE TÉCNICAS DE COACHING EDUCATIVO “COGNITIVO”⁵

Este enfoque persigue reducir el aislamiento del profesor y mejorar su eficacia, incrementando las estrategias de enseñanza, explorando los recursos que posee y que no ha utilizado. Su procedimiento se resume en: a- Conversación planificada; b- Proceso de observación (recopilación de datos); c- Conversación reflexiva. El propósito de cada sesión de coaching consiste en “...llevar a un docente del punto donde éste se encuentra al estado ideal donde quisiera estar” [4]. De los pasos señalados, de acuerdo con la propuesta diseñada por la investigadora norteamericana, Donna Dildy en su trabajo titulado *Action Research: Cognitive Coaching as a Vehicle to Improve Teacher Efficacy*, fue aplicada la estrategia de la “conversación planificada” la cual consiste en una serie de preguntas que el coach realiza al profesor [5], con el objeto de aclarar objetivos, el potencial ritmo de la lección, y los posibles comportamientos de los alumnos cuando realizan una tarea o una lección.⁶

⁵ El coaching “cognitivo”, junto con el coaching “instruccional” y el *literacy coaching*, son propuestas desarrolladas en Estados Unidos, y cuya aplicación se registra en los niveles de educación primaria y secundaria. Para ampliar la información ver: Cornett, J., “Research on Coaching” en Knight, J., (coord) *Coaching Approaches & Perspectives*, USA, Hawker Brownlow Education, 2008, pp. 192-216; Killion, J., “Coaches’ Roles, Responsibilities, and Reach”, en Knight, J. (coord). *Coaching Approaches & Perspectives*, USA, Hawker Brownlow Education, 2008, pp. 7-28; Toll, C., *The Literacy Coach’s Survival Guide: Essential Questions and Practical Answers*, International Reading Association, 2006.

⁶ Para la presente investigación, se llevó a efecto un ejercicio de “conversación planificada” -partiendo de las preguntas propuestas por la investigadora Donna Dildy- realizado entre la dirección de la carrera (rol de coach) y el profesor de la asignatura con las siguientes preguntas y respuestas: 1-¿Cuál es el objetivo de la lección? R- Al impartir el punto del programa sobre las dinámicas de grupo, pretendo lograr una mayor atención, participación y motivación en los alumnos; 2-

La información recogida a lo largo del proceso se completaron por el docente aplicando las siguientes estrategias:

a- **Juego de roles** (realizado el 14 de octubre de 2013). En esta dinámica de grupo, el docente pidió a varios alumnos que realizaran una serie de acciones⁷ en el aula. Con esta actividad se pretendió reforzar el proceso de aprendizaje del tema referido a los conceptos de rol y status. También se buscó estimular la participación.

b- **Estrategia narrativa mediante la fotografía** (realizado el 18 de noviembre de 2013). Dicha actividad consistió en la elaboración (por sub-grupos) de un story-board y con base en el mismo, realizar una serie de fotografías en cuya sucesión de imágenes se transmitiera un mensaje publicitario para la venta de un producto de consumo⁸.

c- **Organización de planos, elaboración de un guion y estructuración de un spot publicitario** (realizado el 16 de diciembre de 2013). A partir de la organización de 5 subgrupos, se proyectaron 7 planos separados de un spot publicitario los cuales debían ser reestructurados, -procurando una mayor persuasión al consumo-, elaborar el guion de la voz en off, y que un miembro de cada grupo narrara el guion. El objetivo era estimular la construcción del conocimiento por parte del alumno⁹.

¿Cómo sabrá que sus estudiantes han alcanzado los objetivos? R- Si logran entender la teoría de los grupos, las dinámicas de grupo y valorar las herramientas de diagnóstico como la sociometría y "eneagrama"; 3-¿Cómo ayudará a los alumnos a lograr los objetivos?¿Qué estrategias podría emplear? R- Se realizará un "Juego de Roles", un "Phillips 66" y se explicará la teoría sobre las dinámicas de grupo. Seguidamente, se expondrá la utilidad del diagnóstico mediante el uso de la sociometría y el "eneagrama". Finalmente se realizarán varias dinámicas para complementar la información teórica expuesta. 4-¿Qué datos le gustaría a usted que el coach recopilara acerca de sus estudiantes? R- Fundamentalmente la concentración de los alumnos y la capacidad de atención.

⁷ Las acciones realizadas por los alumnos consistieron en levantarse sobre una silla, sentarse en un escritorio, o acostarse sobre una mesa, y pronunciar algún tipo de frase -indicada por el profesor-, acompañada de un movimiento específico. Luego de realizada la acción, el profesor preguntó a los alumnos las razones por las que habían ejecutado las órdenes. En la generalidad de las respuestas señalaron que las habían cumplido por respeto a la autoridad del profesor. Luego, el docente explicó que la ejecución de dichas acciones podía ser entendida como un ejemplo en el cual una persona con cierta autoridad, ejerce su status a través del rol, en un espacio social específico.

⁸ En tal sentido, el objetivo grupal estuvo dirigido al logro de un mayor conocimiento de los miembros del grupo. Además se buscó reforzar los conceptos de planimetría, angulación, zona de cuadro, denotación y connotación, indispensables para el profesional del área de marketing y consumo en cuanto al diseño de campañas publicitarias.

⁹ También se buscó cubrir un objetivo académico dirigido a mostrar cómo las formas de planimetría, angulación, proceso de transición entre dos planos, la voz en off, uso de la música, duración de los planos y características del guion varían dependiendo del producto, la marca y las características sociodemográficas y económicas del consumidor.

d- “Phillips 66”, “Dripping” colaborativo de grupo y “Fútbol ciego” (realizados el 13 y 20 de diciembre de 2013). Estas tres dinámicas de grupo tuvieron un objetivo principalmente académico, ya que se buscó ejemplificar un aspecto del temario referido a la teoría de los grupos y las dinámicas de grupo. Pero al mismo tiempo, se trató de estimular el proceso de integración además del conocimiento grupal.

5. RECOPIACIÓN DE LA INFORMACIÓN Y BALANCE

En la tercera fase se aplicó un cuestionario (a 26 de los 28 alumnos) dividido en dos secciones: a-En la sección N°1, se evaluaron las técnicas del coaching “dialógico” a fin de registrar hasta qué punto se había logrado un mayor conocimiento tanto de los alumnos respecto de sí mismos, como de los miembros del grupo (Ver Fig.4)¹⁰.

Expresa, por favor, tu opinión a las siguientes cuestiones, haciendo una valoración en una escala de 1 a 6, sabiendo que el 1 siempre indica el grado más bajo y el 6 el grado más alto.	1	2	3	4	5	6	NS/NC
1 La preparación de la clase fue planificada minuciosamente por los profesores		1	3	3	7	12	
2 La preparación que realizaste para la clase fue minuciosa y sistemática	1	3	7	7	5	3	
3 El papel de los profesores fue fundamental para el buen desarrollo de las actividades		2	1	6	7	10	
4 Comprendí los objetivos de las actividades realizadas		2	7	3	8	6	
5 El cambio del espacio dentro del aula facilitó el aprendizaje	2	3	4	4	8	3	2
6 Consideras que el tamaño del grupo fue apropiado para alcanzar los objetivos marcados	1	4	4	6	11	4	
7 El trabajo en grupo fue positivo para la consecución de los objetivos planteados		4	1	9	7	5	
8 Me sentí responsable del buen desarrollo de las actividades	1	4	6	4	7	4	
9 Me ayudó en mi autoconocimiento		3	6	9	5	3	
10 Era como alumno el protagonista del proceso de enseñanza-aprendizaje	1	2	8	3	6	6	
11 Me he sentido en un ambiente libre	2	4	4	8	8		
12 La experiencia refuerza la práctica de los contenidos teóricos estudiados	1		7	7	7	4	
13 Las actividades estaban bien integradas con el resto de contenidos de la asignatura		3	3	8	6	6	
14 La práctica contribuyó a aumentar mi motivación por el aprendizaje de la asignatura	2	2	3	5	6	8	
15 Las actividades deberían evaluarse como parte de la asignatura	1	2	4	4	4	11	
16 Las actividades ayudaron a crear un espíritu amigable con el grupo	1	1	4	5	7	8	
17 Las actividades mejoraron la relación entre iguales		2		9	7	7	1
18 La experiencia me aportó un mayor conocimiento del grupo	1		2	9	6	8	
19 La experiencia me motivó a conocer más a algunos de mis compañeros	1	2	6	5	7	5	
20 Los temas tratados en el aula conectaron con mis intereses personales	1	1	8	7	6	3	
21 Desde una consideración general, evalúa las DINÁMICAS desarrolladas:		2	3	3	9	9	

Fig.4 Sección N° 1 del Cuestionario

Si nos atenemos a los puntos del cuestionario dirigidos a registrar el nivel de autoconocimiento y participación, y sumamos las valoraciones 4, 5 y 6 para las preguntas n° 8 (*Me sentí responsable del desarrollo de las actividades*), n° 9 (*Me ayudó en mi autoconocimiento*), y n° 10 (*Era como alumno el protagonista en el proceso de enseñanza-aprendizaje*) se obtiene un 57,5%, 65,3%, 57,5% respectivamente, indicando una ligera tendencia hacia un efecto positivo. Sin embargo, estimamos

¹⁰ En la valoración de la escala de 1 al 6, el 1 es el grado más bajo y el 6 el grado más alto.

En relación a la utilidad de las dinámicas para la mejora del aprendizaje, importa destacar la suma de las valoraciones 4, 5 y 6 de la pregunta nº 1-a (*¿Piensa que con la realización de esta dinámica se pudo lograr una mayor comprensión del tema?*) con un 70%, así como las preguntas 3-a (*¿Esta dinámica permite que el alumno logre la construcción de su propio conocimiento?*) y 3-b (*¿Esta dinámica permite la adquisición de alguna habilidad o conocimiento que pueda ser útil para el futuro ejercicio de su carrera?*) ambas con la obtención de un 72%. Estos indicadores aportan una aparente aceptación de los procedimientos pedagógicos que incorporen al alumno al proceso de construcción del conocimiento, o que le permitan constatar mediante actividades prácticas, la comprensión y potencial utilidad de ciertos conceptos, herramientas y procedimientos. También facilitan una aparente integración grupal, tal como se puede constatar en la pregunta 4-a con un 85% (al sumar las valoraciones 4, 5 y 6). No obstante, la planificación previa de los sub-grupos mediante el análisis de los datos obtenidos a través del sociograma y del “eneagrama”, aparentemente no resultó muy efectiva, ya que el 76% de los alumnos prefiere integrarse en grupos de trabajo con compañeros de clase que ya conozca previamente (tal como se constata de la suma de las valoraciones 4, 5, y 6 de la pregunta 2-c).

6. CONCLUSIONES

1-Aunque los datos que ofrece el cuestionario apuntan a una valoración positiva después de aplicadas las dinámicas correspondientes al coaching “dialógico” para lograr una mayor integración grupal, sin embargo en el desarrollo del curso entre los meses de octubre de 2013 hasta febrero de 2014, no se observó una interacción integradora, solidaria y efectiva entre los miembros del grupo.

2-En lo que se refiere a las estrategias dirigidas para una mejora del aprendizaje, los resultados fueron más efectivos, no solo por los datos obtenidos en el cuestionario. También es importante señalar que del total de los estudiantes, solo el 6,6% suspendió la asignatura.

3-Para este caso concreto las estrategias han sido más efectivas para el proceso de aprendizaje que para el proceso de integración grupal.

4-Independientemente de los resultados obtenidos, es importante señalar que este tipo de estrategias contribuyen a una mejora en el proceso de aprendizaje siempre y cuando se profundice en la evaluación y estudio de su efectividad. Por lo cual, es importante concebir el aula como una modalidad de “laboratorio social” en el marco de un proceso abierto para la mejora de la enseñanza.

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GRADOS BILINGÜES. VENTAJAS E INCONVENIENTES

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Resumen.

En la actualidad, las Universidades españolas se están concienciando de la importancia que representan los idiomas a la hora de la internacionalización, tanto de la institución como del alumnado. De tal forma que se está impulsando la impartición de la docencia reglada, principalmente en inglés, en ciertos grados universitarios. Así, el Aprendizaje Integrado de Contenidos y Lenguas Extranjeras (AICLE) es una iniciativa cada vez más empleada en la enseñanza superior, intentando así facilitar el aprendizaje o mejora de idiomas en concreto en lo referente a términos específicos y técnicos de cada enseñanza. Pero para que esta enseñanza se consolide y tenga éxito deben tenerse en cuenta ciertos aspectos como el de poder contar con un profesorado que posea una buena formación no solo en la lengua extranjera sino en el uso de la misma para la enseñanza de sus materias y también que el alumnado que participe en este tipo de enseñanza posea un cierto nivel de conocimiento en inglés para que el proceso de enseñanza-aprendizaje pueda realizarse con éxito. Es por eso que este trabajo pretende abordar una pequeña reflexión de cuáles son las ventajas e inconvenientes, que a nuestro entender, presentan hoy en día los grados bilingües en nuestro sistema universitario.

1. INTRODUCCIÓN

Como resultado de la puesta en marcha del denominado Espacio Europeo de Educación Superior (EEES), las universidades españolas se han visto sometidas a un importante proceso de cambio tanto en la forma de concebir la enseñanza como en la forma de la estructuración y de los contenidos de sus titulaciones. Debido a esto, se han desarrollado y diseñado nuevos planes de estudio centrados en el desarrollo de competencias, siendo una de las más destacadas el conocimiento, por parte del alumnado, de una lengua extranjera, lengua que suele ser el inglés ya que es el idioma internacional por excelencia y ha sido el medio de comunicación empleado en diversos contextos educativos, políticos y sociales. Los trabajos y las evidencias prácticas ponen de manifiesto que el nivel de los estudiantes en competencias idiomáticas no alcanza el valor adecuado para poder competir evidenciando la necesidad de fomentar en nuestros futuros graduados el dominio de otra u otras lenguas europeas con el fin de incrementar sus posibilidades en el mundo laboral.

Con este artículo lo que pretendemos es hacer una pequeña reflexión sobre la docencia bilingüe en la enseñanza superior debido a que es una actividad creciente en

nuestras universidades en la actual adaptación de los planes de estudio al EEES, siendo este un proceso que pretende la internacionalización de las mismas.

Los primeros grados bilingües que se ofertaron en nuestro sistema universitario venían de la mano de las universidades privadas, siendo las pioneras allá por el año 2002, aunque en años posteriores se han ido ofertando en el resto de universidades públicas de todo el sistema. Los cursos y asignaturas ofertados en inglés por las distintas universidades españolas están recogidos por el Ministerio de Educación, Cultura y Deporte en el documento “Degree Programs in English Language in the Spanish University System 2013”, observándose en dichos listados que las áreas que cuentan con mayor número de grados y postgrados en inglés son economía y dirección de empresas, ingeniería, arquitectura y los grados de maestro [1]. La distribución del número de créditos en lengua extranjera así como el nivel mínimo requerido para cursar estos grados depende de cada Centro, presentando estos criterios una gran heterogeneidad. Así, de forma general las universidades suelen hacer un avance progresivo en el número de créditos que han de cursar los alumnos en el idioma extranjero, empezando con una asignatura o dos en el primer curso e ir aumentando el número de créditos en inglés hasta alcanzar más del 50% del total de la carrera. Otra opción que también se está implantando es que el alumno complete su formación en una universidad extranjera, es decir, comienza sus estudios en España y los termina en un centro extranjero, lo cual le permitiría alcanzar un aprendizaje más activo del idioma y una formación con marcado carácter internacional. En cuanto a los requisitos para poder acceder a una titulación bilingüe no hay nada establecido y son los propios Centros los que marcan los criterios mínimos, así en algunos casos con que exista un número mínimo de alumnos interesados sería suficiente para impartir dicha titulación, en otros casos se realiza una prueba de nivel que permita al alumno conocer sus capacidades para cursar estudios en otro idioma, otros centros exigen una nota mínima en dicha prueba o incluso es obligatorio el presentar un certificado que acredite el nivel del alumno, pudiendo ser un B1 o un B2. Generalmente los alumnos acceden al sistema universitario con una serie de debilidades en lo referente al conocimiento de idiomas como es el bajo nivel a pesar del número de años de estudio de otra lengua o que aprenden idiomas sólo por necesidad y con poca motivación. Como contraposición cabe destacar que valoran de forma muy positiva y necesaria el conocimiento de los mismos y reconocen la importancia en su vida laboral futura [2]. En este punto, cabe también mencionar el nivel del profesorado, donde en algunos casos no sirve solo con la buena disposición y voluntariedad del mismo para impartir dicha docencia sino que también se le exige una acreditación con niveles que van desde el B1 hasta el C1.

Dado que el AICLE es una iniciativa cada vez más empleada en la enseñanza superior, se hace necesario realizar una reflexión de cuáles son a día de hoy las ventajas e inconvenientes que presentan estas titulaciones y que aspectos podrían mejorarse

para conseguir un buen grado de satisfacción tanto por parte del alumnado como del profesorado.

El impartir asignaturas en otras lenguas extranjeras no solo implica tener un buen nivel de dicho idioma, generalmente inglés por lo expuesto con anterioridad, sino también dominar los contenidos específicos propios del Grado donde se imparten dichas materias. Es por este motivo que no se puede confundir una materia en lengua extranjera con una clase de idiomas, puesto que lo importante serán los contenidos convirtiéndose el aprendizaje del idioma en un valor añadido tanto en lo referente a vocabulario específico y expresión oral. Si nos centramos en el profesorado, hay que tener presente que no son nativos en dicha lengua y se cuenta con su experiencia y buena disposición para impartir dichas materias. Esto conlleva a un esfuerzo y una mayor carga de trabajo que generalmente no suele ser suficientemente reconocido por parte de las universidades, ya que la preparación de estas asignaturas requiere más tiempo que el destinado a una asignatura impartida en español, constituyendo una causa de desmotivación entre el profesorado, llegando a no querer impartir dichas materias y haciendo más complicado el encontrar gente interesada en impartirlas. También es necesario tener en cuenta el distinto nivel de dominio del idioma por parte de los alumnos matriculados en dichas materias, puesto que aunque el docente tenga un buen nivel lingüístico, soltura en el lenguaje y elocuencia al exponer las ideas, todas ellas se pueden ver mermadas no sólo por la mayor dificultad que presenta el expresarse en otra lengua diferente a la materna sino también por esa diferencia de nivel entre alumnos.

Otro inconveniente que se le presenta al profesorado es cómo abordar la corrección del nivel de inglés que tienen los estudiantes. De forma general, el profesorado considera que es prioritaria la comunicación oral y que es en la parte gramatical donde surgen más dudas a la hora de enfocar la corrección, puesto que los docentes no son especialistas en lengua ni tienen formación filológica. Otra desventaja destacable es la falta de información del estudiantado acerca de la oferta existente de grados bilingües, ni de las asignaturas impartidas en inglés en dichos grados. Quizá una buena publicidad y mayor visibilidad de esta oferta haría que mejorase el número de alumnos matriculados en estas materias.

Es importante mencionar que el hecho de que las mismas materias se oferten en inglés y en castellano implica que debe existir un esfuerzo a mayores de coordinación entre todo el equipo docente que imparte la materia, porque en ningún momento debería existir ninguna diferencia entre unas asignaturas u otras, únicamente el idioma empleado en cada una de ellas.

Como ventajas podemos destacar puntos ya mencionados, como son el manejo de un lenguaje específico propio de la materia y de la aplicación de la misma a sus estudios, lo que también conllevaría mejoras en su campo de trabajo futuro, como serían poder escribir artículos de investigación, ya que las revistas de renombre

internacional emplean el inglés en sus publicaciones. También el hecho de conocer otras lenguas europeas facilitaría la movilidad y ampliaría las oportunidades de trabajo a todo el ambiente laboral internacional. Esta movilidad por parte de los estudiantes también repercutirá en una mayor presencia de alumnos extranjeros en nuestras aulas y deseablemente en una mayor presencia de alumnos de nuestras universidades en otras universidades extranjeras. Otra ventaja que repercute en las universidades es que obtienen numerosos beneficios al ofertar materias y titulaciones en otros idiomas, incrementando así su atractivo hacia el alumnado extranjero y adquiriendo competitividad y excelencia internacional. Al mismo tiempo esto facilita la libre circulación de alumnos y profesores y se pueden abrir colaboraciones con otras universidades creando entre otras cosas, dobles titulaciones.

Todo esto lo podemos resumir en lo que Coleman identifica como “seven forces behind CLIL (Content and Language Integrated Learning)” [3]:

- Aunque las clases se impartan en inglés, el aprendizaje del inglés no es uno de las prioridades ni existen objetivos lingüísticos explícitos.
- Se produce una internacionalización de las universidades tanto por motivos investigadores como docentes, siendo esta internacionalización un indicador de prestigio.
- Se facilita el intercambio de alumnos, sobre todo si se emplea una lengua extranjera común para todos.
- La mayoría de los resultados de investigación sobre todo en las titulaciones técnicas y en las científicas están publicados en inglés. Lo mismo suele ocurrir con los materiales didácticos, desde libros hasta las bases de datos, que se encuentran mayoritariamente en inglés, por lo que resulta más sencillo y eficaz acudir a las fuentes originales que recurrir a las traducciones de las mismas, si es que existen.
- Movilidad por parte del profesorado, tanto en la recepción de profesores extranjeros como en estancias para impartir clases y conferencias en países europeos.
- Salidas laborales para los egresados, ya que al haber estudiado en una lengua extranjera o poder acreditar un determinado nivel de idioma suele considerarse como una mejor preparación profesional y enriquece el currículum.
- Atraer alumnos internacionales ya que un centro tendrá más posibilidades de recibir alumnos extranjeros si la docencia es un inglés que si únicamente se imparte en su lengua local.

En conclusión, estamos en un período de cambios educativos encaminados hacia la convergencia europea mostrándose por parte de nuestras universidades un creciente interés en fomentar entre sus estudiantes conocimientos y competencias en lenguas extranjeras pero todavía queda un largo camino que recorrer a la hora de conseguir

una implantación lo más ventajosa posible tanto para el alumnado, como para los profesores y universidades en grados bilingües. Aun así, este considerable esfuerzo que se está realizando da como resultado una experiencia enriquecedora tanto para las instituciones como para sus miembros y se está consiguiendo con ello resultados satisfactorios en todos los ámbitos.

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LA APLICACIÓN DE RÚBRICAS PARA LA EVALUACIÓN DE COMPETENCIAS. DESARROLLO Y EVALUACIÓN DE UNA EXPERIENCIA APLICADA EN EL GRADO EN ADMINISTRACIÓN Y DIRECCIÓN DE EMPRESAS

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Resumen

La adaptación de la universidad al Espacio Europeo de Educación Superior está llevando a la realización de cambios sustanciales en muchos aspectos vinculados a su modelo pedagógico. Una de las cuestiones fundamentales es la manera como se está evaluando el desarrollo de competencias y su influencia en el proceso de aprendizaje. En este sentido, mediante la presente propuesta de trabajo pretendemos compartir una experiencia de innovación educativa a través del procedimiento de evaluación seguido para un proyecto realizado en la asignatura Investigación Comercial, impartida en el grado de Administración y Dirección de Empresas del Campus d'Alcoi de la Universitat Politècnica de València. Hemos partido de la necesidad de generar un procedimiento de evaluación que especifique las tareas y/o actividades a realizar para conocer y valorar el nivel competencial del estudiante, reflejando los criterios e indicadores de evaluación a través de un instrumento de medida que establezca unos criterios claros y una escala de medida para calificar el nivel de competencia adquirido. El desarrollo de una rúbrica ha supuesto un estímulo hacia la motivación en el desempeño del proyecto, así como en la dedicación y esfuerzo en esta tarea de aprendizaje compleja, mostrando el alumnado un alto grado de satisfacción. A su vez, la rúbrica ha permitido una evaluación más objetiva, formativa y transparente del aprendizaje del alumno bajo un enfoque por competencias. En definitiva, pasar a una evaluación basada en competencias supone uno de los mayores retos del nuevo contexto europeo. En este sentido, las rúbricas aparecen como un recurso imprescindible, y cada vez más presente en el proceso de evaluación, que pueden impulsar la motivación positiva hacia el desarrollo de competencias.

Palabras clave: Evaluación por competencias, Rúbrica, Desempeño, Rendimiento académico, Administración y Dirección de Empresas.

1. INTRODUCCIÓN

El Espacio Europeo de Educación Superior (EEES) está suponiendo cambios sustanciales en la universidad, principalmente en su modelo pedagógico, donde la labor del docente se está trasladando hacia una mayor atención a lo que tienen que hacer los alumnos para aprender (Padilla Carmona y Gil Flores, 2008). Estos cambios están influyendo de forma significativa en diferentes aspectos como la planificación de la enseñanza, la metodología, el diseño de actividades, las tutorías y la evaluación del aprendizaje. Adicionalmente, la adaptación al EEES introduce nuevos elementos en los planes de estudio cuya principal finalidad es el desarrollo de competencias como resultados de aprendizaje en la formación, la renovación metodológica y la utilización de la evaluación como estrategia que debe influir positivamente en el aprendizaje.

Por tanto, nos encontramos ante un modelo de docencia donde la evaluación debe constituirse en un proceso optimizador hacia el aprendizaje, y donde es necesario aplicar determinadas estrategias de cambio en la forma de evaluar, bajo un enfoque orientado al aprendizaje y la adquisición de competencias. Esto sitúa la evaluación en el centro del proceso educativo y permite regular la calidad del aprendizaje, y por ende, la calidad de la docencia universitaria (Fernández March, 2010). Así, pasar a una evaluación para el desarrollo de competencias supone uno de los mayores retos del nuevo contexto europeo para la evaluación en la universidad.

Una vez argumentada la importancia de la elaboración de instrumentos de evaluación de las competencias que permitan emitir un juicio de calidad, tanto para el profesor como para el alumno, cabe apuntar que las rúbricas aparecen como un recurso imprescindible al que se le está prestando cada vez más atención en el terreno evaluativo (Fernández March, 2010). Así por ejemplo, Malini y Andrade (2010) la ponen en un lugar central en la investigación sobre técnicas de evaluación y Fernández March (2010) indica que por su potencialidad didáctica están recibiendo en la literatura reciente mayor atención tanto desde el punto de vista teórico como práctico. En consecuencia y con estas premisas, en este trabajo pretendemos analizar el impacto de la aplicación de un procedimiento de evaluación basado en una rúbrica, así como la valoración de la percepción de utilidad por parte de los alumnos. Pensamos que el resultado dará lugar por un lado a una rúbrica validada y aceptada por los alumnos, que ayudará a alcanzar una evaluación más objetiva y formativa, eliminando la incertidumbre en el alumno sobre la forma en que se le valora su trabajo. Por otro lado, pretendemos aportar una nueva experiencia empírica y valorar la satisfacción por parte de los estudiantes en el uso de rúbricas como recurso de apoyo al proceso evaluativo. El trabajo ha sido desarrollado en el seno de los estudiantes matriculados en la asignatura de carácter obligatorio Investigación Comercial en el Grado de Administración y Dirección de Empresas.

Una vez establecidos los objetivos del trabajo y el contexto de aplicación, a continuación se desarrolla el marco teórico, el estudio empírico y los principales resultados obtenidos, para finalizar con una discusión sobre las implicaciones de la investigación llevada a cabo.

2. DESARROLLO TEÓRICO

A la hora de conceptualizar la evaluación educativa, cabe destacar un cambio fundamental que tal y como específica Fernández March (2010) se produjo en los años sesenta. La investigación sobre el aprendizaje de los estudiantes dio lugar a un resultado sorprendente; lo que influía realmente en el aprendizaje no era la enseñanza, sino la evaluación. A partir de estos primeros resultados, y de forma progresiva, el planteamiento de evaluación centrado originalmente en principios psicométricos ha derivado hacia otro basado en el desarrollo de criterios orientados hacia el proceso de aprendizaje, colaborativos y que facilitan la retroalimentación (Fernández March, 2010; Boud y Falchikov, 2007).

Este cambio de visión en el modelo de aprendizaje y el papel de la evaluación como elemento central, está tomando a su vez mayor protagonismo en el EEES, donde la universidad está adaptándose a un nuevo sistema que supone un movimiento de renovación pedagógico, oportunidad para poner en marcha nuevas metodologías de aprendizaje (Expósito-Langa et al., 2012).

En esta línea aparece la evaluación por competencias, tomando como definición de competencia la de “un atributo latente, conocimiento, actitud, destreza y facultad para el desarrollo de una profesión, puesto de trabajo o actuación académica, ejecutando adecuada y correctamente las actuaciones y actividades laborales o académicas exigidas” (Ibarra y Rodríguez, 2010). Una competencia, por tanto, integra recursos variados e implica la combinación de recursos complementarios y sinérgicos. Así, en el marco de una formación, es fundamental reflexionar sobre qué nivel de desarrollo debe ser alcanzado por los estudiantes al finalizar su formación para que puedan ser profesionales autónomos, con capacidad de reflexión y ética, y como continuar con su desarrollo durante su vida profesional (Fernández March, 2010).

Como se aprecia, la propia definición de competencia ya supone un reto en su evaluación, que debe tratarse de un proceso formativo, es decir, debe informar al estudiante sobre el desarrollo de su aprendizaje. Ante estas circunstancias, se hace necesario generar procedimientos e instrumentos de evaluación que especifiquen las tareas y/o actividades a realizar por profesor y alumnos que faciliten el conocer y valorar el nivel competencial del estudiante. Cada procedimiento deberá reflejar los indicadores de evaluación a través de un instrumento de medida que establezca unos criterios claros con los que llevar a cabo dicha evaluación, así como las escalas de medida para calificar el nivel de competencia adquirido. Por tanto, y teniendo en

cuenta que la evaluación es una de las actividades de mayor relevancia en el contexto educativo, diseñar dicho procedimiento para evaluar el aprendizaje en competencias por parte de nuestro egresados, con criterios claros y conocidos, consideramos que es de gran interés para la comunidad universitaria.

Si bien se pueden identificar varios instrumentos para la evaluación de competencias alternativos a los tradicionales centrados en la realización de exámenes, como el portafolio, nos ocuparemos en este trabajo de la rúbrica. La rúbrica es una herramienta de evaluación no convencional que resulta en una guía para estimar la calidad en el resultado y el nivel de ejecución logrado por los estudiantes en tareas complejas, especificando los criterios a considerar y los niveles de adecuación de desempeño en cada uno de ellos (Andrade y Du, 2005, Mertler, 2001). Para García-Ros (2011), la rúbrica todavía tiene un uso escaso en nuestro contexto educativo, debido a causas como la controversia sobre su fiabilidad y validez para valorar a los estudiantes, así como a una posible falta de formación docente sobre técnicas de evaluación. La rúbrica es un instrumento que puede dar lugar a un aprendizaje de calidad ya que facilita que los alumnos focalicen su esfuerzo en aquellos elementos de aprendizaje que se consideran fundamentales para alcanzar un nivel óptimo de capacidades en los contenidos docentes. De esta forma, el alumno desde el principio puede comprender qué se entiende por un trabajo bien hecho. Por otra parte también facilita que ellos mismos se puedan autoevaluar, así como permitir mayor objetividad en la evaluación por parte del profesorado. Las rúbricas se pueden aplicar a diferentes actividades y en distintos momentos del proceso de aprendizaje, así como utilizar por todos los agentes (profesor, alumnos, otros evaluadores) implicados en el proceso de formación (Fernández March, 2010). Por tanto, en la medida que la rúbrica se convierte en un referente para el desarrollo de una tarea, puede ser un instrumento de valoración del progreso y alcance de competencias.

Una vez hemos contextualizado nuestra investigación, pasaremos a continuación a desarrollar de forma empírica los objetivos propuestos.

3. ESTUDIO EMPÍRICO

El Campus d'Alcoi, con un total de 2.344 alumnos (curso 2013-2014), es uno de los campus externos que tiene la *Universitat Politècnica de València*. Alcoy es una ciudad situada en la provincia de Alicante que cuenta con una población aproximada de 62.000 habitantes y una tradición en la enseñanza superior, principalmente en el campo de la ingeniería, de más de 150 años de experiencia. La *Universitat Politècnica de València* ha implantado en el Campus de Alcoy un total de 6 grados. Entre estas titulaciones, se encuentra el grado en Administración y Dirección de Empresas como una de las que más aceptación tiene en cuanto a matrícula, siendo 367 el total de alumnos matriculados en el grado durante el curso 2013-2014.

En estos estudios se pretende capacitar al alumno para que pueda desarrollar su actividad con desenvoltura en un contexto de gerencia o de dirección de las diferentes áreas específicas de una organización, tanto privada como pública (comercialización, recursos humanos, finanzas, etc.), así como tareas de consultoría y asesoría a terceros.

Esta motivación compartida tanto por los alumnos, como por el profesorado y el personal de administración nos conduce a la búsqueda de una diferenciación con otras implantaciones del mismo título en el mapa de universidades tanto valenciano como español. Así, valores como la proximidad al alumno y el esfuerzo continuo y compartido, hacen que sea atractiva y motivadora para el alumno, dando lugar a profesionales con una formación humana integral.

Confección de la muestra y fuentes de datos

La asignatura Investigación Comercial es de carácter obligatorio en el plan de estudios del Grado. Se imparte en segundo curso y los alumnos deben desarrollar, entre otras metodologías de evaluación, un proyecto en grupo que consiste en simular el proceso real de una investigación comercial, pasando por todas sus etapas. En este curso, al proponer el trabajo, se ha presentado a los alumnos un modelo de rúbrica con el que se van a evaluar los contenidos de la asignatura llevados a la práctica en el proyecto.

Como hemos indicado anteriormente, el objeto del presente trabajo es el de valorar el impacto de la aplicación de un procedimiento de rúbrica para la evaluación de competencias de estudio. En este contexto, para la confección de la muestra hemos considerado la totalidad de alumnos matriculados en la asignatura Investigación Comercial de segundo curso del grado en Administración y Dirección de Empresas. El trabajo de campo abarcó el mes de enero de 2014 y la fuente de información básica fue la aportada por las respuestas anónimas a un cuestionario. Previamente se transmitió a los alumnos el objetivo de la investigación y se les pidió la máxima sinceridad en las respuestas. Respecto al test, anteriormente se llevó a cabo una prueba piloto con un grupo reducido de alumnos y un par de profesores con el objeto de ajustar y confirmar que las preguntas eran comprensibles y estaban bien formuladas.

Este trabajo de campo dio como resultado, y una vez depuradas, un total de 82 respuestas válidas sobre un total posible de 98 alumnos matriculados en la asignatura. El resultado supone un nivel de respuesta del 84% y un error muestral del 4,5%, valores que se consideran adecuados para poder establecer un análisis posterior. La Tabla 1 muestra la ficha técnica del estudio.

TABLA 1. Ficha técnica del estudio

<i>UNIVERSO</i>	Titulación de ADE del <i>Campus d'Alcoi</i> de la <i>Universitat Politècnica de València</i>
ÁMBITO GEOGRÁFICO	<i>Campus d'Alcoi</i> (Alicante)
MARCO MUESTRAL	Alumnos matriculados en la asignatura Investigación Comercial de segundo curso del grado en Administración y Dirección de Empresas (total población 98 alumnos)
ELEMENTO MUESTRAL	Alumnos
TAMAÑO MUESTRAL	82 respuestas válidas
ERROR MUESTRAL	± 4,5% (Nivel de confianza del 95,5%; p = q = 0,5)
DISEÑO MUESTRAL	Diseño y Pre-test del cuestionario
INFORMACION RECOGIDA	Percepción de utilidad y validez de la rúbrica

Variables

Acorde a nuestras premisas se plantean como variables de medida la percepción de utilidad y validez de la rúbrica propuesta a los alumnos. Hemos seguido otros trabajos como Moskal y Leydens (2000) y García-Ros (2011) que proponen la aplicación de un conjunto de ítems con escala Likert para la evaluación de rúbricas.

Como *percepción de utilidad*, entendemos la capacidad que la rúbrica ofrece al estudiante para orientarle hacia un nivel de logro adecuado con el esfuerzo desarrollado, posibilitando la propia autoevaluación. Adaptamos la escala propuesta por García-Ros (2011) a las circunstancias particulares de nuestra investigación para proponer una escala de 6 ítems medidos a partir de una valoración Likert de 5 puntos, donde 1 es la menor puntuación y 5 la máxima. El resultado queda expresado a partir de la Tabla 2.

TABLA 2. Medida de la percepción de la utilidad de la rúbrica

<i>La rúbrica me ha resultado útil para...</i>	1	2	3	4	5
1. Desarrollar expectativas ajustadas sobre qué se me pide en el trabajo					
2. Planificar la elaboración del trabajo y su presentación					

3. Tomar decisiones a nivel de grupo sobre cómo desarrollar el trabajo	
4. Revisar lo que iba haciendo para ajustarlo a los criterios establecidos	
5. Evaluar la adecuación del trabajo a las exigencias de la asignatura	
6. Mejorar el resultado final de mi trabajo	

Respecto a la *percepción de validez*, entendemos esta variable como un proceso de acumulación de evidencia basada en las respuestas de los estudiantes hacia la conveniencia del uso de la rúbrica de evaluación (Moskal y Leydens, 2000). Hemos planteado una escala Likert de 5 puntos (donde 1 es la menor puntuación y 5 la máxima). De nuevo, hemos adaptado la escala propuesta por García-Ros (2011) a las particularidades de nuestra investigación. La escala final queda redefinida con un total de 5 ítems como puede observarse en la Tabla 3.

TABLA 3. Medida de la percepción de validez de la rúbrica

<i>Pienso que la rúbrica...</i>	1	2	3	4	5
1. Integra los elementos clave para el desarrollo del proyecto					
2. Permite evaluar las competencias importantes en el trabajo					
3. Es una herramienta adecuada para medir la calidad del proyecto					
4. Facilita una comparación justa entre los trabajos de los grupos					
5. Permite conocer claramente los criterios de valoración					

4. RESULTADOS

A continuación mostramos estadísticos descriptivos básicos de la percepción de la utilidad y validez de la rúbrica de evaluación de competencias para el trabajo académico de la asignatura. Como se puede observar la puntuación media de cada uno de los ítems es superior a 3, punto medio en la escala 1 a 5.

TABLA 4. Descriptivos básicos sobre la percepción de utilidad y validez

<i>Percepción de utilidad</i>	<i>Media</i>	<i>Desv.</i>	<i>Moda</i>
1. Desarrollar expectativas ajustadas sobre qué se me pide en el trabajo	3,79	,733	4
2. Planificar la elaboración del trabajo y su presentación	3,83	,814	4
3. Tomar decisiones a nivel de grupo sobre cómo desarrollar el trabajo	3,49	,789	4
4. Revisar lo que iba haciendo para ajustarlo a los criterios estableci-	3,89	1,006	5

dos			
5. Evaluar la adecuación del trabajo a las exigencias de la asignatura	3,77	,907	4
6. Mejorar el resultado final de mi trabajo	3,99	,882	4
Percepción de validez	Media	Desv.	Moda
1. Integra los elementos clave para el desarrollo del proyecto	3,84	,824	4
2. Permite evaluar las competencias importantes en el trabajo	3,91	,773	4
3. Es una herramienta adecuada para medir la calidad del proyecto	3,94	,866	4
4. Facilita una comparación justa entre los trabajos de los grupos	3,73	,817	4
5. Permite conocer claramente los criterios de valoración	4,18	,877	5

En cuanto a la percepción de utilidad, los alumnos confirman a través de los ítems mejor valorados, que disponer de la rúbrica les ha permitido poder planificar la elaboración del trabajo (ítem 2), así como ir ajustando el trabajo a los criterios establecidos para su evaluación (ítem 4), lo que redundará en un mejor resultado del mismo (ítem 6). Por otra parte, si bien el indicador del ítem 3 supera el valor medio, la rúbrica no se percibe tanto como un elemento que ayude a la toma de decisiones en grupo. En general los valores obtenidos son coincidentes con los de García-Ros (2011).

Para la percepción de la validez, cabe apuntar que los valores medios obtenidos son en general superiores a los de la percepción de utilidad, destacando especialmente la importancia del establecimiento de rúbricas como herramienta que clarifica los criterios de valoración (ítem 5) y que permite medir la calidad de los proyectos (ítems 3). De nuevo encontramos coincidencias con García-Ros (2011) en los resultados obtenidos. El ítem 4, si bien su puntuación es alta, puede que el poco uso de rúbricas para la evaluación de trabajos genere algunas dudas como una herramienta justa de comparación de trabajos. Esto se puede interpretar como que los alumnos no perciben que el profesor pueda valorar completamente el trabajo desarrollado fuera del aula, por lo que habría que trabajar mejor estos aspectos.

5. CONCLUSIONES

En este trabajo hemos pretendido aportar evidencias de la utilidad del uso de rúbricas como herramienta para la evaluación del aprendizaje del alumno bajo un enfoque basado en competencias. Hemos puesto en conocimiento de los alumnos la rúbrica para la evaluación de un proyecto realizado en grupo en el contexto de la asignatura Investigación Comercial, impartida en segundo curso del Grado en Ad-

ministración y Dirección de Empresas del Campus d'Alcoi de la Universitat Politècnica de València. Posteriormente, y una vez entregados los trabajos, se ha preguntado a los estudiantes sobre la percepción de la utilidad y validez del medio de evaluación utilizado.

Para los alumnos era prácticamente novedoso el uso de rúbricas para la evaluación en trabajos, al menos con el nivel de detalle con que estaba desarrollada. En su opinión, disponer de la rúbrica desde los primeros compases de su proyecto les ha facilitado mejorar aspectos que de otra forma les habría sido más complejo. Por tanto, consideran que la mayor utilidad ha sido hacia la planificación y la autoevaluación, ajustando el trabajo hacia un mejor resultado final y ajustado a las exigencias de la asignatura. Por tanto, la rúbrica ha resultado un instrumento útil para dar soporte a un proceso cognitivo de alto nivel. Estos resultados son acordes a otros trabajos anteriores como García-Ros (2011), Struyven et al. (2008) o Hafner y Hafner (2003).

Por otro lado, hemos medido la percepción de validez y adecuación de la rúbrica como soporte de evaluación para el trabajo de la asignatura. Los alumnos valoran la importancia de disponer de antemano los criterios de evaluación del trabajo, así como que permite evaluar las competencias importantes en el mismo. Por tanto, sí que consideran que es una herramienta adecuada que facilita la orientación a la tarea.

En definitiva, pensamos que el resultado ha dado lugar a una rúbrica aceptada por los alumnos, que les ha ayudado a alcanzar una evaluación más objetiva y formativa, reduciendo incertidumbre sobre la forma en que se les valora su trabajo, así como potenciando mayor equidad del esfuerzo dedicado en la nota final.

Para Chica Merino (2011), el hecho de que el profesor presente de manera explícita los criterios de evaluación al alumnado fomenta la motivación. La rúbrica, en este sentido es considerada una herramienta de evaluación formativa, ya que conocer las expectativas del profesor en el desarrollo del proyecto de la asignatura es un elemento que favorece la adquisición de un aprendizaje significativo, así como un aprendizaje autónomo. Adicionalmente, es un estímulo hacia la motivación positiva en el desempeño de la tarea, así como en la dedicación y el esfuerzo en actividades de aprendizaje complejas. Por tanto, que el alumno disponga de una colección de resultados de aprendizaje, y en qué medida es esperable que sean comprendidos y demostrados, le llevará a una mejora de su rendimiento académico.

Queremos señalar que este trabajo si bien puede contribuir a una mejor comprensión de la utilidad de uso de rúbricas como herramientas de evaluación, presenta ciertas limitaciones. En primer lugar, y como mejora futura los alumnos deben ser partícipes en el desarrollo de la rúbrica. Desde un primer momento se les pidió su valoración sobre la rúbrica propuesta por el profesor, si bien la poca experiencia

con esta herramienta evaluativa generó escasos comentarios. Conforme los alumnos se familiaricen más con esta forma de evaluar serán más críticos en el proceso, lo que redundará en un mejor diseño y consensuado, así como en una mayor implicación y participación del alumnado.

En definitiva, consideramos que el trabajo puede contribuir como una experiencia que refuerza la necesidad del uso de rúbricas como recurso de apoyo al proceso evaluativo, tan importante en el contexto del EEES. No obstante, se trata sin duda de una interesante línea de trabajo que debemos seguir mejorando mediante la incorporación de nuevos factores que motiven un proceso de aprendizaje formativo en capacidades.

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USO DE LA TELEFONÍA MÓVIL POR PARTE DEL ALUMNADO ADULTO MAYOR Y DIFERENCIAS DE GÉNERO

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Resumen

El uso de las Tecnologías de la Información y la Comunicación (TIC) implica una adaptación positiva a los cambios que se están produciendo en la sociedad. Uno de los colectivos con mayor riesgo de tener dificultades para la adquisición y utilización habitual de las TIC es el de las personas mayores. Se habla pues, no sólo de la brecha digital en personas mayores sino de su amplitud a partir del género, según la cual las mujeres encuentran más dificultades de acceso que los hombres a la sociedad de la información.

Los programas universitarios para mayores se perfilan como un instrumento para mejorar la formación, bienestar y calidad de vida de las personas mayores, y suponen una oportunidad para este colectivo de cara al aprovechamiento de su capacidad de aprendizaje, crecimiento y desarrollo.

El objetivo de esta comunicación es conocer el uso de las TIC, concretamente del teléfono móvil de los alumnos sénior desde la perspectiva de género, utilizando para ello un cuestionario cumplimentado por más de 200 alumnos Diploma Sénior de la Universitat Oberta per a Majors.

Los resultados muestran que una amplia mayoría (más del 90%) disponen de móvil, si bien parece haber diferencias entre los usos y frecuencias de utilización entre hombre y mujeres, integrándolo, algunos de ellos, en su vida cotidiana como instrumento para mantener, actualizar y ampliar su red social.

Las diferencias encontradas podrían explicarse por los roles sociales asignados a cada uno de los géneros. Así mismo, se plantea la necesidad de potenciar un uso de las TIC que tome como punto de partida el empoderamiento y capacitación de las mujeres y, más en concreto, de las mujeres mayores con el propósito de avanzar en la igualdad de género y las posibilidades de desarrollo personal, educativo y social.

1. INTRODUCCIÓN

El pasado 2012 fue el Año Europeo del Envejecimiento Activo y de la Solidaridad Intergeneracional. Como profesionales que estamos en contacto con el colectivo de personas mayores es nuestro deber reflexionar sobre el estado del envejecimiento en estos momentos. Desde hace ya unos años hasta nuestros días se habla mucho de envejecimiento activo, es como si ahora mismo fuera la novedad y lo más apropia-

do es incluir este concepto en todas las actividades dirigidas al colectivo de mayores. Nos encontramos en el momento más adecuado para poder pensar y reflexionar sobre lo que quieren decir *envejecimiento* y *activo* por si solos, por separado, para luego darle el significado conjunto que merece. Si entendemos el binomio envejecimiento activo como aquel que posibilita que la persona mayor forme parte importante de la sociedad y que participe de todas sus actividades, podemos afirmar que los programas educativos para mayores están contribuyendo muy positivamente a este fin. Al respecto, uno de los objetivos de los Programas Universitarios para Mayores (PUM) es contribuir a este envejecimiento activo, desde la participación del alumnado mayor en el desarrollo de actividades que generen esta parte activa. Lo que más nos importa es que el alumnado sea el responsable de su propio proceso de aprendizaje. Ellos por si mismos han de ser capaces de descubrir el potencial que tienen y por este motivo se les debe ofrecer actividades útiles y mostrarles esa utilidad vital que pueden tener para su día a día.

Las Tecnologías de la Comunicación y la Información (TIC) pueden ser consideradas como una de las áreas más importantes en lo que se refiere a la participación de los mayores en la sociedad. Las TIC son una forma de posibilitar el acceso a la información y a la interacción social, cultural o educativa, aspectos necesarios para poder desarrollar al máximo nuestras facultades, coincidiendo con Zamarrón [1]. Las TIC van evolucionando a una velocidad vertiginosa y esta adaptación, a veces, es algo complicada. La brecha que se abre entre las personas con acceso eficiente a las TIC y las que no, es la llamada brecha digital [2].

Objetivo

El objetivo del estudio ha sido conocer el uso que el alumnado del programa universitario para mayores de nuestra universidad hace de las nuevas tecnologías de la información y la comunicación (TIC), dada la importancia que el manejo de éstas puede tener para su calidad de vida, centrándonos en el presente trabajo en el uso de la telefonía móvil por parte de hombres y mujeres, debido a que consideramos que sobre este tema no existe mucha literatura que trate este aspecto desde la perspectiva de género.

2. MÉTODO

Participantes

La muestra estaba formada por 203 personas matriculadas en el programa universitario para mayores de la *Universitat de les Illes Balears*, conocido como *Universitat Oberta per a Majors* (UOM). El rango de edad abarcaba desde los 50 a los 84 años, con una media de edad de 63,79. El 59,6% eran mujeres y el 40,4% hombres. La muestra incluyó alumnos del primer curso del *Diploma Sènior*, de cuatro promociones distintas y consecutivas, del 2009 al 2012, (25,1% del curso académico 2009-

10, 26,1% del curso académico 2010-11, 28,6% del curso académico 2011-12 y 20,2% del curso académico 2012-13). La mayoría de están jubilados/as (48,8%) o prejubilados/as (19,2%) con un total del 68% y tienen un nivel de estudios previo de bachiller (50,8%, el 24,8% elemental y el 22,7% superior), con estudios primarios completos tenemos al 16,3% de la muestra y con 13,3% nos encontramos con aquellos alumnos que poseen estudios de grado medio y estudios universitarios.

Por géneros, vemos que el perfil sociodemográfico presenta algunas diferencias. En el caso de los hombres, la mayoría (75,6%) están casados, mientras que en las mujeres la distribución es la siguiente: un 49,6% están casadas, un 19% viudas (frente a un 7,3% de los hombres), un 19,8% están separadas o divorciadas, un 11,6% solteras. En cuanto a la situación laboral, cabe destacar que en ambos grupos la mayoría están prejubilados/as o jubilados/as (80,5% de los hombres y 59,5% de las mujeres), aunque en el grupo de las mujeres un 11,6% se incluyen en la categoría de amas de casa (frente a un 0% de hombres) y hay más mujeres en situación de paro (10,7%, frente al 3,7% de hombres) o que se encuentran activas laboralmente con un porcentaje muy igualado al de los hombres (13,2% de mujeres frente a 12,2% de hombres). Por último, en cuanto al nivel educativo, los hombres presentan un nivel de estudios superior al de las mujeres en los niveles más altos, es decir, en estudios de grado medio y universitario (14,6% y 20,7% respectivamente frente al 12,4% y 8,3% de las mujeres), en cambio las mujeres presentan porcentajes más altos a los hombres en bachiller, tanto elemental como superior (33,1% y 25,6% respectivamente frente al 20,7% y 18,3% de los hombres).

3. INSTRUMENTO Y PROCEDIMIENTO

Se elaboró un cuestionario que fue repartido en las distintas promociones de estudiantes y que los participantes rellenaron individualmente y de manera voluntaria. Una vez recogidos los cuestionarios se eliminaron de la muestra aquellos que no estaban cumplimentados en su totalidad.

El cuestionario se componía de 31 ítems repartidos de la siguiente manera. Los seis primeros ítems hacen referencia a variables sociodemográficas (género, edad, estado civil, nivel de estudios y situación laboral) y a los años que llevan participando en la UOM. El ítem siete es una pregunta general para conocer de qué recursos tecnológicos disponen en su casa (TV, DVD, telefonía, ordenadores, cámara digital, etc.). A partir de ahí, nos centramos en averiguar de manera más específica el uso que hacen de tres de ellos: 1- telefonía móvil, 2- ordenadores y 3- conexión a Internet y correo electrónico.

Los ítems del 8 al 11 hacen referencia a la telefonía móvil. En concreto, nos interesaba saber para qué utilizan el teléfono móvil y con qué frecuencia, además de hacer énfasis en el uso de los SMS (mensajes cortos de texto) como forma de co-

municación. Los 19 ítems siguientes englobaban preguntas acerca del uso del ordenador y de Internet. En cuanto al uso del ordenador se plantearon diez preguntas que recogían información sobre la frecuencia de uso del ordenador, para qué suelen utilizarlo, si lo usan solos o en compañía, a qué lugares acuden a utilizarlo, si han realizado algún curso de informática en otras instituciones y qué tipo de cursos les gustaría realizar, y si utilizan el ordenador como herramienta para sus estudios. En relación a la conexión a Internet planteamos siete ítems que indagaban acerca de si disponen de conexión a la red en su casa o si se desplazan a otros lugares para conectarse, sobre la frecuencia de uso, aparte de preguntar sobre qué contenidos suelen visitar con mayor frecuencia y por qué tipo de páginas suelen navegar más asiduamente. Además, se añadieron dos ítems acerca de la disponibilidad y frecuencia de consulta del correo electrónico.

Se incorporó un último ítem para conocer la familiaridad que las personas mayores poseen respecto al vocabulario utilizado normalmente en el ámbito de las TIC. Se presentó un listado con 18 términos diferentes, como Chat, Blog, E-mail, Web, entre otros, en el que debían señalar si conocían o no su significado.

A continuación se presentan los resultados relativos al uso de la telefonía móvil.

4. RESULTADOS

Las pruebas estadísticas muestran que no se producen diferencias estadísticamente significativas en la disponibilidad de teléfono móvil por parte de hombres (96,3%) y mujeres (95,9%). Como podemos observar, en la tabla 1, casi la totalidad de la muestra dispone de teléfono móvil, siendo el caso de la mujer, con un 1,7%, el porcentaje de respuestas negativa al hecho de disponer de teléfono móvil.

Tabla 1. Diferencias de género en la disponibilidad de teléfono móvil.

Disponibilidad de teléfono móvil	Género	
	Hombre	Mujer
Sí	96,3%	95,9%
No	0%	1,7%
Ns/Nc	3,7%	2,4%

En cuanto al uso que nuestra muestra le da al teléfono móvil, podemos apreciar, en la tabla 2, que tanto los hombres como las mujeres utilizan el teléfono móvil para comunicarse de manera habitual, tanto con los miembros de la familia como con los amigos, presentando un porcentaje del 72% en el caso de los hombres y un 59,5% en el caso de las mujeres. Debemos destacar como aspecto curioso que las mujeres, en un 28,1% usa su teléfono móvil para llamadas de emergencia, frente al 17,1% de los hombres.

Tabla 2. Diferencias de género en el uso del teléfono móvil.

Uso del teléfono móvil	Género	
	Hombre	Mujer
Comunicarme de manera habitual con la familia y amigos	72%	59,5%
Llamadas de emergencia	17,1%	28,1%
Recibir llamadas	2,4%	1,7%
Otros	4,9%	6,6%
Ns/Nc	3,6%	4,1%

En la tabla 3 podemos observar que el porcentaje más alto corresponde a la opción de respuesta de “A veces” como la opción más puntuada, con un 65,9% en el caso de los hombres y con un 73,6% en el caso de las mujeres, no contestando a la opción de “Siempre” seguramente porque en casa no hacen uso del teléfono móvil sino que utilizan de manera habitual el teléfono fijo. En la siguiente tabla se resumen los resultados:

Tabla 3. Diferencias de género en la frecuencia de uso del teléfono móvil.

Frecuencia de uso del teléfono móvil	Género	
	Hombre	Mujer
Siempre	31,7%	22,3%
A veces	65,9%	73,6%
Nunca	0%	1,7%
Ns/Nc	2,4%	2,4%

Es interesante fijarnos en un aspecto sobre el uso del servicio de mensajes cortos de texto (SMS), debido a que ambos grupos presentan bajos porcentajes de utilización de dicho servicio (el 27,1% no envía nunca SMS). En la tabla 4 podemos observar las puntuaciones obtenidas en las que las mujeres dejan de manifiesto que utilizan más este servicio que los hombres, tanto en la respuesta “Sí, a menudo” (con un 33,9% frente al 28% de los hombres) como en la respuesta “Sí, alguna vez” (con un 39,7% frente a un 37,8%).

Tabla 4. Utilización del servicio SMS.

Envía o ha enviado mensajes cortos de texto (SMS) con el teléfono móvil	Género	
	Hombre	Mujer
Sí, a menudo	28%	33,9%
Sí, alguna vez	37,8%	39,7%
No	32,9%	23,1%
Ns/Nc	1,3%	3,3%

En la tabla 5 podemos observar una comparativa con un estudio que se realizó en el año 2008, con un grupo similar al que nosotros hemos utilizado para éste y se puede apreciar que, aunque los valores de utilización del servicio siguen siendo bajos, se ha producido una mejora en los porcentajes sobre todo en las mujeres, por tanto podemos decir que las mujeres en estos momentos utilizan con más frecuencia el servicio de envío de mensajes cortos de texto, aunque se debería analizar, actualmente, el uso del *whatsapp* para poder comprobar si se ha producido una adaptación positiva al nuevo sistema de comunicación instantánea.

Tabla 5. Comparativa estudio 2008 y 2014

Envía o ha enviado mensajes cortos de texto (SMS) con el teléfono móvil		Género	
		Hombre	Mujer
Sí, a menudo	2014	28%	33,9%
	2008	25,4%	22,4%
Sí, alguna vez	2014	37,8%	39,7%
	2008	42,9%	32,8%
No	2014	32,9%	23,1%
	2008	31,7%	44,8%
Ns/Nc	2014	1,3%	3,3%
	2008	0%	0%

En cuanto a la pregunta de ¿Para qué utilizas el teléfono móvil? podemos observar que los usos que nuestra muestra le da a su teléfono móvil son básicamente los de comunicación, tanto con familiares como con amigos, en detrimento de otras utilidades como puedes ser usar el teléfono para participar en diferentes concursos o descargarse tono, politonos, imágenes, etc. En la tabla 6 podemos ver algunos ejemplos:

Tabla 6. Utilidad del teléfono móvil

	Género	
	Hombre	Mujer
Para comunicarse con sus familiares		
Sí	52,4%	59,5%
No	24,4%	13,2%
Ns/Nc	23,2%	27,3%
Para comunicarse con sus amigos		
Sí	50,0%	46,3%
No	23,2%	13,2%
Ns/Nc	28,8%	40,5%
Para participar en concursos		
Sí	2,4%	0,8%
No	48,8%	43,0%
Ns/Nc	48,8%	56,2%
Para pedir tonos, fotos, imágenes para el móvil		
Sí	2,4%	1,7%
No	50,0%	43,8%
Ns/Nc	47,6%	54,5%

Como se ha podido observar las mujeres utilizan el teléfono móvil para comunicarse con sus familiares en un 59,5% frente al 54,2% de los hombres, en el caso de los amigos la puntuación de los hombres está por encima de la puntuación de las mujeres pero con una diferencia muy pequeña. Como se puede apreciar los porcentajes de descargas y participación en concursos son muy bajas en ambos aspectos.

5. CONCLUSIONES

Los resultados evidencian la necesidad de seguir trabajando para superar la brecha digital de género, aprovechando en nuestro caso las posibilidades de empoderamiento que aportan los programas educativos para mayores. De todos modos, creemos que el elevado número de personas que disponen de teléfono móvil en la muestra y franja de edad con la que estamos trabajando refleja la influencia tanto de su nivel socioeconómico como educativo y social. Se trata de personas con muchas inquietudes, que se mantienen altamente activas tanto intelectual como socialmente hablando. Además, participan en un programa educativo en el que se potencian aún más estos aspectos y que les dota de herramientas para aprovechar las posibilidades de crecimiento y ganancia que aún conservan con la edad, fomentando así el empoderamiento del colectivo de adultos mayores, hombres y mujeres.

Queremos en este punto reflexionar sobre la importancia que en la actualidad tienen los programas universitarios para mayores (PUM) como educación permanente de adultos mayores y como catalizadores de las posibilidades de desarrollo personal, cultural y social de este colectivo. Este tipo de programas aglutinan cada año más alumnado y reportan importantes beneficios a las personas mayores que en ellos participan, la mayoría de ellas mujeres.

Por ejemplo, los siguientes autores [3] [4], concluyen que el alumnado de los PUM dispone de la posibilidad de acceso a las TIC en un alto porcentaje y las utiliza con mucha mayor frecuencia que la población general, por tanto este tipo de programaciones facilita la adaptación de los mayores a la sociedad del conocimiento a través de las TIC. En otro estudio [5], los autores se preguntan si cuando los alumnos acceden a un programa educativo, éstos lo hacen debido a que su buen estado de salud le permite participar en las actividades educativas y culturales, y están en disposición de ampliar sus redes sociales, o si por el contrario, el hecho de participar en un programa educativo y entrar en contacto con otros compañeros, huir de pensamientos negativos y hacer un trabajo cognitivo constante, hace que su estado de salud se considere mejor.

Posiblemente las dos hipótesis son verdaderas y están relacionadas ya que las personas que acceden tienen un estado de salud bueno, pero el hecho de participar lo mejora y lo amplía. Siguiendo esta misma línea, en ese mismo estudio [5] se concluye que el grupo de personas evaluadas posee indicadores comunes que parecen indicar que están satisfechos en general con su vida, aunque existen diferentes indicadores donde hay diferencias, especialmente en el uso de las nuevas tecnologías. De igual manera, otras investigaciones [6] señalan que las TIC deben formar parte de programaciones de este tipo de programas educativos ofertados por la Universidad por la mejora en la calidad de vida de los participantes. Todo lo anterior si dejar de lado estudios como el siguiente [7], que nos muestran que los programas educativos para mayores, además de cumplir una función educativa y de extensión del conocimiento, cumplen también una función en relación con la salud física y psicológica, concretamente en relación al apoyo social, al contribuir a la creación de nuevas redes sociales. Pero además, se les posibilita la adquisición de unas habilidades y conocimientos que no poseían con anterioridad o que tenían ya olvidadas o poco desarrolladas [8] [9], por ejemplo, al facilitarles el acceso a la utilización de las TIC. Muchas mujeres que no tuvieron acceso a la educación superior y/o al mercado de trabajo, cuentan ahora gracias a este tipo de programas, con posibilidades para desarrollarse, adaptarse a los cambios sociales y “ponerse al día” que de otro modo no estarían a su alcance, contribuyendo por tanto al empoderamiento del colectivo de mujeres mayores. Facilitar el acceso a las nuevas tecnologías es una forma de acceder a la información necesaria para tener un mayor poder de decisión sobre las propias vidas, en definitiva, promoviendo el empoderamiento [8], y redu-

ciendo así la brecha digital de género en pro de una sociedad cada vez más igualitaria.

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COMPARATIVA DE EXPERIENCIAS DOCENTES EN LA FORMACIÓN DE LA MEJORA DE PROCESOS EN EMPRESAS Y EN FORMACIÓN REGLADA UNIVERSITARIA.

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Resumen:

El aumento de los ingresos en las organizaciones puede realizarse a través de la incorporación de nuevas inversiones en activos no corrientes, la subcontratación de servicios y/o el aumento de capacidades de los procesos cuello de botella. Nuevos activos implica renunciar a inversiones en otros activos más rentables. La subcontratación hace perder control de gestión. Sin embargo, el aumento de capacidades de los procesos cuello de botella no inmoviliza financiación relevante al tiempo que permite mantener el control interno de la gestión.

La *docencia* de la mejora de procesos *en formación reglada universitaria* (títulos de grado y máster) nos dirige hacia una parcela teórica donde es esencial hacer entender al alumno la necesidad de la mejora continua versus las inversiones y la subcontratación. De igual forma, el conocimiento del concepto de cuello de botella y la identificación de las restricciones, los verdaderos limitadores de su capacidad, así como el rediseño de tareas debe estar amparado por la medición de los resultados, aunque el estudiante no realiza este trabajo en sus estudios. El alumno fundamenta su conocimiento en los conceptos que luego pondrá en práctica a través de la función directiva o la gestión de áreas o procesos industriales en empresas de diferente ámbito.

La *docencia en empresa*, aunque tiene su base en el concepto teórico, no está centrada sobre la misma. De hecho el análisis pasa a ocupar directamente el primer pasó de desarrollo de la mejora. Sin embargo, el resultado cuantitativo si presenta un objetivo clave de conocimiento y aceptación del trabajo realizado.

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La formación y puesta en marcha en organizaciones reales tiene, además, su fundamento en el aprendizaje de los intervinientes o personas que desarrollan la secuencia del proceso. La experiencia de estas personas favorece la puesta en marcha de las mejoras analizadas, definidas y rediseñadas. En muchos casos la formación no requiere de intervenciones de gran calado pero en rediseños de importancia donde, sobre todo, se definen nuevos procesos como estratégicos el grado de recualificación puede ser muy alto, provocando la reestructuración de grupos de trabajo en todos los sentidos.

Palabras clave: Cuello de botella, SMED, Lean, Procesos, Transporte

1. LA IMPORTANCIA DE LA MEJORA CONTINUA DE LOS PROCESOS

Para conocer la importancia de la mejora continua de los procesos podemos basarnos en diversos puntos de vista, pero nosotros nos centramos fundamentalmente en el concepto financiero del ciclo de caja. A fin de cuentas la consecución de una estructura patrimonial óptima, reflejada a través del balance de la compañía, es el objetivo último que se persigue cuando se invierte en cualquier negocio.

El ciclo de caja [1], entendido como el tiempo que transcurre desde que la empresa paga su inversión en existencias hasta que lo cobra, relaciona los períodos medios de ambos hitos como puede observarse en la Fig 1.

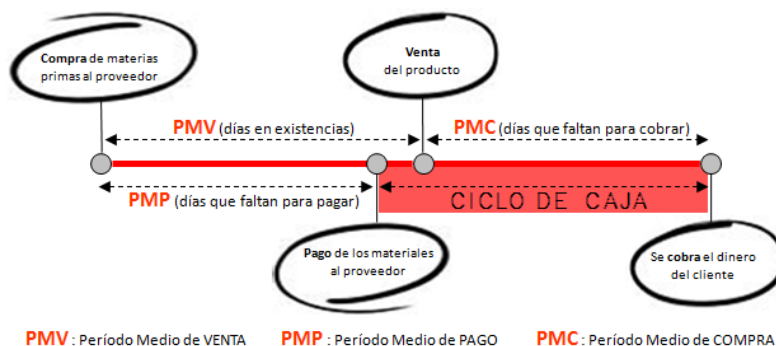


Fig. 1 Ciclo de caja teórico. Elaboración propia.

Obviamente, es objetivo genérico de toda empresa la reducción del ciclo de caja con el fin de que las necesidades de financiación ajena sean mínimas. Para ello la

empresa ha de trabajar tanto en los plazos del pasivo (proveedores) como en los del activo (clientes).

Es fácil observar que ciclos de procesos ágiles y óptimos en costes favorece este objetivo. Si la empresa es capaz de convertir con rapidez sus existencias [2] en dinero líquido las tensiones financieras para atender los compromisos de pago del pasivo corriente serán inferiores. Centrándonos en el activo corriente, el primer eslabón lo tenemos en las existencias. La empresa invierte el dinero que consigue mediante financiación propia y/o ajena en comprar mercaderías que luego pretende vender a sus clientes, convirtiendo las cuentas de “Existencias” en cuentas de “Deudores”. Finalmente “Deudores” se convertirá con el tiempo, salvo en los casos de forma de pago contado, en dinero líquido a través de las cuentas de “Disponible”.

Procesos ágiles y de coste óptimo mejora el ciclo de caja por los siguientes motivos:

- Reducción del tiempo medio de mercaderías en existencias (PMV) y, por tanto, adelanto del hito de cobro al reducir los plazos de entrega.
- Aumento de la rotación, entendida como la relación entre la cifra de ventas y el activo de la empresa (ventas/activo) al conseguir un aumento significativo del numerador como consecuencia de una mayor satisfacción, fidelización y aumento de cartera de clientes. Estos objetivos genéricos desde la perspectiva del cliente se consiguen gracias a las mejoras de algunas de las propuestas de valor [3] que la empresa ofrece a los mismos: plazo de entrega y precios óptimos, como se detalla en la ventana extraída del mapa estratégico [4] genérico de la Fig 2.



Fig. 2 Ventana del mapa estratégico. Elaboración propia.

Por tanto, la mejora de procesos como práctica de conducta laboral habitual es condición necesaria para la eficiencia operativa óptima [5] y para el resultado financiero que la compañía defina como aceptable. Hay otras formas de mejorar los mismos parámetros pero en todos los casos se requiere de necesidades de capital adicionales, reduciendo las posibilidades de inversión en activos más rentables, o de subcontratación, reduciendo el control interno de gestión y aumentando la

probabilidad de no ajuste entre el trabajo externalizado y los estándares de servicio de la empresa.

2. LOS HITOS DOCENTES EN LA MEJORA DE PROCESOS

Una vez somos conscientes de las ventajas obvias que presenta la mejora de los procesos como forma de trabajo es necesario resumir de forma genérica lo que para nosotros son los pasos lógicos de este proceso docente en sí. Porque el aprendizaje del mismo comienza en el ámbito universitario pero termina en la puesta en práctica directamente en las empresas, normalmente por parte de antiguos alumnos a los que se les ha impartido la asignatura correspondiente.

Los 6 hitos docentes asociados a la mejora de los procesos en su totalidad, tal como queda representado en la Fig 3, son los siguientes:

1. Incidencia de la mejora de los procesos en el resultado económico-financiero de las empresas.
2. Concepto teórico de la mejora de procesos
3. Análisis del proceso
4. Puesta en marcha de la mejora
5. Evaluación de los resultados
6. Revisión continua del proceso

Desde nuestro punto de vista, la docencia reglada universitaria y la formación directamente realizada en empresa presentan hitos de confluencia, como son los puntos 3 y 4 sobre análisis y puesta en marcha respectivamente. Sin embargo, en el caso universitario el hito de comienzo se establece en la incidencia que la práctica tiene sobre la estructura patrimonial de la empresa para profundizar posteriormente en el concepto teórico del mismo (punto 2). Por su parte, en los casos de ejecución en empresa el trabajo no para en el punto 4 sino que continúa con la evaluación real de los resultados (punto 5) como objetivo financiero último del sentido empresarial y cierra el círculo con la necesaria revisión continua del proceso (punto 6). Hay que tener en cuenta que la redefinición de un proceso en la empresa supone cambios seguros en el resto de tareas o procesos con los que está ligado en mayor o menor medida, lo que obliga a estar continuamente alerta en su nuevo funcionamiento.

La evaluación y revisión continua son puntos informativos en la docencia universitaria pero no cuestionan si la mejora realizada es positiva o no. Sin embargo en la empresa la evaluación confirmará si la implantación final de los cambios ha de hacerse de facto o por el contrario, a pesar de haber llevado a cabo la traslación del concepto teórico a la práctica de forma impecable, el resultado no valida su implementación definitiva.

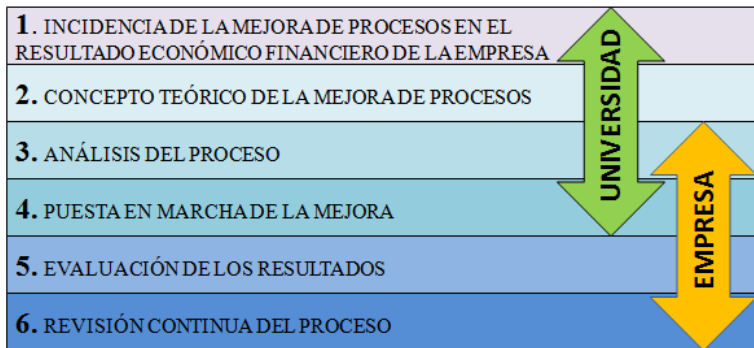


Fig. 3 Esquema hitos formativos. Elaboración propia.

Ejemplo práctico del desarrollo de los hitos definidos. Aplicación práctica al proceso de transporte en el negocio de la distribución de productos de acero al carbono para el sector de la construcción.

3. INCIDENCIA DE LA MEJORA DE PROCESOS EN EL RESULTADO ECONÓMICO-FINANCIERO DE LA EMPRESA

Este hito, punto de inicio para conocer las ventajas económicas asociadas al desarrollo de la mejora continua de procesos, se ejecuta tal y como hemos comentado en la docencia universitaria, y su objetivo es hacer ver al alumno cual es la ventaja real que se consigue con ello. En el caso de la formación en empresa se comienza directamente en el proceso en curso, no haciendo referencia en ningún caso al mismo. Además, en muchos casos los operarios y técnicos relacionados con el proceso de estudio son beneficiosos para la mejora esperada gracias a su formación y experiencia más que a sus conocimientos sobre la forma de proceder teóricamente. Obviamente siempre existe la función directiva, la cual suele ser llevada a cabo por un antiguo estudiante que conoce las bases teóricas de los pasos a seguir.

El primer apartado del artículo “La importancia de la mejora continua de los procesos” define este hito desde el punto de vista docente. Al final todas las prácticas llevadas a cabo en la empresa tienen que conseguir una estructura patrimonial óptima para la empresa. Asociado a este punto es necesario hacer entender al alumno el concepto estratégico de la empresa y la necesidad de relacionar las diferentes perspectivas estratégicas como causa-efecto [6], desembocando siempre en la perspectiva financiera y definiendo lo que para los accionistas supone el éxito económico.

4. CONCEPTO TEÓRICO DE LA MEJORA DE PROCESOS

Para la docencia del concepto teórico de la mejora de procesos existen diversas fuentes a desarrollar, todas ellas con una visión prescriptora evidente que permita seguir unos pasos de forma estándar. Está basada en una forma de trabajar donde la posibilidad de mejora se considera siempre posible, y se fundamenta sobre una serie de conceptos que están apoyados en principios como la simplicidad, el cuestionamiento constante y la medición como forma de gestionar.

En líneas generales la mejora de un proceso está asociada al cambio en la forma de realizarlo, de forma que se consiga el óptimo en aquellos indicadores que se consideran representativos del mismo. Para ello se dispone de infinidad de técnicas que no son objeto de desarrollo en este artículo pero que se pueden simplificar a través del ciclo PDCA (esquema en Fig 4), también conocido como ciclo Deming [7] o ciclo de mejora continua.

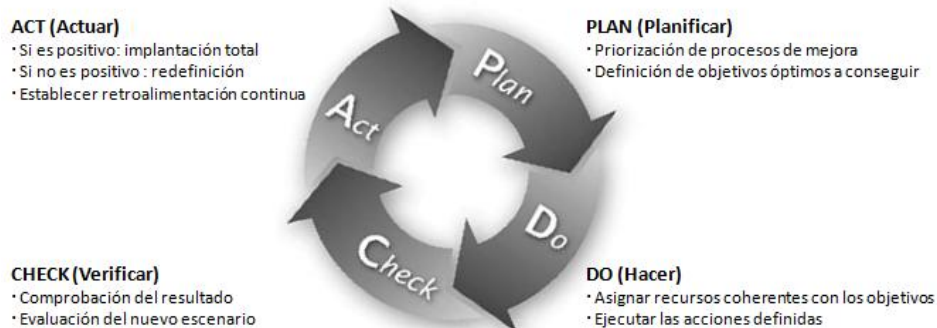


Fig. 4 Esquema sistema PDCA. Elaboración propia.

El círculo PDCA aporta una guía de sistemática de aplicación para la mejora de procesos

A partir de este se aplican diversas técnicas que posibilitan la mejora y que se puede resumir dentro del concepto de Lean Manufacturing [8], el cual engloba herramientas como SMED [9], KAIZEN ó 5S [10] entre otras.

Estos conceptos teóricos, donde destacamos la necesidad de tener una guía correctamente definida y estructuralmente estándar es un hito exclusivo de la docencia reglada universitaria aunque es el back up para la puesta en marcha futura en las empresas. De hecho, tal y como hemos comentado, los procesos de mejora o la actividad directiva basada en la mejora continua es liderado habitualmente por empleados con formación universitaria apropiada.

5. ANÁLISIS DEL PROCESO

A partir del conocimiento de los conceptos teóricos es posible una aplicación más óptima del propio proceso para la mejora continua. Este hito es desarrollado completamente en ambos escenarios: universidad y empresa. En el primer caso con el fin de aprender cómo llevar a cabo la puesta en marcha de las diferentes técnicas teóricas. Para ello se utilizan ejemplos basados habitualmente en mejoras reales realizadas en empresa. En el caso de la formación en empresa este hito es el primero de los seis. Ya hay un proceso que funciona pero con unos resultados que se quieren mejorar o, siendo más concreto, que se pueden mejorar aunque sea mínimamente. La planificación de los objetivos a alcanzar definirá el cambio esperado.

Con el análisis (etapa Plan del PDCA) se establecerían los objetivos a conseguir. Dichos objetivos son siempre cuantitativos [11], única forma de gestionar realmente cualquier actividad. Es importante recordar que, aunque todos los procesos son mejorables, la asignación de recursos es limitada por lo que será necesario un análisis previo de priorización de procesos [12] a mejorar de forma que los beneficios del trabajo realizado sea el óptimo en el menor tiempo posible.

Análisis del proceso. Caso de estudio.

En nuestro caso de estudio el trabajo se desarrolla en el negocio de la distribución de productos de acero al carbono para la construcción. Tras el análisis de los procesos más determinantes sobre las propuestas de valor de los clientes se identifica el transporte como el más crítico y el que puedo ofrecer una mejora incremental más importante a corto plazo.

El transporte de los productos es el cuello de botella [13] del sistema. Pero, ¿cómo incide su limitación sobre el resultado? Limitando la cifra de negocio. Y, ¿cuáles son las causas de su condición de cuello de botella?, ¿cuáles son las restricciones? Reflejamos las dos más determinantes:

- **Reducción de la satisfacción de los clientes por entregas fuera de plazo.** Debido al sistema de preparación
- **Capacidad de captación de pedidos limitada.** Debido al sistema de preparación

La medición inicial del proceso (Tab 1) se estable sobre aquellos indicadores que realmente miden la actividad del negocio y que es coherente con la estrategia de la compañía. Estos son los siguientes:

		Valores iniciales (2010)			
		Ene	Feb	Mar	Total
Ud.	Días	19	20	22	61
Ton	Ventas	2.071	2.767	3.020	7.858
Ud.	Cientes con venta	672	722	764	719
Ud.	Albaranes	2.241	2.710	3.047	7.998
Ud.	Líneas de albarán	5.060	6.175	6.999	18.234
Ud.	Albaranes en fecha	1.990	2.367	2.675	7.032
€	Gasto Transporte	36.308	46.304	49.881	132.493
Ratios					
Ton/día	Ventas	109,0	138,4	137,3	128,8
Alb/día	Albaranes	117,9	135,5	138,5	131,1
Ud.	Cientes con venta	672,0	722,0	764,0	719,3
€/ton	Gasto Transporte	17,5	16,7	16,5	16,9
%	Nivel de servicio	88,8%	87,3%	87,8%	87,9%

Tab. 1 Valores tomados inicialmente.

El análisis detallado del proceso refleja distintos subprocesos de tiempo que determinan el tiempo total del mismo. Entre ellos la restricción más determinante está asociada al *tiempo de carga*. Pero, ¿cuáles son las causas que elevan el tiempo de carga hasta convertirlo en la restricción más importante del proceso de transporte? Son cuatro las causas identificadas:

- **Los pedidos no están preparados cuando llega el camión.** Debido al sistema de preparación de pedidos, definido para preparar en orden de entrada en lugar de en orden de salida. La preparación en orden de entrada hace que se preparen pedidos que saldrán después que otros. De esa forma hay pedidos no preparados cuando llega el camión, alargando el tiempo de carga.
- **El tiempo de carga es alto al ser difícil la identificación de las líneas.** El sistema de identificación no es estándar lo que hace que el tiempo de localización y carga se alargue.
- **Tiempo alto al estar los pedidos en diversas zonas del almacén.** No hay una única zona de carga sino que esta está repartida en función de las zonas de preparación. Es el camión el que recorre el almacén cuando carga.
- **Mucho tiempo de preparación de la documentación.** La preparación de la documentación se realiza cuando el camión está cargado lo que hace que el camión deba esperar una vez terminada la carga efectiva del mismo.

6. PUESTA EN MARCHA DE LA MEJORA

El cuarto hito se establece igualmente en ambos desarrollos: universitario y empresa. Correspondería a la etapa Do del ciclo PDCA, la cual se establece como desarrollo metodológico apoyado en casos reales para el alumno de universidad pero que tiene un componente crítico para su ejecución en empresa debido al componente humano (ver punto 4 “Diferencias entre escenarios: universitario y empresa”) que lleva implícito en la mayoría de los casos la resistencia al cambio.

El conocimiento teórico del concepto Lean Manufacturing y las herramientas asociadas al mismo permiten entender dónde incidir y cómo llevar a cabo la mejora del proceso.

Puesta en marcha de la mejora. Caso de estudio.

La puesta en práctica de la herramienta SMED [14] nos ha permitido ejecutar como externas tareas que hasta el momento del análisis se efectuaban como internas. Los cambios más significativos son los siguientes:

- **Cambio en el orden de preparación.** Se prepara en orden de salida en lugar del de entrada. De esta forma los pedidos están preparados al llegar el camión y se reduce el tiempo de carga.
- **Nueva identificación de las líneas de pedido.** Implantación de una denominación automática, estándar y sencilla de identificar que agiliza la visualización de la carga, reduciendo el tiempo de la misma.
- **Movimiento de las líneas preparadas a una única zona de carga.** De esta forma el tiempo de carga no presenta restricciones por rutas internas del camión en el propio almacén.
- **Preparación de la documentación previa a la carga real.** El análisis de la esta limitación permite redefinir la sub-tarea para realizarla de forma externa (antes de la llegada del camión) en lugar de interna.

7. EVALUACIÓN DE LOS RESULTADOS

El hito 5 no lo situamos dentro de los específicos de la docencia universitaria aunque creemos que su influencia debe ser tan importante como en la empresa pero con una orientación diferente.

La evaluación de la mejora llevada a cabo en las empresas reflejará si esta ha sido positiva o no, si los resultados han sido los esperados o si las desviaciones obtenidas están dentro de los límites considerados como aceptables. La estrategia de la empresa define la coherencia de estos resultados, los cuales han de ser coherentes

con la misma. No hay coherencia necesaria en la docencia universitaria puesto que los procesos se evalúan de forma independiente, sin restricciones en ningún tipo de recurso.

Sin embargo, aunque no es un hito incluido en la docencia universitaria si queremos destacar un aspecto desde nuestro punto de vista fundamental: hacer ver al alumno la necesidad de medir como forma de gestión. Esta parte de la función directiva debería tener una puntualización determinante en hito 2 “Concepto teórico de la mejora de procesos”.

Evaluación de los resultados. Caso de estudio.

Tras la puesta en marcha de las mejoras definidas, la medición vuelve a generarse con el fin de conocer el resultado real de la misma, en nuestro caso de estudio es la representada en la tabla 2, que refleja unos valores positivos según lo esperado.

		Valores iniciales (2010)				Valores tras mejora (2010)			
		Ene	Feb	Mar	Total	Abr	May	Jun	Total
Ud.	Días	19	20	22	61	20	21	23	64
Ton	Ventas	2.071	2.767	3.020	7.858	2.950	2.712	2.997	8.659
Ud.	Clientes con venta	672	722	764	719	736	754	794	761
Ud.	Albaranes	2.241	2.710	3.047	7.998	2.789	3.113	3.489	9.391
Ud.	Líneas de albarán	5.060	6.175	6.999	18.234	6.199	7.169	7.929	21.297
Ud.	Albaranes en fecha	1.990	2.367	2.675	7.032	2.499	2.874	3.195	8.568
€	Gasto Transporte	36.308	46.304	49.881	132.493	44.322	39.665	42.177	126.164
Ratios									
Ton/día	Ventas	109,0	138,4	137,3	128,8	147,5	129,1	130,3	135,3
Alb/día	Albaranes	117,9	135,5	138,5	131,1	139,5	148,2	151,7	146,7
Ud.	Clientes con venta	672,0	722,0	764,0	719,3	736,0	754,0	794,0	761,3
€/ton	Gasto Transporte	17,5	16,7	16,5	16,9	15,0	14,6	14,1	14,6
%	Nivel de servicio	88,8%	87,3%	87,8%	87,9%	89,6%	92,3%	91,6%	91,2%

Tab. 2 Valores tomados tras puesta en marcha de las mejoras

- **Ventas (Ton/día).** Incremento del 5% positivo [15] [16]
- **Albaranes (Albaranes/día).** Incremento del 11,9% positivo.
- **Número de clientes con venta.** Mejora del 5,8%
- **Gasto en transporte.** Mejora (reducción del gasto) del 13,6%
- **Nivel de servicio.** Incremento del 87,9% al 91,2%.

Revisión continua del proceso

La mejora continua de los procesos, como su propio nombre indica, necesita de estandarización de la práctica de forma que se establezcan alertas que identifiquen desviaciones fuera de lo calificado como aceptable. Además, hay que tener presente que los resultados inicialmente pueden resultar positivos pero, puesto que hay procesos que inciden directamente con el mejorado o que limitan directamente su agilidad, pueden cambiar su respuesta en el tiempo. Igualmente, el concepto de restricción al cambio hace necesario el control de la buena marcha del mismo conforme las personas lo van monitorizando sin la supervisión del líder inicial del proyecto.

Diferencias más significativas entre la docencia universitaria y la formación en empresa

Algunas de las diferencias más importantes que se encuentran entre la docencia en mejora continua de procesos y la formación de la acción en la práctica real de empresa son las siguientes:

Aspecto	Docencia Universitaria	Formación en empresa
Percepción del beneficio	Los alumnos tiene un percepción del beneficio de la práctica a largo plazo, en su futura función directiva.	Los empleados ven el beneficio del resultado a corto plazo, pues repercute en cuentas de explotación y/o incentivos económicos.
Interacción con equipo	Aunque se pueden hacer trabajos en grupo la actividad de estudio es independiente. Además, en caso de trabajo en equipo todos tiene las mismas orientaciones.	Necesariamente hay que tener en cuenta al resto de participantes, los cuales forman un equipo decisivo como tal. Pueden ser de diferentes áreas y, por tanto, orientaciones.
Perfil participantes	Estudiantes	Se mezclan perfiles muy diversos en experiencia profesional, en nivel formativo y en especialidades.
Aspectos limitantes	El estudiante no presenta limitaciones asociadas	Una empresa son personas diferentes, procesos que interaccionan, aspectos que chocan en sus posiciones, etc. y por tanto aparecen aspectos que limitan la aplicación del proceso de mejora en algún sentido.
Influencia de la	La mejora de procesos es algo independiente, local, sin influencias más	La mejora tiene que ser inexorablemente coherente con la estrategia de la

estrategia	allá que el propio proceso de mejora.	compañía. La mejora ha de ser general, no local.
Restricciones cognitivas	El estudiante no está condicionado por el entorno puesto que no hay interacciones.	El conocimiento de la empresa, las personas, los procesos y en general todos los componentes que participan en la empresa condiciona el comportamiento de los participantes.
Validación del modelo	El proceso analizado tiene un objetivo exclusivamente docente y, por tanto, el modelo se valida siempre.	El modelo solo se valida si los resultados son considerados positivos con la perspectiva financiera y coherente con la estrategia de la empresa.

8. CONCLUSIONES Y CONSIDERACIONES DOCENTES

La mejora de procesos como forma de trabajar es absolutamente necesaria para la eficiencia operativa de cualquier empresa. No es posible en un mercado de continua competencia, donde la información de mejoras y procesos es prácticamente conocida, ser competitivo sin mejorar continuamente todos los procesos.

Esta práctica tiene una doble vertiente docente: universitaria y en empresa. En el primer caso estamos ante la fuente de la que beberá en el futuro la empresa mientras que, recíprocamente, los casos reales conseguidos en empresa se emplean en la docencia universitaria para potenciar las herramientas utilizadas.

En el caso de la docencia universitaria tenemos una situación claramente unipersonal, que en algunos casos puede ser trabajada en equipo, pero que en cualquier caso no presenta restricciones, ni interacciones, ni diferencias formativas, ni profesionales.

En el caso de la formación en empresas se da el caso totalmente diferente, con una necesaria interacción con equipos, procesos, áreas, personas y niveles formativos, en una horquilla de edades totalmente variada, lo que dificulta su puesta en marcha.

La división de la práctica en 6 hitos deja ver que en la empresa aparece el análisis, puesta en marcha, valoración y retroalimentación. Por el contrario, en la universidad aparece el componente inicial del concepto teórico así como el entendimiento más concreto de la necesidad del proceso para el objetivo último de cualquier empresa.

Al alumno hay que hacerle ver la importancia de las herramientas con el fin de conseguir que la función directiva que desarrolle en el futuro sea por convencimiento y no por obligación. El empleado de la empresa tendrá su motivación en el resultado económico que percibe a corto plazo.

En ambos casos, aunque con diferentes parámetros, es evidente la importancia de la mejora continua y la medición [17] dentro de la eficiencia operativa.

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EL TRABAJO DE COMPETENCIAS ÉTICAS EN LA EDUCACIÓN UNIVERSITARIA

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Resumen.

La consecución de ciertas competencias éticas viene recogido en todos los planes de estudio de los grados universitarios, sin embargo, frecuentemente los profesores declaran no saber cómo abordar estas competencias en sus clases. El objetivo de este trabajo es exponer una forma original de trabajar las competencias éticas, a través de, un rallye fotográfico en el contexto de una ciudad patrimonio de la humanidad. Un rallye fotográfico es una actividad de orientación que consiste en encontrar ciertos elementos que se han fotografiado previamente y se entregan dentro de un mapa al participante. Cuando el participante encuentra el elemento fotografiado tiene que escuchar una historia o texto y responder a varias preguntas que le hacen reflexionar. Nuestra intención es utilizar esta actividad para trabajar las competencias éticas. En esta comunicación se expondrá una experiencia llevada a cabo en la Universidad de Extremadura. En concreto, para la realización de la actividad “rallye fotográfico para el trabajo de competencias éticas” se dividió a la clase en grupos de 5 personas y a cada grupo se les encargó que diseñaran y confeccionaran el mapa con las fotografías que habría de servir para realizar la actividad. Cuando se llegaba al punto elegido se realizaba una lectura de interés para el trabajo de competencias éticas o se exponía un dilema ético con el que todos reflexionábamos, en el marco sin igual, de una ciudad patrimonio de la humanidad, posteriormente se realizaban unas preguntas en cada posta y cada uno la respondía según sus conocimientos y pensamiento ético. Para finalizar se hacía un pequeño resumen reflexión sobre cada temática abordada. Como conclusión un rallye fotográfico puede ser una forma motivante y atractiva de trabajo de las competencias éticas en alumnos universitarios.

1. INTRODUCCIÓN

En el actual contexto de crisis económica existe una preocupación creciente de toda la sociedad por los aspectos éticos. Profesionales con una sólida formación universitaria han cometido delitos como el fraude fiscal, el cohecho o la apropiación indebida. Ante estos hechos la sociedad sorprendida se pregunta ¿dónde está la ética profesional de estas personas?, ¿la universidad no ha sido capaz de formar profesionales con una ética profesional inquebrantable?.

Algunos profesores universitarios podrían argumentar que la ética profesional no sólo depende de la Universidad y posiblemente no les falte razón, sin embargo, esto no puede ser motivo para que la Universidad no se preocupe por la adquisición de las competencias éticas de su alumnado poniendo todos los medios a su alcance para que éstos adquieran una formación ética sólida y de calidad.

Posiblemente una buena educación ética hará de nuestros alumnos profesionales más éticos (William Thomas, 2004).

Con la llegada de los nuevos planes de estudios universitarios, se ha hecho patente la necesidad de incorporar el trabajo de los aspectos éticos. La práctica totalidad de los nuevos planes formativos de

los grados universitarios incluyen que el alumnado tras su paso por la titulación haya adquirido unas competencias éticas.

En la práctica diaria el profesorado universitario, a menudo, no sabe cómo trabajar y evaluar las competencias éticas en sus clases y termina por no realizar ninguna actividad enfocada a este fin.

Las actividades fuera del aula “outdoor” pueden ser una oportunidad para motivar a los alumnos y trabajar diversas competencias como la ética. En este sentido los recorridos de orientación urbana suponen una oportunidad, dado que propician un ambiente motivador y novedoso para el alumnado. En concreto los “rallyes fotográficos” son una actividad que ya han sido utilizadas con éxito en el ámbito educativo con fines docentes (Giménez, Téllez, & Sierra, 2009; Pedraza, 2009).

2. OBJETIVOS

El objetivo de este trabajo es exponer una forma original de trabajar las competencias éticas, a través de, un rallye fotográfico en el contexto de una ciudad patrimonio de la humanidad.

3. MÉTODO

Para la realización de esta actividad formativa se dividió a la clase en grupos de 5 personas y a cada grupo se les encargó que diseñaran y confeccionaran el mapa con las fotografías que habría de servir para realizar la actividad. Posteriormente se eligió entre toda la clase el mapa que parecía ser de mayor interés para todos. Había un total de 9 postas o paradas ilustradas con una o más fotografías en el mapa. En cada una de las paradas había que realizar una actividad apoyada en la lectura de un texto de interés para el trabajo y profundización en los aspectos éticos.

Cuando se llegaba al punto elegido se realizaba una lectura de interés para el trabajo de competencias éticas o se exponía un dilema ético con el que todos reflexionábamos, en el marco sin igual, de una ciudad patrimonio de la humanidad, posteriormente se realizaban unas preguntas en cada posta y cada uno la respondía según sus conocimientos y pensamiento ético. Para finalizar se hacía un pequeño resumen reflexión sobre cada temática abordada.

Tabla 1. Lecturas realizadas en cada parada.

1. El profesor de educación física y su responsabilidad por lesiones de los alumnos durante el periodo de escolarización obligatoria.

2. Un artículo científico titulado: “Reflexiones a los diez años de la imposición de la colegiación obligatoria de los profesores de educación física”.

3. Lectura de la primera parte del código deontológico.

4. Lectura de la segunda parte del código deontológico.

5. Lectura de la tercera parte del código deontológico.

6. Lectura de la comunicación “código deontológico dos profesionais do deporte”.

7. Lectura del código ético y de conducta para los entrenadores de deportes.

8. Lectura del código de conducta en competiciones deportivas escolares del Consejo Superior de Deportes.

9. Lectura sobre el “caso karate”. Artículo publicado en la versión digital del mundo el Viernes 15/ 03/ 2013, llamado “El mayor caso de pederastia de España. Después se procederá a la lectura del artículo publicado el día 13/05/2013 por el Periódico de Extremadura en su versión digital llamado “El karateca de la ‘secta sexual’ trabajó en Cáceres”.

Tabla 2. Actividades realizadas en cada parada.

- 1. Imagina que realizas una actividad en la parte Antigua con alumnos de 4º de la ESO, una niña se tuerce un pie y tienes que ir a llevarla al centro de salud. Dejas a los alumnos al cuidado de la delegada y cuando vuelves del centro de salud después de haber dejado a la alumna lesionada con sus padres, te encuentras que ha habido una pelea y un niño ha perdido un ojo. ¿Tendrías alguna responsabilidad legal? ¿y ética?. Se debe leer en grupo el texto “el profesor de educación física y su responsabilidad por lesiones de los alumnos**

durante el periodo de escolarización obligatoria”.

- 2. Imagina que acabas de terminar la carrera y te contratan para un instituto privado-concertado. Comienzas tus clases y a mediados de curso te llega una carta del colegio profesional de licenciados en educación física, requiriendo que te colegies porque así lo indica la ley y que de lo contrario procederán a denunciarte. ¿Cómo actuarías? ¿Crees que es adecuado que se obligue la colegiación en la enseñanza concertada y en la pública no?. Se debe leer en grupo el texto “reflexiones a los diez años de la imposición de la colegiación obligatoria de los profesores de educación física.**

- 3. Se debe leer con atención la sección A del código deontológico llamada “principios clave en la educación física”. Cada uno debe describir una situación que haya vivido o le hayan contado en clase de educación física ya sea en el colegio, en secundaria o en la Universidad en la que alguno de estos principios no se haya tenido en cuenta, así mismo, se debe pensar cómo debería haber actuado el alumnado para impedir que algo así volviese a suceder.**

- 4. Se debe leer con atención la sección B del código deontológico llamada “buenas prácticas en la educación física” y pensar cada uno al menos una buena práctica que no esté incluida en el código.**
-

5. Todos los días uno de vuestros alumnos/as llega con moratones a clase, uno días con cardenales, otros con quemaduras pequeñas y un día con el ojo morado. Cuando le preguntas cómo se hizo eso, siempre da datos imprecisos y no quiere hablar del tema. ¿qué harías?. Se debe leer con atención la sección C del código deontológico llamada “posible estrés, agotamiento y abuso en la educación física”. y pensar cada uno al menos una buena práctica que no esté incluida en el código.

6. Pensad cómo debería ser la relación profesor-alumno. Posteriormente leer el power point llamado “código deontológico dos profesionales do deporte” y poned por escrito las coincidencias y lo que solo vosotros destacáis en la relación profesor-alumno.

7. ¿Cabe la competición en un ámbito educativo?. Haced un resumen del código de conducta a aplicar en competiciones deportivas escolares.

8. Haz una lista de comprobación con todas las áreas que aparecen el “código ético y de conducta para entrenadores de deportes” (humanidad, relaciones, etc.), pensando en un entrenador que hayas tenido en secundaria, en caso de tener problemas en algún área indicar cuál y proponer una acción para mejorarlo.

9. Se debe leer “el mayor caso de pederastia de España”. Pensad que tenéis un compañero de trabajo que sospecháis que es un abusador/a

¿qué podéis hacer?

10. ¿Cómo se podría mejorar este rallye para trabajar mejor las competencias éticas?

4. DISCUSIÓN

En el rallye fotográfico la participación fue elevada ya que todos tenían que expresar su opinión sobre el texto leído así como compartir su visión sobre los distintos aspectos tratados.

En general las cuestiones sobre el código deontológico eran conocidas de una u otra forma por el alumnado, si bien, había un desconocimiento general sobre la existencia de los códigos éticos expuestos.

La cuestión que hacía referencia al caso Karate, causó consternación al conocer que el profesor condenado por abusos a menores había impartido clase en nuestra facultad en Cáceres. Por otra parte sirvió para reflexionar sobre qué hacer ante sospechas o indicios de que un compañero de profesión tenga actitudes o comportamientos impropios con el alumnado. No se llegó a una opinión unánime al ser un tema muy controvertido. Si bien la mayoría pensaba que ante la mínima sospecha lo mejor era ponerlo en conocimiento de las autoridades del centro de trabajo para que se tomen las medidas que se consideren oportunas.

En cuanto a las sugerencias de mejora, el alumnado comentó que la actividad había sido un poco aburrida al haber demasiado texto para leer.

Como sugerencia se indicó que sería interesante añadir pequeñas representaciones o teatralizaciones en cada parada realizada para que no se tuviese que leer, otra opción que algunos discentes ofrecieron fue la de traer los textos preparados desde casa.

Como punto fuerte destacaron que desconocían la obligatoriedad de colegiarse si se trabaja en el ámbito privado y también que nunca habían leído ni trabajado con el código deontológico de nuestra profesión

5. CONCLUSIÓN

Un rallye fotográfico puede ser una forma motivante y atractiva de trabajo de las competencias éticas en alumnos universitarios.

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ADAPTACIÓN CULTURAL Y VALIDACIÓN DEL CUESTIONARIO “ETHICS ORIENTATION SCALE” EN POBLACIÓN UNIVERSITARIA ESPAÑOLA.

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Resumen.

Los cambios en la sociedad actual y los avances científico-tecnológicos han puesto de manifiesto unas necesidades de formación y educación ética desde diversos ámbitos. El entorno universitario debe adaptarse para hacer frente a estas demandas y preparar a sus alumnos, desde el punto de vista de la ética, para su desempeño laboral futuro. El primer paso para un adecuado tratamiento debe ser una buena evaluación de la situación actual a través de un cuestionario validado en población universitaria española. El cuestionario “Ethical Orientation Scale” (EOS) es uno de los más usados en el mundo para medir la orientación ética. Sin embargo, este cuestionario no está validado en población española. El objetivo es obtener un cuestionario de calidad para la evaluación de los aspectos éticos que sirva de herramienta para investigadores y profesores de las distintas universidades españolas. La adaptación cultural y validación tiene diferentes fases. En primer lugar se debe realizar una traducción desde el inglés por parte de una persona bilingüe. A continuación se discuten las posibles modificaciones que han de hacerse debido a las diferencias culturales. Tras esto, otra persona bilingüe revisa el documento. Previa a la validación, ha de realizarse una prueba de comprensibilidad con al menos 100 personas de diferentes regiones españolas. Como conclusión se establece que una adecuada evaluación y tratamiento de la ética en el contexto universitario español, es necesaria una validación y adaptación cultural de un cuestionario de calidad como el EOS.

Palabras clave: Ética, Universidad, Educación, Orientación ética.

1. INTRODUCCIÓN

En los últimos años, la investigación sobre la ética en la educación superior se ha incrementado de manera considerable. Existe un consenso acerca de la importancia de la formación ética de los alumnos universitarios desde la propia universidad, estableciéndose en el currículum como contenido transversal. No obstante, la forma de abordar esta educación ética continúa siendo un tema susceptible de múltiples discusiones, existiendo desacuerdos en cuanto al modo en el que debe aparecer en el currículum y la manera en la que ésta debe ser enseñada en el aula.

La idea de que unos alumnos con una mejor educación ética en la universidad serán unos profesionales con un comportamiento ético más adecuado (William Thomas) está ampliamente extendida entre los investigadores en este campo. La mayoría de estudios en este campo se enfocan en unas titulaciones específicas como por ejemplo contabilidad (Kerr and Murphy Smith), biociencias (Loike et al.) o medicina (Goldie).

En las universidades españolas, un amplio número de profesores obvian los contenidos éticos en sus actividades docentes habituales. Es por ello, que algunos investigadores han considerado necesario un tratamiento más normativo y una importancia mayor para este contenido tan olvidado (Bolívar).

Hoy en día nadie duda de la relevancia de la ética en la educación superior, sin embargo ¿cómo se podría mejorar el tratamiento que se hace desde la Universidad a la ética? Desde nuestro punto de vista, siguiendo los principios científicos que deben regir todos los aspectos en la Universidad, el primer paso para mejorar algo es conocer cuál es el estado inicial del que partimos en las Universidades españolas. Para esta evaluación del estado inicial necesitamos instrumentos sólidos y fiables que permitan medir cuáles son las características éticas generales, por zonas geográficas o por áreas de conocimiento, de los estudiantes, profesores y trabajadores del ámbito universitario.

Una vez tengamos caracterizada la población universitaria, podremos plantear novedosos programas con el fin de optimizar la situación. Sin embargo, nos encontramos con un problema importante, ya que no disponemos de las herramientas necesarias para realizar esta evaluación.

Uno de los estudios universitarios que más han suscitado el interés de los investigadores es de los estudios empresariales y de administración, por entenderse

que la formación ética en los estudiantes universitarios de estas titulaciones es de especial relevancia de cara a la sociedad. En este sentido, el cuestionario Ethical Orientation Scale (EOS) fue desarrollado con estudiantes del ámbito empresarial y administrativo de la India, a partir de ítems de otros cuestionarios y escalas. El EOS consta de 16 ítems que dan lugar a seis dimensiones:

- Situacionalismo: grado en que la persona siente que su orientación y comportamiento ético dependen de la situación.
- Cisma ético: grado en que la persona considera su vida y su desempeño laboral como elementos separados, éticamente independientes.
- Predisposición a pagar el precio: grado en que la persona siente la necesidad de actuar de manera ética incluso si tiene repercusiones negativas para sí misma.
- Relativismo: grado en que la persona siente que no existen términos absolutos sobre ética, sino que cada persona decide qué es ético y qué no.
- Ética competitiva: grado en que la persona siente que en actividades competitivas se pueden comportar de maneras que son consideradas poco aceptables en situaciones cotidianas.
- Ética capitalista: grado en que la persona valora el lucro y los accionistas por encima de otros aspectos como la responsabilidad social, el bienestar de los empleados...

A pesar de que este cuestionario es específico del ámbito empresarial y por tanto de titulaciones relacionadas con la administración y dirección de empresas, consideramos que todas las titulaciones universitarias se encaminan, en mayor o menor medida, al desempeño laboral dentro de una empresa, a través del emprendimiento de negocios relacionados con temas específicos de cada titulación, por ejemplo, en las ciencias del deporte son cada vez más frecuentes las empresas que surgen en actividad física y salud, entrenamiento personal, actividades en la naturaleza, etc. Es por ello, que la aplicación de este cuestionario no debería limitarse a titulaciones de índole empresarial, sino que debería hacerse extensivo a todo el ámbito universitario.

1. OBJETIVOS

Obtener una herramienta de evaluación de la ética en el ámbito universitario, que pueda caracterizar a la población universitaria de las diferentes facultades de España

2. MÉTODO

Para la realización de una adaptación cultural de un cuestionario concreto existen diversas posibilidades. El procedimiento que planteamos en este trabajo es el recomendado por diversos autores (Sperber) y considerado como el más adecuado desde nuestro punto de vista.

El primer paso es la toma de contacto con los autores del cuestionario original, para solicitarles autorización y, en su caso, colaboración para trabajar con el cuestionario que desarrollaron.

En segundo lugar, se realizará la traducción del cuestionario original al español. Para este proceso, Sperber plantean una serie de recomendaciones y criterios que se deben tener en cuenta. El cuestionario debe ser traducido desde el inglés original a español por dos traductores independientes, los cuales deben ser bilingües. La combinación de las dos traducciones independientes da como resultado una nueva versión del cuestionario en español. Esta traducción debe ser nuevamente traducida al inglés por otros dos traductores independientes que no hayan visto la versión original del cuestionario en inglés. Compararemos a continuación la versión original del cuestionario en inglés con la versión traducida desde el español al inglés, para asegurar su equivalencia y adecuación.

A continuación, procederemos con la validación del idioma. Es necesario un mínimo de 30 personas de habla inglesa para comparar ambos cuestionarios. Cada ítem se evalúa del 1 al 7, siendo 1 el valor para “extremadamente similar” y 7 “nada similar”. Aquellos ítems con una puntuación media mayor de 3 deberán ser revisados y retraducidos.

El siguiente paso que se debe dar es la evaluación de la comprensibilidad de la nueva versión en español del cuestionario EOS. Para este fin, se debe contar con una muestra de al menos 100 sujetos, si bien existen factores aquí que se deben tener en cuenta, como la diversidad lingüística de la geografía española. En cualquier caso, este paso es indispensable para asegurar la comprensión del cuestionario por las personas de un lugar.

3. DISCUSIÓN

Basamos la pertinencia de este trabajo en la necesidad que existe en España de una herramienta que evalúe la orientación ética de los estudiantes y profesionales del ámbito universitario.

Dado que el objetivo de la Universidad debe ser el de contribuir a la construcción de una sociedad mejor para todos, la educación ética de los estudiantes, que se convertirán en los futuros profesionales de la sociedad española, cobra una enorme trascendencia.

Unos estudiantes mejor formados éticamente darán como resultado unos profesionales más éticos y, por tanto, una sociedad más ética (William Thomas). Este debe ser el argumento que lidere un nuevo paradigma de educación ética en el ámbito universitario, aumentando los esfuerzos para hacer más tangible la formación ética en la educación superior.

Todo este proceso debe comenzar con la evaluación de las características éticas del alumnado y profesorado universitario, surgiendo en este sentido una serie de cuestiones como ¿son diferentes las características éticas en función de la titulación? ¿Existe un perfil ético para cada titulación? ¿Debe

darse una educación ética distinta en función de la titulación? ¿En qué medida?. Todas estas cuestiones no pueden responderse sin las herramientas de medida adecuadas.

Otro aspecto relevante que se debe evaluar es el efecto que tiene la Universidad actualmente en los alumnos, es decir ¿existen diferencias éticas entre los alumnos de primer curso y los de último curso? ¿a qué se pueden deber en caso de que existan? La respuesta a esta última pregunta es difícil de precisar, ya que si no se cuenta con un programa específico de formación ética, las variaciones en el alumnado durante el transcurso de su vida universitaria se van a deber a factores y elementos incontrolados e impredecibles.

4. CONCLUSIÓN

Se establece la necesidad de desarrollar un instrumento de evaluación ética como el EOS validado en español para caracterizar a la población universitaria española. La traducción y adaptación cultural ha de hacerse de manera cuidadosa para conseguir una herramienta precisa que permita evaluar la orientación ética de manera eficaz.

Esto permitiría plantear y desarrollar un programa ético de calidad basado en la situación real y actual del sistema universitario español.

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APRENDIZAJE ACTIVO Y SUS DETERMINANTES: UN ENFOQUE MULTIDISCIPLINAR

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Resumen

Desde la perspectiva de la investigación educativa la puesta en marcha de metodologías que propicien la mejora y consolidación del proceso de aprendizaje se considera crucial. El trabajo en equipo y el aprendizaje cooperativo son los métodos utilizados para fomentar el espíritu activo de los estudiantes. Este estudio va más allá y además pretende profundizar en los factores determinantes del desempeño de los estudiantes una vez que estas estrategias de aprendizaje activo son implementadas. Se incluyen en el análisis diversas variables cualitativas de los estudiantes como la edad, el sexo, la nacionalidad, entre otras, en un entorno de cambios, globalización y diversidad, como lo es el actual marco universitario. Utilizamos datos obtenidos a través de cuestionarios completados por estudiantes que cursan estudios de diversas disciplinas en un intento de identificar algunos patrones de eficiencia en su rendimiento. Nuestros resultados arrojan luz sobre la correlación existente entre unas características específicas de grupos de estudiantes que siguen un enfoque de aprendizaje activo y su éxito alcanzado durante un curso lectivo.

1. INTRODUCCIÓN

La gradual integración que está experimentando el sistema universitario español de acuerdo al estilo docente marcado por el Espacio Europeo de Educación Superior (EEES) ha motivado un notable incremento de acciones innovadoras enfocadas a mejorar el proceso de enseñanza-aprendizaje. Las Instituciones de Educación Superior (IES) en general, y específicamente, la Universitat Jaume I en colaboración con el Instituto de Tecnología de Dublín (DIT) están afrontando el reto de implementar estrategias activas simultáneamente en el aula con el fin de mejorar el proceso de enseñanza-aprendizaje y hacerlo más efectivo. Estudios anteriores han puesto de manifiesto los beneficios asociados al aprendizaje activo para los estudiantes, como por ejemplo [1], desde una visión crítica para el ámbito de Ingeniería afirma que el análisis sobre estudios basados en aprendizaje activo es convincente y que es recomendable implementar alternativas a métodos tradicionales. Así, en sintonía con los estudios de [2-4] que abogan por defender la aplicación de los métodos de enseñanza centrados en el alumno. En este trabajo se aborda este modelo de enseñanza y se

centra en la perspectiva del aprendizaje constructivista, según la cual es el alumno quien activamente va construyendo su propio conocimiento.

En este contexto y en el marco de la mejora educativa, algunos autores, como por ejemplo [5], proponen la incorporación de la función del estudiante en el proceso de aprendizaje y hacen hincapié en la importancia de las formas de pensar en que el estudiante es responsable y dirige su o su propio aprendizaje en la acción. Desde esta perspectiva, el papel del profesor y la del estudiante se reposiciona. Así, bajo este nuevo paradigma el profesor se concibe como un mediador y facilitador de una manera más participativa y cooperativa de un aprendizaje adaptado a la diversidad del entorno y al contexto social. En este sentido, uno de los principios básicos de la globalización como una teoría del desarrollo, es que las diferentes regiones del mundo están cada vez más integradas y que este nivel de integración está afectando a las condiciones económicas y sociales de los países. En otras palabras, la globalización es un proceso dinámico que está impulsando la reestructuración de la sociedad actual. Así, el fenómeno de la integración social es una realidad y las instituciones de educación superior juegan un papel crucial en el desarrollo de los conocimientos y su eficiente canalización hacia el entorno más adecuado. La globalización está afectando a la educación superior, y según [6, p. 44], la universidad focaliza estos procesos de internacionalización y globalización.

En este contexto, los estudiantes perfilan claramente un grupo heterogéneo, encontramos que esta realidad no siempre se tiene en cuenta en el diseño de las guías docentes y en la planificación ad-hoc de los cursos. Las especificaciones son comúnmente diseñadas para promover la estandarización y la objetividad en el proceso de aprendizaje, ello garantiza un rendimiento adecuado, así como la consolidación de las competencias y habilidades exigidas para formar futuros profesionales en un escenario global. Así, la implementación de buenas prácticas, nuevos recursos e innovaciones para mejorar el proceso de enseñanza-aprendizaje es crucial, como lo demuestran los numerosos trabajos publicados relacionados con experiencias de instituciones de todo el mundo. Específicamente el aprendizaje activo es ampliamente reconocido por sus beneficios para los alumnos, así como por tener un mayor impacto en su proceso de aprendizaje. Sin embargo, desde el punto de vista de la investigación educativa, puede considerarse especialmente útil para establecer la relación existente entre los perfiles de los estudiantes y su rendimiento, ya que existen diferentes grupos de estudiantes activos en un ambiente de diversidad.

La literatura aún está tratando de determinar si las características específicas de los estudiantes pueden vincularse a su desempeño académico o *performance*. Por ejemplo, en el caso de la edad [7] encuentra una relación negativa, es decir, cuanto más joven es el estudiante, mejor será su rendimiento, sin embargo [8] afirma que son los estudiantes más maduros los que son más propensos a obtener mejores resulta-

dos. La controversia también se mantiene con respecto al género: algunos estudios han sugerido una ventaja masculina en el rendimiento, entre otros, [9]; otros autores exponen que las estudiantes lo hacen mejor considerando un mismo tema según [10] y, por último, otros análisis sugieren que no existe ningún efecto significativo en cuanto al género [11].

En vista de estas inconsistencias, este estudio tiene como objetivo explorar aquellos factores que influyen en el rendimiento académico de los estudiantes mediante la inclusión de las variables antes mencionadas, la edad y el género, sino también el análisis de ciertas características cualitativas, como el ser estudiante español frente al extranjero y finalmente la disciplina de grado (Economía, Finanzas y Contabilidad o Administración de Empresas y marketing). Este artículo presenta nuestra experiencia basada en un cuestionario exploratorio y extrae conclusiones de una muestra de estudiantes que siguen un enfoque de aprendizaje activo. Se lleva a cabo como una extensión de un estudio de diagnóstico del rendimiento previo en el que todos los estudiantes que participaron en el curso académico 2012/13 obtuvieron resultados sorprendentemente positivos. Para más información, véase [12,13]. Así, los estudiantes participan en una experiencia piloto con técnicas activas (aprendizaje basado en problemas, *puzzle de Aronson* y trabajo en equipo cooperativo).

En el presente estudio se encuentra que la edad está asociada negativamente con el rendimiento, mientras que el género femenino no ha tenido un efecto positivo significativo en el rendimiento con respecto al masculino. Pero en relación con el número de convocatorias a exámenes oficiales, parece que los estudiantes más jóvenes son menos eficientes que sus contrapartes de mayor edad. Por otro lado, nuestros resultados apuntan hacia un rendimiento similar pero ligeramente inferior en el caso de las estudiantes ya que éste va asociado a un mayor número de exámenes para superar la asignatura. Por último, el perfil de los estudiantes extranjeros tiende a ser el más eficiente en cuanto al menor número de convocatorias. Los resultados positivos de este estudio sugieren que se necesitan más investigaciones en otras materias, preferiblemente dentro la misma titulación, pero también extrapolable a otras disciplinas, a fin de encontrar sinergias y para poder evaluar el impacto de la introducción de nuevas prácticas orientadas hacia el aprendizaje activo.

El resto del artículo está organizado de la siguiente manera. En primer lugar, se contextualiza la experiencia mediante la presentación de una breve descripción de la metodología, la muestra considerada y la evaluación. A continuación, se discuten los resultados obtenidos y, finalmente, la conclusión.

2. METODOLOGÍA

Este estudio se ha realizado en la Facultad de Ciencias Jurídicas y Económicas de la Universitat Jaume I de Castellón (España). El grupo de investigación está formado

por profesores experimentados y comprometidos con la mejora de la educación desde una perspectiva internacional. El equipo de investigación, EDUFIN, es un Grupo de Innovación Educativa (GIE), creado para proporcionar un apoyo a las mejores prácticas y compartir experiencias con el fin de identificar las ventajas e inconvenientes o dificultades en su potencial implementación.

Estrategias didácticas de aprendizaje activo

Los estudiantes son informados y se les hace partícipes del presente proyecto en el que se adopta una metodología de enseñanza-aprendizaje activa como modelo pedagógico. Los alumnos son distribuidos en subgrupos de modo que el aprovechamiento del tiempo en el aula sea el óptimo y se intenta incentivar la participación, reflexión y debate cuando se llevan a cabo las actividades de aprendizaje activo. El trabajo en equipo y el aprendizaje cooperativo son las propuestas didácticas implementadas junto con la realización de actividades de carácter autónomo que vienen descritas en la Guía Docente. La consecución de los objetivos queda reflejada en los criterios de evaluación y los alumnos son puntuados de acuerdo a ellos, representando un 30% de la nota final.

Participantes

La muestra ha consistido en 126 cuestionarios completados en su totalidad por los estudiantes. Cuestionarios incompletos son rechazados, así como aquéllos que no dieron su consentimiento para participar en el proyecto para el curso académico 2013/2014. El estudio se lleva a cabo en el primer semestre del año lectivo y la información es obtenida después de que los alumnos se examinasen y se pasaran las Actas Oficiales, en febrero 2014. Un total de 128 estudiantes completaron el cuestionario, pero dos de ellos no fueron incluidos en el estudio, ya que no habían proporcionado toda la información cualitativa necesaria. La muestra es reducida en comparación con la totalidad de alumnos matriculados en el curso (aproximadamente 440); pero consideramos que es suficiente y representativa para los efectos del seguimiento del impacto y el compromiso de los estudiantes, ya que el número promedio de participantes en las sesiones del grupo de prácticas ha sido del orden de 30 alumnos. Hay que hacer mención de que generalmente los alumnos de cada grupo de teoría se subdividen por subgrupos con el fin de optimizar tanto el tiempo como su aprovechamiento en el desarrollo de las clases prácticas; lugar donde especialmente los alumnos tienen una participación más activa.

La Tabla 1 presenta los datos de las respuestas de los estudiantes, la información se ha organizado según un cuestionario tipo de respuesta única.

Tabla 1. Resumen de la muestra

	Edad		Sexo		Nacionalidad		Disciplina		
	19 a 22	>=23	Masculino	Femenino	Español	Extranjero	Eco	Contab	Marqueting
Frecuencia	76	50	44	82	119	7	21	47	58
Porcentaje (%)	60,32	39,68	34,92	65,08	94,44	5,56	16,67	37,30	46,03

Las variables que hemos considerado para el análisis: edad, sexo, nacionalidad y disciplina de especialización perfilan nuestro análisis cualitativo. Dichas variables son convenientemente diseñadas para que las características relevantes puedan ser aisladas dentro del mismo grupo. La información facilitada en porcentajes arroja información sobre el grupo mayoritario de estudiantes que pertenecen al grupo de edad más joven en un 60%, sin embargo, los mayores o de igual edad a 23 años representan casi el 40 %. Este relativamente alto porcentaje podría estar relacionado con la elevada tasa de desempleo que está gradualmente azotando a la población activa en España en los últimos tiempos. Así, las instituciones de educación superior están atrayendo el interés de una población desempleada, pero también se está produciendo un efecto de profundo arraigo a la formación, observándose que los estudiantes ya formados invierten en un segundo grado o postgrado buscando mejorar sus oportunidades de empleabilidad. Esta tendencia no es nueva, sino que se observó por primera vez en el inicio de la crisis financiera y todo indica que continuará hasta que la economía se recupere. La segunda variable es el género; los datos muestran que el sexo femenino supera al masculino en una proporción casi de dos a uno. La tercera variable, la nacionalidad, pone de manifiesto la importancia de los programas de movilidad y el impacto que tiene en esta titulación, observándose que un 5.56% de los estudiantes han sido extranjeros. Por último, el análisis de la participación de los estudiantes de diferentes disciplinas muestra una mayoría notable de los estudiantes de Administración y Marketing (46.03%), seguido de una ligeramente menor presencia de estudiantes de Finanzas y Contabilidad (37.30%) y, finalmente, con una proporción mucho menor de estudiantes de Economía (un 16.67 %).

Este estudio pretende explorar frecuencias, así como atribuir importancia a los factores determinantes del logro académico. En particular, nuestro objetivo es examinar cómo los factores seleccionados pueden afectar al rendimiento académico de los

estudiantes de manera que no sólo se pueda extrapolar información sobre el rendimiento comparativamente, sino que se puedan identificar patrones para mejorarlo.

Evaluación

En esta sección se aborda nuestra experiencia después de la implementación de estrategias de aprendizaje activo y se basa en la información obtenida de los cuestionarios que los estudiantes completaron voluntariamente y en los que dieron su consentimiento para la difusión de los resultados.

3. RESULTADOS

El estudio utiliza una compilación de análisis comparativo que relaciona la medición del desempeño o performance, considerando diferentes variables: éxito (medido mediante la superación de la asignatura, independientemente de la nota alcanzada) y número de convocatorias oficiales que han sido requeridos para superar la asignatura.

La Tabla 2 muestra la posible consistencia en el rendimiento de los alumnos distribuidos por grupos, distinguiendo los alumnos que superan o no superan la asignatura de entre el total de alumnos existentes en cada subgrupo. El estudio comparativo se lleva a cabo proporcionalmente como sigue:

Tabla 2. Porcentaje de alumnos que superan y no superan la asignatura, diferenciando entre grupos de edad, sexo, nacionalidad y disciplina.

	Edad		Sexo		Nacionalidad		Disciplina		
	19 a 22	>=23	Masculino	Femenino	Español	Extranjero	Eco	Contab	Admón & Marketing
Superan (%)	52,63	40,00	47,73	47,56	48,74	28,57	52,38	36,17	55,17
No superan* (%)	47,37	60,00	52,27	52,44	51,26	71,43	47,62	63,83	44,83

*El grupo "No superan" incluye el grupo de alumnos que suspenden y los que no se presentan

Los datos descriptivos referidos a la edad muestran que, inicialmente, los estudiantes más jóvenes presentan un mejor desempeño, aunque la diferencia es muy débil entre los casos favorables (aproximadamente del 12%). Guardándose la misma proporción para los que no superan la materia, observándose un valor de 12,63%. La comparación de género revela una gran consistencia entre grupos de distinto género, siendo ligeramente más favorable para el grupo masculino. La comparación por nacionalidad muestra que los estudiantes extranjeros tuvieron un peor desempeño, con una diferencia a favor de los estudiantes nacionales del orden del 20.17%; el bajo valor alcanzado por los estudiantes extranjeros podría ser debido al sesgo

muestral. Por último, el análisis dentro de las disciplinas muestra que Economía y Administración y Marketing tuvieron resultados más similares, mientras que la disciplina Finanzas y Contabilidad engloba gran número de estudiantes que suspenden o que no se presentan, superando a las otras dos en aproximadamente un 18%.

El siguiente cuadro 3 muestra los hallazgos en el número de convocatorias de exámenes oficiales en cada una de las cuales los alumnos han superado la materia, diferenciando entre los mismos grupos y subgrupos que anteriormente.

Tabla 3. Porcentaje de alumnos que superan la asignatura y número de convocatoria oficial en la que se aprueba

	Edad		Sexo		Nacionalidad		Disciplina		
	19 a 22	>=23	Masculino	Femenino	Español	Extranjero	Fin & Eco	Admón & Contab	Marqueting
1ª Conv. (%)	75	90	76,19	82,05	79,31	100,00	81,82	82,35	78,13
2ª Conv. (%)	10	10	9,52	10,26	10,34	0,00	9,09	11,76	9,38
3ª Conv. (%)	15	0	14,29	7,69	10,34	0,00	9,09	5,88	12,50

La naturaleza del gran grupo de estudiantes matriculados en el presente curso en comparación con su baja asistencia a clase es una característica llamativa, ello puede llevarnos a pensar que un número significativo de los estudiantes repiten curso o se han matriculado previamente en cursos lectivos anteriores. Si la matrícula se formaliza y no se supera la asignatura, año tras año dependerá del posible impacto de un factor particular y no sólo debería recaer en la posible dificultad que esta asignatura entraña per se. Así, de las cifras del cuadro 3, en relación con la edad el número medio de exámenes oficiales tomadas es considerablemente inferior en el caso de los estudiantes de mayor edad. Hay dos explicaciones para este hallazgo. En primer lugar, los estudiantes más jóvenes suelen tener una tendencia de menor motivación para afrontar el curso. Esto no quiere decir que no estén interesados en pasar con éxito el curso, pero sí que necesitan algún tipo de incentivo para asumir el trabajo extra o comprometerse con las tareas requeridas. En segundo lugar, los estudiantes de mayor edad (más de o igual a 23 años de edad en nuestro análisis) tienden a tener un perfil de un estudiante de segunda titulación, que está muy motivado para completar los objetivos del curso lo más rápidamente posible (no se encuentran casos de estudiantes que hagan uso de una tercera convocatoria para este subgrupo). Teniendo en cuenta que estos resultados se expresan en términos relativos, parece que los estudiantes más jóvenes suelen ser más numerosos y son más propensos a repetir en el número de convocatorias, pero nuestros resultados en la comparación de la Tabla 2 demuestran que de entre los que aprueban los jóvenes superan en

proporción a sus semejantes de mayor edad, lo único es que invierten un mayor número de recursos para conseguirlo, en término monetario y de tiempo.

En cuanto a la segunda variable, el sexo, la tabla 3 muestra que las estudiantes centralizan un valor más alto, para la primera convocatoria, que los estudiantes varones y esta tendencia es decreciente en el número de convocatorias. Este resultado hace pensar que el rendimiento de las estudiantes viene materializado en plazos cortos, cuando se logra superar la asignatura mayoritariamente en una primera o segunda convocatoria. En cambio, para el caso de los estudiantes, aunque la Tabla 2 muestra un ligeramente mejor rendimiento cuando se analiza la variable sexo masculino, parece que la proporción de éxito en la superación de la materia es más favorable para una tercera convocatoria en vez de en una segunda; aunque como se refleja en la Tabla 3 la mayor parte de los estudiantes aprueban en una primera convocatoria.

El tercer parámetro que varía es la nacionalidad, en nuestro intento de descubrir tendencias, comparamos el rendimiento con el número de cursos matriculados en entre estudiantes españoles y extranjeros. El hallazgo anterior de la Tabla 2 indicaba una evolución comparativa favorable para los estudiantes nacionales, ya que los extranjeros tienen un índice de no superación casi del 70%. Es lógico pensar que existen dificultades derivadas de vivir en un país extranjero, también limitaciones lingüísticas que estos estudiantes deben afrontar, pero el cuadro 3 arroja información sobre la notable evolución de los estudiantes que aprueban ya que en un 100% pasan el examen en su primer intento. Algunos podrían inferir que este estudio está sesgado ya que los mejores estudiantes son los que tratan de beneficiarse de un programa de movilidad, y de hecho, es cierto que en un contexto internacional puede considerarse que los estudiantes están compitiendo entre sí, en nuestra opinión, ésta es la mejor manera para lograr estudios armonizados y para preparar a los estudiantes para la competencia en un entorno global. Actualmente existen programas que facilitan la movilidad entre las instituciones europeas (por ejemplo, Erasmus+) y es previsible que en el corto plazo la presencia de estudiantes extranjeros en la Universitat Jaume I aumente notablemente por las acciones de internacionalización y programas que la institución promueve.

Por último, en cuanto a grado de disciplina, el resultado más notable es que el mayor número de alumnos repetidores proviene del Grado de Administración y Marketing. Esto podría explicarse por la naturaleza de la materia que, a diferencia de las disciplinas que engloba Economía y Finanzas & Contabilidad que son similares en cuanto a enfoque teórico-práctico, aquella tiene un componente de cálculo muy reducido. Así, en relación con los resultados de aprobados por disciplina encontramos que la proporción de estudiantes de Administración & Marketing en el grupo es mayor, si bien el número de tercera convocatoria para este subgrupo atrae el mayor número, siendo para los otros subgrupos el resultado muy consistente entre

segunda y tercera convocatoria para el caso de Economía. Finalmente, para Finanzas & Contabilidad se acorta el número de convocatorias necesarias, superando la segunda a la tercera convocatoria y liderando este grupo dentro de la primera convocatoria.

4. CONCLUSIÓN

Nuestra experiencia piloto llevada a cabo previamente introduciendo estrategias de enseñanza- aprendizaje activo en el aula culminó con un resultado positivo en cuanto a participación de estudiantes y su implicación con las técnicas. Este resultado motivó continuar en la misma línea de acciones y la realización del presente estudio en el que se analiza el efecto de algunas variables cualitativas en relación con el rendimiento académico de los estudiantes.

En primer lugar, el número de alumnos matriculados en el curso es un punto interesante para discutir en términos de la implementación de estrategias activas para todo el curso. Desde nuestra experiencia, el porcentaje de participación es relativamente alta en comparación con el número de estudiantes que asisten por clase (30 como máximo), pero sigue siendo escasa en comparación con el número total de alumnos matriculados (en torno a 440), que se distribuyen en 15 grupos. Nos gustaría extender esta experiencia a todos los estudiantes, ya que los resultados positivos obtenidos validan este modelo que no es incompatible con la metodología tradicional. Complementariamente un grupo que siga metodologías activas puede fácilmente alcanzar las metas del curso pero además nutrirse de una experiencia de aprendizaje profundo, se promueve el aprendizaje permanente, una mejor comprensión de los conceptos y se profundiza en adquirir competencias transversales bajo un paraguas de dinamismo e implicación vía la corresponsabilidad. Por tanto, proponemos extender la implementación del enfoque de aprendizaje activo en otras disciplinas con el fin de evidenciar su versatilidad y eficiencia.

En segundo lugar, el éxito de esta experiencia radica en la introducción gradual y en la capacidad del profesor para mantener el hilo de la motivación, la atención y los sentimientos positivos, tanto antes como durante la experiencia. También una recompensa adecuada en la puntuación debe ser detallada para garantizar la participación de los estudiantes y para estandarizar los criterios de evaluación.

En tercer lugar, se mide el impacto logrado por la práctica mediante un cuestionario. En general, los estudiantes manifiestan un impacto positivo y este recurso parece ser muy adecuado para su uso en futuras experiencias de aprendizaje.

Los resultados indican que la edad de los estudiantes tiene una relación negativa con el rendimiento promedio, sin embargo los estudiantes más jóvenes tienen más probabilidades de repetir el curso y tienden a superar el curso hasta en su tercer intento. En segundo lugar, el género no parece ser determinante ya que mientras que

las estudiantes lograron un ligero mejor desempeño, esto podría no ser considerado como un parámetro de corte porque su tasa de éxito está vinculada a un mayor número de convocatorias a exámenes oficiales. Pero para los estudiantes extranjeros las cifras muestran que son mejores en los cortos plazos pudiendo lograr sus objetivos en la primera convocatoria. Por tanto, podemos afirmar que son más eficientes que los estudiantes españoles. Por último, la disciplina elegida indica que las preferencias para matricularse en un curso se relacionan con las habilidades y competencias de los alumnos. No se ha pretendido identificar la idiosincrasia sobre ello, sin embargo, resaltamos que los estudiantes de Administración de Empresas & marketing se enfrentan a más dificultades para cumplir con los objetivos del curso y por ello su media de rendimiento es menor y el número de exámenes oficiales que toman es ligeramente superior. Toda esta información puede ser de gran valor para el profesor cuando enfoque el curso con el fin no sólo de hacer frente a las dificultades, sino también para ayudar a los estudiantes a cumplir con los objetivos del curso favoreciendo el apoyo y facilitando opcionalmente recursos auxiliares. Estamos a favor del aprendizaje activo porque los estudiantes se benefician no sólo de la re-actualización docente sino también de la influencia positiva de sus compañeros.

Agradecimientos

Los autores agradecen a los estudiantes participantes su colaboración en la realización de los cuestionarios. Este proyecto ha sido financiado por la Unidad de Apoyo Educativo (USE) de la Universitat Jaume I (España) y dirigido a Grupos de Innovación Educativa (GIE), Ref. 2757/13.

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INCORPORACIÓN DE LAS TIC,S EN LOS RESULTADOS DE APRENDIZAJE EN GRUPOS NUMEROSOS. APLICACIÓN EN LA MATERIA DE ECONOMÍA Y GESTIÓN EMPRESARIAL EN LA FORMACIÓN DE ARQUITECTOS.

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Resumen

El siguiente trabajo tiene como objetivo valorar cómo ha influido el uso de las TIC,s en la enseñanza de la materia de Economía y Gestión Empresarial en la formación de los arquitectos. El caso analizado permite valorar la influencia de las TICs en los resultados de aprendizaje. Inicialmente se utilizó la plataforma digital exclusivamente para el almacenamiento de los materiales de la asignatura, los dos últimos años se ha incrementado su uso, especialmente como un medio para comunicar y compartir, además los alumnos también han utilizado las redes sociales. El trabajo analiza, en primer lugar, cómo se han aprovechado las herramientas y, en segundo lugar, cómo han sido los resultados obtenidos en comparación con cursos precedentes.

Se deriva que, en términos generales, las TIC,s permiten un aumento de la comunicación entre el profesor y el alumno, especialmente en grupos numerosos. La plataforma digital nos ha permitido, a partir del espacio compartido entre el profesor y cada alumno, y las aplicaciones relativas a tareas y calificación, un mayor seguimiento del trabajo de los alumnos y, por tanto, mayor facilidad para el aprendizaje continuo. Si bien, queremos transmitir que el uso de las TIC,s *per se* no es condición suficiente para explicar los cambios observados en los resultados de aprendizaje, pues aspectos como el aumento del tiempo de dedicación a la asignatura por parte de profesores y alumnos también habrán tenido influencia sobre los resultados observados.

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Keywords: TIC,s, aprendizaje continuo, resultados de aprendizaje, evaluación en grupos numerosos.

1. INTRODUCCIÓN

A lo largo del tiempo, la humanidad ha pasado por diferentes revoluciones tecnológicas, desde la agrícola, pasando por la industrial, postindustrial, hasta revolución tecnológica actual. Definimos la sociedad del conocimiento como: “un estadio de desarrollo social caracterizado por la capacidad de sus miembros (ciudadanos, empresas y Administraciones públicas) para obtener, compartir y procesar cualquier información por medios telemáticos instantáneamente, desde cualquier lugar y en la forma que se prefiera”^[1].

En la “Declaración mundial sobre la educación superior en el siglo XXI: visión y acción”^[2], la UNESCO nos llama la atención sobre todos los cambios que se deben de desarrollar en las Universidades, tanto de tipo tecnológico, como culturales y sociales, para adaptarse a las necesidades de los nuevos tiempos. Las nuevas estrategias buscan generar un nuevo perfil de alumnado en el que el proceso formativo de mera acumulación cognitiva se transforma en uno de generación de competencias en torno a la capacidad de autoaprendizaje, creatividad, trabajo de equipo, identificación crítica de problemas, habilidades interpersonales, etc. En este nuevo marco formativo la utilización de las TIC como apoyo a la enseñanza reglada ofrece oportunidades únicas de construcción colaborativa del conocimiento y aporta grandes posibilidades de mejora de los procesos de enseñanza- aprendizaje en múltiples aspectos^[3].

La incorporación de las TICs a la metodología docente universitaria es imprescindible para acometer el reto marcado, construir una Europa del conocimiento basada en un sistema educativo de calidad^[4]. No obstante, ésta es una condición necesaria pero no suficiente, pues la generalización en el uso de las TICs en la docencia no garantiza, por sí sola, la consecución de los objetivos perseguidos para alcanzar dicha enseñanza de calidad. Lo que pasa, ineludiblemente, por una profunda transformación de los fundamentos pedagógicos del sistema de enseñanza universitaria

El presente trabajo trata de mostrar una experiencia de enseñanza/aprendizaje en un entorno universitario. Del análisis de los datos se constata una mejora de los resultados de aprendizaje, en la evaluación, en el propio proceso de aprendizaje y en la motivación de profesores y alumnos. Se sostiene que los cambios realizados en la metodología y el uso más intensivo de las herramientas TIC son las causas de la

mejora observada en los resultados obtenidos por los alumnos.

La asignatura analizada corresponde a la titulación de Grado en Arquitectura en la Escuela Técnica Superior de Arquitectura de Valencia. Se trata de una asignatura Troncal de tercer curso de 4,5 créditos. La asignatura se divide en dos partes: Economía y Gestión Empresarial enfocada al sector inmobiliario. La evaluación de la asignatura consta de pruebas de examen y trabajos de curso.

El número de alumnos totales para el curso 2012-2013 fue de 419 y en el 2013-2014 de 379. El tamaño medio de los grupos se redujo sensiblemente de 80 alumnos a 60 alumnos (para Teoría de Aula), siendo de la mitad, el tamaño de los grupos de prácticas, en cada caso. Se trata pues de grupos numerosos, en los que el uso de herramientas TICs se ha demostrado de gran utilidad.

2. ESTRATEGIAS METODOLÓGICAS

Las distintas tareas desarrolladas durante el curso, algunas de ellas solicitadas al alumno para su evaluación, están dirigidas especialmente al desarrollo de las capacidades descritas niveles 3, 4 y 5 de la taxonomía de Bloom. Los cambios metodológicos, recientemente incorporados, han implicado la anulación de tareas de curso de carácter evaluable realizadas en el aula por la incorporación de tareas consistentes en trabajo colaborativo realizado en el tiempo de trabajo autónomo del alumno, manteniéndose pruebas de examen. El material para la realización de las prácticas o trabajos de carácter evaluable consiste, en la parte de economía, de información económica actual, especialmente centrada en el mercado inmobiliario. Para la parte de Gestión Empresarial, se trabaja con información económico-financiera de empresas reales del sector.

Para el curso 2012 el trabajo de curso se organizó a partir de la realización de dos tipos de actividades: 1. ejercicios, y casos y cuestiones de reflexión, ambos muy dirigidos, por parte del profesor. 2. prácticas de carácter evaluable, centradas en el análisis de aspectos de actualidad relativos a asuntos económicos y de gestión. En el curso 2013, se realizan también sesiones de ejercicios muy dirigidos por el profesor, sin embargo, se desarrollan más casos prácticos centrados en el análisis y la participación del alumno y se anulan las realización de tareas evaluables en el aula. Por el contrario, el alumno debe realizar 3 trabajos de tipo colaborativo, conocidos en el mismo momento en que comienzan a desarrollarse los contenidos y prácticas en el aula, jugando un papel muy importante la coordinación de las fechas de publicación y entrega de los trabajos y los periodos de resolución de tareas y problemas relativos al tema en el aula. Además, las restantes pruebas evaluables

recogen el conjunto de capacidades a evaluar desarrolladas previamente por el trabajo autónomo del alumno.


Acciones	Niveles	Proceso
Lectura de apuntes y desarrollo de las clases teóricas	1ª adquisición de conocimientos	Concreto  Abstracto
Refuerzo del conocimiento (pruebas tipo test, cuestionarios, verdadero o falso)		
Ejercitación práctica (cuestiones de reflexión y aplicación de conocimientos)	2ª comprensión y 3º aplicación	
Análisis de entorno económico, general y sectorial Análisis económico y financiero de las empresas del sector	4º Análisis 5º Síntesis	
Autoevaluación	6º evaluación	

Tabla 1. Nuestro estudio de la materia a través de la taxonomía de Bloom

Las ventajas observadas en la realización de trabajo colaborativo, frente a las prácticas realizadas en el aula como tareas de evaluación, son las siguientes:

1. El trabajo colaborativo permite evaluar más capacidades que deseamos que el alumno alcance. Por ejemplo, la posibilidad en el trabajo colaborativo de realizar tareas relativas a búsqueda, síntesis y análisis de información con carácter evaluable. Algo que no era posible evaluar adecuadamente en el tiempo dedicado en las prácticas en el aula.
2. En términos generales, en las prácticas de aula, el alumno cuenta con un tiempo demasiado limitado para demostrar adecuadamente las capacidades a evaluar.
3. El trabajo colaborativo permite que la tarea con carácter evaluable ocupe un tiempo mucho más extenso de su proceso de aprendizaje, involucrando más alumno y equilibrando en mayor medida el tiempo realizado a las tareas y su evaluación.

3. LAS TICS EN LA ENSEÑANZA DE LA ASIGNATURA

Las TICs son un conjunto de procesos y productos derivados de las nuevas herramientas (hardware y software), soportes de la información y canales de comunicación, relacionada con el almacenamiento, procesamiento y transmisión digitalizados de la información de forma rápida y en grandes cantidades ^[3]. El reconocimiento del papel que las TIC desempeñan hoy día en nuestras universidades, tanto en aspectos docentes como investigadores y de gestión es de generalizada aceptación, y ha sido objeto de análisis en numerosos trabajos de investigación ^{[3][4][5][6][7]}.

Las Tics ofrecen posibilidades para diseñar múltiples tareas como la recogida, organización e interpretación de la información del proceso evaluador, nos facilitan la realización de nuestros trabajos porque permiten: 1. fácil acceso a una gran cantidad de información; 2. proceso de datos de manera rápida y fiable; 3. canales de comunicación inmediata para difundir información y contactar personas o instituciones; 4. automatización de tareas ; 5. interactividad, y 6. almacenamiento de grandes cantidades de información en pequeños soportes de fácil transporte.

Partiendo de una estrategia más o menos tradicional y sin referirnos a un cambio en la estrategia metodológica, el uso de las herramientas TIC permite acceder, en el propio desarrollo de las clases, a contenidos antes casi impensables. Para realizar diferentes actividades y alcanzar calidad, es necesario el manejo de una cantidad de información diversa que sería imposible sin el acceso a las TIC. Si muchas de las actividades que realizo profesionalmente en mi vida diaria no puedo realizarlas sin ordenador también puede ocurrir lo mismo con la actividad del aula. Por ejemplo, si deseamos analizar la información económica, el acceso a las TICs en el aula nos permite un mayor desarrollo de habilidades: captación y selección de información, qué entidades generan la información, qué papel juegan dichas entidades en el sistema. De esta manera podemos desarrollar tareas en el aula en que la información no es suministrada por el profesor sino por el mundo. El profesor media, hace de enlace. el profesor transmite su saber hacer, los conocimientos se captan por uno mismo.

A continuación se describen las principales herramientas TIC utilizadas:

- **Las tutorías en línea y correo electrónico**

Hemos comprobado que mediante este sistema de interacción, el índice de cuestiones del alumnado al profesorado aumenta significativamente, en comparación con un sistema exclusivo de consultas a través de tutorías presenciales.

Es necesario señalar que leer correos consume una notable cantidad de tiempo. Es aconsejable, sobre todo en grupos numerosos que el profesor indique al

comienzo de las clases cuáles son los tipos de consultas a realizar y, en términos generales, las reglas para el envío de correos.

- **Almacenamiento de Contenidos**

La web o plataforma de la asignatura se utiliza como herramienta en la que se cuelgan los contenidos (apuntes, material para las clases prácticas presentaciones de los contenidos de las clases teóricas, ficheros de vídeo, artículos de interés, bibliografía...). El hecho de que los profesores incluyan información relevante para el desarrollo de su asignatura supone una ayuda importante para que los estudiantes organicen de manera autónoma su estudio y avancen adecuadamente en los contenidos de la asignatura^[8].

- **Espacio virtual para compartir información personalizada entre el profesor y el alumno.**

El uso del espacio compartido virtual entre el profesor y el alumno fue utilizado en un principio como soporte para que el alumno colgara sus trabajos objeto de evaluación. Para la realización de consultas se ha seguido utilizando el correo electrónico. Con el tiempo, se ha observado la utilidad del espacio virtual como medio de soporte al seguimiento continuado del trabajo del alumno, permitiendo que el profesor pueda realizar correcciones previas y comunicarlas, observando que se incrementa la participación, motivación e implicación del alumno. Si bien, en grupos numerosos, esta tarea consume una cantidad de tiempo que en algunos casos excede las posibilidades del profesor.

En nuestro caso, el asesoramiento del profesor, a partir de consejos y modificaciones en los borradores de trabajos del alumno, se ha practicado de forma desigual. Las correcciones intermedias se han realizado a solicitud del alumno, aunque lo ideal habría sido la realización de una tutorización o corrección intermedia a todos los grupos de alumnos. Aspecto muy complicado con el número actual de alumnos por profesor.

Por otro lado, no hay que olvidar la reducción en el consumo del papel y tinta que supone el uso de este tipo de herramientas. Renunciar a las entregas en papel es importante, no solo por el ahorro económico, sino por el compromiso con la sostenibilidad.

- **Espacio virtual para la comunicación entre alumnos a partir del chat de la asignatura.**

En nuestro caso, el uso del chat no ha sido una herramienta promovida por los profesores. Su uso, limitado a los alumnos, se ha incrementado en los periodos previos a los exámenes, o a la publicación de notas.

- **Redes sociales.**

Al igual que en el caso del chat, el uso de redes sociales no ha sido promovido por el profesorado. Se ha tenido conocimiento que redes sociales como Facebook o twitter han sido utilizadas durante el presente en relación a la resolución de dudas en periodos previos a las entregas de trabajos y especialmente de realización de exámenes.

4. TICS, DISEÑO DE NUEVAS TAREAS Y RESULTADOS DE APRENDIZAJE

El uso de las herramientas TICs pone de manifiesto ^[9] que las principales ventajas son: la ruptura de las barreras espacio- temporales, la posibilidad que ofrecen de interacción con la información y lo útil que resultan como herramienta de apoyo al aprendizaje. Por el contrario, se observa que el uso de las TICs no solo no reduce el tiempo dedicado por el profesor, por el contrario el tiempo de dedicación aumenta.

Las nuevas TICs permiten un acceso más rápido y eficaz de docentes y estudiantes a la información, reduciendo de este modo el grado de obsolescencia de la información, y utilizando de forma más eficiente las distintas fuentes informativas existentes a través de la red ^[10].

Con la incorporación de las TICs, el proceso de aprendizaje universitario deja de ser una mera recepción y memorización de datos recibidos en la clase, pasando a requerir una permanente búsqueda, análisis y reelaboración de informaciones obtenidas en la red. De este modo, el estudiante deja de ser sólo un procesador activo de información, convirtiéndose en un constructor significativo de la misma, en función de su experiencia y conocimientos previos, de las actitudes y creencias que tenga, de su implicación directa en el aprendizaje, y de que persiga el desarrollo de procesos y capacidades mentales de niveles superiores ^[11].

La aplicación de las TICs motiva a los alumnos y capta su atención, convirtiéndose en uno de los motores del aprendizaje ya que incita a la actividad y al pensamiento. Al estar más motivados, los estudiantes dedican más tiempo a trabajar y aprenden más, puesto que están permanentemente activos al interactuar con el ordenador y entre ellos mismos a distancia ^[12].

En cuanto a la dedicación docente, las investigaciones realizadas señalan que las TIC permiten realizar más cosas y nos permiten proporcionar entornos de aprendizaje con mayor potencial pedagógico, pero para ello el tiempo de dedicación del profesor aumenta. El rol del docente cambia dejando de ser fuente del conocimiento para desarrollar funciones de guía, orientador, asesor y facilitador de recursos y herramientas de aprendizaje ^{[13][14]}. La aplicación de las TIC en los quehaceres

docentes supone más la mejora de los procesos de enseñanza que la reducción de los tiempos empleados, en nuestro caso se considera que los tiempos dedicados a la corrección y tutorización de los alumnos se multiplica por algo más de 2.

A continuación veamos cuáles han sido los cambios en los resultados de aprendizaje, y participación del alumno, pasando después a relacionar los resultados obtenidos con los cambios en el diseño de tareas e incremento del uso de las TIC en la asignatura.

	presentados/ matriculados	Aproba- dos/presentados	Aproba- dos/matriculados
2012	82,78%	78,61%	65,07%
2013	93,65%	92,94%	87,04%

Tabla 2. Resultados en la asignatura

Los resultados muestran una mejora en el rendimiento, con un aumento tanto en la proporción de alumnos que han seguido el curso de la asignatura, como el éxito alcanzado para el conjunto de alumnos matriculados. La tasa de presentados sobre matriculados ha aumentado en 10,87 puntos, y la proporción de alumnos presentados que han superado la asignatura en 14,33 puntos. Así pues, se observa coincidencia en el aumento de intensidad de uso de las herramientas TICs con una mejora en los resultados obtenidos.

Respecto a la proporción de presentados sobre matriculados, o en sentido contrario, la tasa de abandono, su disminución también debe haber sido debida al aumento de las tasas universitarias en segunda matriculación. No debemos descartar el efecto de esta medida, pues es previsible que repercuta en una menor tendencia del alumno a dejarse la asignatura para otras convocatorias.

En relación a nuestra asignatura consideramos que las ventajas proporcionadas por las TICs pueden englobarse en dos apartados: en primer lugar, la capacidad para procesar, almacenar y gestionar mayor cantidad de información; en segundo lugar, La capacidad de facilitar la comunicación entre todos aquellos implicados en la asignatura.

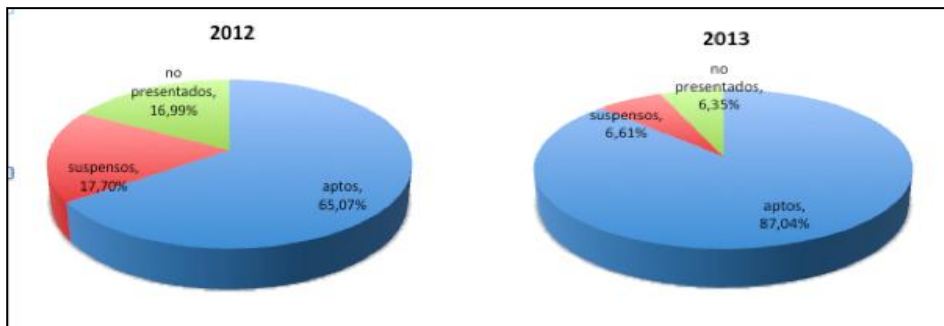


Figura 1. Participación y grado de éxito en la asignatura

En cuanto al primer punto, las herramientas TIC han permitido:

1. Aumentar la calidad de las tareas realizadas durante el curso como el trabajo autónomo del alumno.
2. Realizar actividades más próximas a la forma de trabajo en la empresa actual.
3. Realizar actividades más completas,
4. Aumentar la eficiencia de las tareas realizadas, entendido como la orientación hacia las capacidades que se desean alcanzar.
5. Mejorar la gestión de los materiales que se deben intercambiar durante el curso profesores y alumnos.

En cuanto a la capacidad para facilitar la comunicación entre los agentes implicados, el uso de las herramientas han permitido:

1. Aumentar la comunicación entre profesor y alumno a través de las tutorías y comunicación online.
2. Permitir un aprendizaje basado en mayor medida en el trabajo autónomo del alumno.
3. A través del uso continuado de las TICs, deposito de materiales, anuncios de tareas a realizar, fechas de entrega, etc. Se produce una sensación de mayor conectividad que pensamos redundante positivamente en la participación de los alumnos.

Somos conscientes que nuestra utilización de los recursos TICs es limitada y que un uso más intensivo podría ayudar a mejorar nuestro proceso de enseñanza-aprendizaje y los resultados alcanzados. Se han planteado las siguientes herramientas a incorporar para el siguiente curso:

- Generación de cuestionarios de respuesta Múltiple
- Grupos de Debate online
- FAQ
- Foros de discusión

5. CONCLUSIONES

En términos generales podemos afirmar que la mejora en los resultados obtenidos puede atribuirse a dos aspectos, por un lado los cambios en la estrategia metodológica, potenciando un mayor trabajo autónomo más intenso y coordinado con el desarrollo de las clases, y por otro, la utilización de herramientas TICs.

Consideramos que para nuestra asignatura las ventajas del uso más intensivo de las TICs se manifiestan tanto en el nivel de participación y motivación del alumno, como en la calidad de los trabajos realizados.

El ritmo de introducción de las nuevas metodologías, requieren una predisposición no solo del profesor, sino también del alumno, en el que existe inercia al uso de metodologías del pasado. El alumno está muy habituado a entender el proceso como un mero conocimiento o aprendizaje de los materiales aportados por el profesor.

La introducción de las metodologías más activas implica un cambio a nivel institucional, no puede ser una tarea del profesor sin apoyo de la institución. El apoyo solicitado no se centra exclusivamente en la instalación de tecnologías que permitan el uso de las TICs en el aula, debe ser una estrategia a nivel de toda la entidad. Ya hemos señalado que es necesario un cambio en el papel y actuación del profesor más como mediador y gestor de contenidos que como transmisor. Sin embargo, la primera pregunta que se realiza al alumno en la encuesta de satisfacción hace referencia al dominio del profesor de los contenidos de la materia y otras se enfocan a su papel de transmisor. Es posible que los profesores que apliquen cambios metodológicos puedan salir perjudicados en las encuestas de satisfacción.

Sin lugar a dudas, podemos afirmar que un uso más intensivo de las TICs, acompañados de metodologías más participativas hace que el alumno se sienta más conectado, implicado y participativo. Ahora, estas nuevas metodologías requieren una mayor labor de tutorización y más tiempo de dedicación por parte del profesor.

Debemos avanzar en el diseño de materiales adecuados, pasa las nuevas plataformas de aprendizaje. No se trata de la reproducción de los contenidos anteriores en nuevos formatos, sino de nuevos diseños que sirvan al desarrollo de las nuevas capacidades.

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APRENDIZAJE COOPERATIVO APLICADO A LA DOCENCIA UNIVERSITARIA, REVISIÓN DE LITERATURA.

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Resumen.

El aprendizaje cooperativo es el uso didáctico de grupos reducidos de alumnos que trabajan en clase en equipos, se basa en el valor del fomento de interacciones, prácticamente todas positivas, entre todos los alumnos, y entre éstos y el profesor. Se trata de apoyar y dar recursos para llevar a cabo una organización del trabajo académico en el aula de forma cooperativa, alejándose de tendencias individualistas. El aprendizaje cooperativo es un recurso novedoso para atender a la diversidad de los estudiantes, desde un enfoque de incluir a todos en un sentido estricto, y de aprovechar todas las capacidades individuales. Se trata de dotar al alumnado de herramientas para que se aprovechen las sinergias de trabajar en conjunto. Con frecuencia se observa que cuando hay trabajos en equipo, lo más habitual es la división del trabajo entre los distintos miembros, los cuales trabajan al final de forma individual para posteriormente unir las distintas partes elaboradas por cada uno. La metodología del aprendizaje cooperativa es bastante utilizada en el contexto de la enseñanza no universitaria, en casos en que los alumnos son muy diversos en cuanto a sus capacidades. Sin embargo en el contexto universitario, donde las características de los alumnos son más homogéneas, podría dar unos frutos muy interesantes. Se trata en esta ponencia de revisar la literatura del aprendizaje cooperativo y cuál es su campo de utilización en la docencia universitaria.

Palabras clave: aprendizaje cooperativo, docencia, universidad.

1. INTRODUCCIÓN

El aprendizaje cooperativo es el uso didáctico de grupos reducidos de alumnos y alumnas que trabajan en clase en equipos, con el fin de aprovechar la interacción entre ellos mismos y aprender los contenidos curriculares cada uno hasta el máximo de sus capacidades, y aprender, a la vez, a trabajar en equipo (1). Casi todo el mundo académico coincide en que las interacciones entre los alumnos, y entre los alumnos y el profesor, son fundamentales para fomentar el correcto aprendizaje. Es más, una de las principales tendencias hacia la docencia universitaria actual-

mente en el contexto del Espacio Europeo de Enseñanza superior (EESE) es que los estudiantes deben adquirir un mayor protagonismo, más activo, que les ayude en su proceso de aprendizaje de forma más autónoma. Una de las innovaciones que deben acometerse es la propiciación de metodologías que fomenten el aprendizaje reflexivo (2). En dicho EESE, en el que se fomenta tanto el trabajo presencial en el aula, como el no presencial, es necesario replantear nuevos retos pedagógicos. Uno de estos retos es el fomento del trabajo colaborativo que permita trabajar juntos a los alumnos para maximizar su aprendizaje (3)

Sin embargo, solamente en algunas ocasiones los alumnos trabajan en común y el aprendizaje se sigue considerando básicamente individual. En muchas ocasiones los alumnos deben competir entre ellos para obtener algunos premios, o puestos mejores, y la ayuda mutua entre alumnos no se suele valorar por el profesor. Además la disposición del aula, por lo menos en nuestra universidad, dista mucho de aquella para el fomento del trabajo en equipo, ya que la mayoría de las aulas están formadas por bancos todos ellos enfocados hacia el profesor.

El objetivo de este artículo es la realización de una revisión de la literatura reciente de aprendizaje cooperativo, para conocer cuáles son las últimas aportaciones en el mundo académico sobre su aplicación. Posteriormente se revisarán algunas experiencias concretas realizadas en la Universidad Politécnica de Valencia.

2. DESARROLLO

Es muy curioso observar, sobre todo en época de exámenes, como se forman grupos de alumnos que estudian juntos. En estos grupos frecuentemente algún alumno está explicando a otros, y uno se pregunta, entre dos alumnos, uno que explica y otro que escucha, ¿Quién se ve más beneficiado? Una primera impresión que se podría tomar es que el estudiante aventajado, el que explica, está “perdiendo el tiempo”, mientras que el que escucha está “aprovechándose” del compañero. Una impresión más profunda, avalada por muchos estudios (1) demuestra que cuando un alumno explica a otro lo que ha aprendido, se ve obligado a organizar sus ideas, mientras explica se da cuenta de errores propios y lagunas en su conocimiento, mientras explica se afianzan sus ideas y por lo tanto se ve también beneficiado de estos procesos cognitivos, y le permiten profundizar mucho más en su conocimiento. Son varios los autores que se refieren al paradigma de “Learning by teaching”, “aprender enseñando” según el cual es totalmente demostrable que se aprende mientras se está enseñando, de forma bidireccional. (4)

Según (5), se conoce aprendizaje competitivo, como aquel en el que los estudiantes compiten entre sí. El estudiante que opte a una recompensa, la alcanzará si y sólo si los demás no la logran. Por ejemplo alcanzar una beca Erasmus en el lugar deseado. En una situación de aprendizaje individualista, el alumno trabaja para hacer su tarea y conseguir los resultados a nivel individual, el hecho de que un alumno con-

siga su objetivo no interfiere en que otros compañeros también lo consigan. Por ejemplo aprobar un examen individual. En un entorno de aprendizaje cooperativo, un grupo de alumnos trabaja de forma conjunta para lograr los objetivos, y se conseguirán si y solo sí, cada miembro del equipo consigue los suyos. En este caso los beneficios del grupo coinciden con los individuales. Por ejemplo un trabajo en grupo con tareas individuales, que posteriormente debe presentarse al profesor de forma conjunta.

No se trata en este artículo de mostrar el aprendizaje cooperativo como el mejor, y pretender sustituir el aprendizaje competitivo y el individual por estructuras de tipo cooperativo. Esto no es planteado ni por los más acérrimos defensores del aprendizaje cooperativo (6). Se trata de introducir la cooperación en las aulas para que este recurso pueda ser utilizado en igualdad de condiciones como el aprendizaje individual y el competitivo. Para ello, es necesario que los profesores conozcan esta metodología para poder aplicarla de forma correcta.

Para poder aplicar el entorno de aprendizaje cooperativo, no es suficiente que los alumnos hagan de vez en cuando un trabajo en grupo. Trabajar en equipo requiere de un aprendizaje, es necesaria una organización en un equipo estable, un aprender a trabajar juntos. Esto se consigue más fácilmente si se enseña como un contenido más, así el trabajo en equipo no debería ser únicamente un método, sino debería tener la forma de un contenido para ser enseñado de forma sistemática. (7).

Para (8), los objetivos para enseñar en pequeños grupos cooperativos son tres: desarrollo de estrategias de comunicación, desarrollo de competencias intelectuales y profesionales y el crecimiento personal de los estudiantes. Estos objetivos se consiguen sabiendo que el papel fundamental del profesor es el de dirigir y facilitar la tarea de aprendizaje. Las competencias que se desarrollan a través de esta estrategia son muy diversas, por ejemplo: razonar con lógica, valorar y juzgar críticamente, sintetizar, resolver problemas...

Para facilitar la enseñanza cooperativa son necesarias unas acciones que permitan a los alumnos interactuar correctamente, según (9) las siguientes serían necesarias: 1) Ordenar los asientos.- para promover la interacción cooperativa es necesaria una distribución del aula circular entre los alumnos. 2) Organizar los tiempos lectivos a una distribución que permita tener tiempo para debate, interacción y discusión. 3) Reglas básicas.- Establecer la forma de trabajar juntos con unas reglas básicas de funcionamiento. 4) Número de personas.- Se aconseja entre tres y cinco personas, interesa un número impar para así poder facilitar negociaciones, consensos y acuerdos entre el grupo.

Los pasos necesarios para organizar un equipo de trabajo cooperativo, según (10) pueden darse de forma general y son las siguientes: 1) Formar los grupos con el objetivo a cumplir. 2) Asignar una actividad al grupo. 3) Dar a cada integrante del

grupo su tarea individual. 4) Cada persona prepara su parte y se produce la interacción con el grupo posterior. 5) Ejercitar lo aprendido. 6) Evaluación del rendimiento individual y del grupo por parte del profesor.

Cuando todos los alumnos del equipo están dispuestos a trabajar de forma cooperativa no suele haber ningún problema, y si el equipo está bien cohesionado funciona con éxito. Pero, ¿qué ocurre si el equipo no está cohesionado?. Resulta que aquellos estudiantes con interés, motivación y capacidad prefieren entonces trabajar solos, mientras que aquellos que no quieren estudiar no lo hacen de ninguna forma. También puede ocurrir que algún miembro del equipo ni tenga el mismo interés y pretenda aprovecharse del equipo creando un conflicto. Esto mismo puede suceder posteriormente en el mundo laboral. Según (11), este problema tiene solución, y es que el equipo debe mantenerse firme en su postura, y si alguien no participa correctamente en el trabajo en equipo se debe reprobar su actitud y pararla lo antes posible, para esto es importante la ayuda del profesor en su labor de mediador. Un factor fundamental necesario para que estos equipos funcionen es que exista una mínima cohesión, para de esta forma facilitar la ayuda mutua.

Para un correcto funcionamiento del equipo, son necesarios tres roles fundamentales: coordinador, secretario y observador (11). Interesa siempre que dichos roles sean rotativos para que todos pasen por ellos. El coordinador debe controlar el tiempo, liderar la reunión, mediar en los conflictos, motivar y reforzar al grupo. El secretario debe recoger lo expuesto en el grupo y realizar las actas de las reuniones. El observador participa y asesora al grupo sobre los problemas que observa.

Aunque hasta ahora todo lo explicado en cuanto al trabajo en equipo cooperativo es común, es necesario mencionar que existen distintas variantes dentro de esta metodología, dichas variantes han sido desarrolladas para adecuarse mejor al grupo de estudiantes y a la tarea a realizar, a continuación se van a nombrar algunas de ellas. Existen muchas posibilidades desarrolladas para la enseñanza de niños y jóvenes de educación primaria y secundaria, pero las que se nombran a continuación son algunas de las más adecuadas para la docencia universitaria.

Puzle o rompecabezas (1). Es muy útil para aquellos trabajos que pueden ser fragmentados en distintas partes. Esta variante favorece la interdependencia de los estudiantes, ya que cada alumno tiene una parte de información necesaria para el grupo. Tutoría entre iguales (12). Se trata en esta variante de formalizar las explicaciones mutuas sobre cualquier materia. Según esta cada miembro del equipo debe explicar algo a otros, aprovechándose de este modo de los beneficios de aprender explicando. Sindicatos (12). Son grupos que se reúnen sin tutor para hacer un trabajo en el que se requieren discusiones en el grupo y la realización de un informe final. Esta variante combina la libertad de organizarse con unos métodos de trabajo claros, favorece la autonomía de los universitarios y así su capacidad para resolver problemas entre ellos.

En escuelas con un grado de heterogeneidad grande entre el alumnado, como ha sucedido en los últimos años por el gran número de extranjeros en las aulas, el aprendizaje cooperativo se ha demostrado como un medio muy eficaz para crear una orientación inclusiva en el aula, representa un medio muy bueno para luchar contra las actitudes discriminatorias, crear un ambiente escolar más inclusivo y conseguir una educación para todos (1). Esta parece ser una de las razones principales por las que el aprendizaje cooperativo se ha desarrollado mucho en la enseñanza primaria y secundaria en los últimos años. En la docencia universitaria, sin embargo, no se ha desarrollado tanto, quizás porque el nivel de homogeneidad entre el alumnado es mucho mayor que en la escuela. Aunque si se han encontrado varios ejemplos de aplicaciones del aprendizaje cooperativo con éxito en el entorno universitario. A continuación se van a mencionar varios casos encontrados llevados a cabo en la Universidad politécnica de Valencia en distintas asignaturas de diferentes escuelas y titulaciones.

3. EXPERIENCIAS EN LA UNIVERSITAT POLITÉCNICA DE VALÈNCIA

1.- Una experiencia innovadora de aplicación de aprendizaje cooperativo fue la realizada en la asignatura **Gestión de la titulación Ingeniería de Organización Industrial** (13). Esta asignatura incluía dos competencias genéricas en su guía docente que así lo recomendaban, capacidad para trabajar en equipo en un entorno multilingüe y capacidad para comunicarse efectivamente con otras personas. Para ellos se creaban grupos en clase para la realización y el trabajo de distintos temas, la técnica utilizada de aprendizaje cooperativo era el puzzle, y se descomponían de la materia teórica tantas partes como miembros tenía cada uno de los grupos, cada grupo diseñaba su plan de trabajo y se repartía los distintos roles del equipo, posteriormente se reunían según la forma grupo de expertos, con los miembros de los otros grupos encargados de la misma parte para profundizar en el tema asignado. Compartían posteriormente la información con el resto de miembros del equipo. Esta experiencia fue desarrollada en dos grupos, uno con docencia por la mañana y otro con docencia por la tarde. Para recibir la opinión de los alumnos con respecto a la metodología docente utilizada, se les pasó una encuesta específica para ello, los resultados fueron muy positivos, un 81% de los alumnos la consideraba mejor que la forma tradicional. La experiencia fue muy positiva, esto fue reflejado tanto en la opinión del profesorado involucrado, como en las encuestas obtenidas de los alumnos al finalizar el curso, que mostraban mejores resultados académicos que en cursos anteriores, así como una satisfacción por la metodología innovadora utilizada.

2.- Otra experiencia similar fue llevada a cabo en la asignatura **Termodinámica aplicada perteneciente al segundo curso de Ingeniero químico**. (14). En esta asignatura la motivación principal para llevar a cabo dicha innovación basada en aprendizaje cooperativo era que los resultados académicos de años anteriores habían sido desalentadores. Dicha aplicación se realizó a un grupo de clase formado por 90 personas matriculadas. La metodología propuesta era la de resolución de problemas y cuestiones en grupos de alumnos fuera del horario de clase. El grupo debía discutir y resolver los problemas y cuestiones y posteriormente se entregaba al profesor para su corrección. Después los distintos grupos compartían los problemas resueltos con los de los otros compañeros, disponiendo de esta forma de una colección de problemas resueltos mayor. Para evaluar el trabajo cooperativo, se realizaba una exposición oral de cada grupo, en dicha exposición se exponía un problema elegido al azar y la hacía un miembro del equipo también elegido al azar. Esta parte de trabajo cooperativo tenía un valor del 15% de la nota de la asignatura. Los resultados fueron muy positivos, ya que disminuyó el número de alumnos no presentados y aumentó el porcentaje de alumnos que superaron la asignatura.

3.- También se realizó una **triple experiencia coordinada por el ICE** (Instituto de ciencias de la educación) en la asignatura ganadería y medio ambiente, de la titulación de Ingeniero agrónomo, en la asignatura legislación urbanística impartida en la titulación de administración y dirección de empresas, y en la asignatura anatomía artística correspondiente a la titulación de bellas artes (15). Todas estas asignaturas compartían en sus guías docentes respectivas la competencia habilidad para trabajar en equipo. La modalidad de trabajo cooperativo seguida en estos tres casos fue el puzzle, para resolver temas prácticos de dificultad grande. Los alumnos mostraron un mayor porcentaje de aprobados respecto de cursos anteriores y en una encuesta específica sobre la nueva metodología utilizada, mostraban más satisfacción que con la metodología tradicional de clases magistrales.

4. CONCLUSIONES

La primera conclusión que se puede obtener en este artículo es que la metodología del aprendizaje cooperativo, como una metodología activa ayuda a los alumnos a un mejor aprendizaje autónomo y duradero. Se han visto varias experiencias exitosas de su aplicación. Sin embargo también se observan dificultades reales para su aplicación, comenzando por la rigidez de la disposición de las aulas en la universidad y por las dificultades en arrancar un método nuevo. Se recomienda mucho su aplicación ya que en campo laboral se van a encontrar los alumnos con muchos trabajos a realizar en equipo, y aprender dicha metodología puede ser de gran ayuda para su aplicación en el mundo laboral. Dicha formación además de practicarse debería darse como contenido según la opinión del autor.

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EVALUACIÓN CONTINUA DEL DESEMPEÑO DE UNA ASIGNATURA A TRAVÉS DE UN BLOG. ANÁLISIS DE UN CASO PRÁCTICO.

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Resumen.

Las popularmente conocidas como TICs, Tecnologías de la Información y Comunicaciones, han supuesto una auténtica revolución en el campo social y en el económico, también es indudable la importancia creciente de dichas nuevas tecnologías en la docencia universitaria. En el Espacio Europeo de Educación Superior, EEES, está cada vez más presente la evaluación continua como un elemento indispensable para el mejor seguimiento del rendimiento de los alumnos. Se trata en esta ponencia de compartir las experiencias vividas en la evaluación docente continua de una asignatura a través de la creación de un blog por parte de los alumnos. El objetivo fundamental de dicha experiencia es conjuntar los conocimientos propios de la asignatura con la iniciación en la creación del blog. Se ha hecho de forma experimental en una asignatura de grado, y se trata de evaluar sus ventajas e inconvenientes así como los resultados obtenidos, los cuales además se contrastarán con las impresiones de los alumnos.

Palabras clave: Evaluación continua, blog, competencias, caso práctico

1. INTRODUCCIÓN

Las popularmente conocidas como TICs, Tecnologías de la Información y Comunicaciones han supuesto una auténtica revolución en el campo social y en el económico (1), también es indudable la importancia creciente de dichas nuevas tecnologías en la docencia universitaria. En el Espacio Europeo de Educación Superior, EEES, está cada vez más presente la evaluación continua como un elemento indispensable para el mejor seguimiento del rendimiento de los alumnos. Este método permite el seguimiento más cercano de los estudiantes, y es por ello que la evaluación continua se considera la estrategia de evaluación más orientada al proceso de aprendizaje y no tanto a una valoración puntual (2). Una de las principales aportaciones hacia la docencia universitaria actualmente es que los estudiantes deben

adquirir un mayor protagonismo, más activo, que les ayude en su proceso de aprendizaje de forma más autónoma. (3)

Las TICs, particularmente algunas de sus herramientas permiten el desarrollo por parte de cualquier usuario de contenido abierto al público en general. Entre estas herramientas, los blogs, permiten que se evolucione hacia un aprendizaje activo, que facilita el hecho de aprender haciendo (4). Un blog es un lugar web donde se pueden recopilar distintas informaciones en orden cronológico inverso, estas informaciones se exponen públicamente en Internet y ofrecen en general a los lectores la posibilidad de añadir sus opiniones y comentarios (5) (9).

En este artículo se muestra una experiencia docente de evaluación continua basada en el uso de un blog particular creado individualmente por cada alumno. Dicho blog es mantenido y actualizado por cada estudiante de forma continuada, y en él se van colgando todas las actividades diarias que componen el trabajo en el aula. Con este método el profesor docente, además de evaluar dichas actividades de aula, aprovecha para comentarlas y dar al alumno a través de sus comentarios, información válida que le servirá para aprender de una forma más eficiente e individualizada. Asimismo se introduce al alumno en el mundo de las TICs y se evalúa también como es la habilidad del alumno en la creación de su blog, evaluando además de las propias actividades de aula su desempeño en la creación de un blog más atractivo, ordenado y claro.

2. METODOLOGÍA

El funcionamiento de esta experiencia docente ha sido el siguiente: La asignatura que ha acogido esta experiencia es perteneciente a un grado. En dicha asignatura se realizan en el aula un gran número de prácticas llamadas prácticas de aula. En años anteriores, dichas prácticas de aula se enviaban al profesor para su corrección de forma individual. El profesor las corregía y entregaba a los alumnos posteriormente. Con este sistema, siempre había un tiempo necesario para la corrección y comentario a los alumnos de aquellos aspectos a mejorar.

Se pensó en utilizar un blog para darle forma a una especie de “cuaderno de bitácora” de la asignatura. En dicho blog se deberían incluir todas las entradas correspondientes a las prácticas de aula que diariamente se realizan, deberían aparecer una serie de entradas obligatorias para todos los alumnos, que serían indicadas por el profesor y al mismo tiempo deberían aparecer otras aportaciones que ellos considerasen interesantes, estas aportaciones voluntarias podían ser materiales de elaboración propia o creados a partir de los contenidos trabajados en el aula. A los alumnos se les explica que los contenidos deben de ser sus propias tareas con contenidos propios; no estaba permitido el copiar y pegar información de internet sin ningún tipo de valor añadido por el estudiante.

Para la creación del blog se les presentaban diferentes herramientas de uso libre que se pueden encontrar en la red fácilmente, y que son gratuitas (blogger, wordpress, blogspot...). El estudiante podía seleccionar aquella que más le gustase para crear y personalizar su blog.

Una vez el blog estuviese creado, deberían enviar un correo electrónico con la dirección del blog al profesor, para que este pudiese consultarlo y así dar el visto bueno. A través de estos blogs, los alumnos recogían las experiencias vividas en el aula, al mismo tiempo se disponía de un espacio de comunicación virtual mucho más efectivo y rápido que la comunicación informal que se podía disponer sin la utilización de dicha plataforma.

La revisión de los blogs se hacía de forma semanal, tal y como se participa comúnmente en los blogs, el profesor realizaba una aportación a modo de comentario, a través del cual corregía, proponía sugerencias a los alumnos para que mejorasen sus entradas y aportaciones.

3. EXPERIENCIA DOCENTE

Una de las facetas más interesantes de la utilización del blog es su libre acceso a través de Internet. En el entorno de aprendizaje anterior, el trabajo realizado en clase permanecía oculto, o mejor dicho, no disponible para otras personas exceptuando al alumno y al profesor. Impidiendo de este modo la interacción entre los propios alumnos. Una de las principales críticas al método tradicional de enviar trabajos solamente al profesor, es que este tipo de sistema ha limitado el desarrollo de competencias sociales y el pensamiento crítico. (4) (11). El uso del blog rompe con dichas fronteras totalmente y abre la posibilidad a que otras personas, compañeros, amigos, otros profesores, incluso los padres, puedan observar el trabajo realizado y hacer sus aportaciones si así lo desean. Merece la pena mencionar a los padres, puesto que en el desarrollo de esta experiencia, se han recibido varias muestras de satisfacción por parte de padres de alumnos, que normalmente están imposibilitados a acceder al seguimiento de los estudios universitarios de sus hijos, al ser estos mayores de edad. Sin embargo, tienen de esta forma una posibilidad de observar de una forma no invasiva de la intimidad de su hijo su desarrollo académico universitario. Pueden asimismo participar activamente mediante sus aportaciones a la creación del blog de sus hijos.

La aplicación de estas tecnologías ha supuesto un gran adelanto para el desarrollo de contenido colaborativo y abierto al público (6), estos blogs permiten que el alumno “aprenda haciendo” de una forma mucho más activa.

Otra de las aportaciones más útiles del blog, es su carácter bidireccional de la comunicación por las conversaciones que se establecen a través de los comentarios. (7). Por otro lado, el bajo coste de dicha herramienta, la mayoría de veces son de

libre acceso, permite que cualquier persona con unos sencillos conocimientos de edición y un poco de práctica y paciencia pueda lograr un blog interesante. (8)

El hecho de utilizar una herramienta tecnológica supone para los alumnos con menor predisposición técnica una dificultad añadida al desarrollo normal de la asignatura, se han observado dificultades sobre todo las primeras sesiones debido a este hecho. Fue necesario en esta experiencia dedicar más tiempo a los aspectos primeros de creación del blog por esta razón.

En lo referente a la evaluación del blog en sí mismo, a lo largo de la asignatura se ha incluido la descripción detallada de las características que debe tener un blog para facilitar su seguimiento (10). Las utilizadas en esta experiencia docente son las siguientes: 1) Parámetros generales: Que indique claramente los temas de interés, que tenga una estructura coherente y orientada al usuario. 2) Layout de la página: que se aprovechen de forma correcta las distintas zonas disponibles.

4. CONCLUSIONES

Las ventajas que se han observado a la hora de recoger los aprendizajes a través del blog frente al tradicional portafolio en papel han sido las siguientes:

El alumno puede realizar aportaciones escritas con retroalimentación, por parte del docente, de una forma más rápida y efectiva durante el proceso de creación del material.

El blog permite introducir soportes tipo video que sería imposible en el formato papel. La utilización de dichos formatos de video, aumenta de forma grande las posibilidades de aprender. La disponibilidad de distintos repositorios de video de forma ilimitada y gratuita, como por ejemplo YouTube, ha permitido la utilización por parte de los alumnos de gran cantidad de videos en sus blogs, que han enriquecido muchísimo su trabajo de aula.

El blog es mucho más ecológico que el formato tradicional anterior, ya que la información se almacena en la red y no es necesario el uso de papel ni tinta para compartirlo y entregarlo.

Se ha observado, sin embargo, que este modo de trabajo predisponía a los alumnos a realizar aportaciones de carácter más informal que las que realizaban en papel. Esto ha implicado un mayor trabajo para el profesor que debía realizar muchas más correcciones e indicaciones que al recoger trabajos en formato papel.

A pesar de las pequeñas dificultades iniciales que encontraron los alumnos a la hora de trabajar así, debido sobre todo al pobre dominio de las herramientas digitales, en una encuesta realizada al final del curso mostraron su satisfacción por el hecho de haber conseguido “perder el miedo” a dicha herramienta.

Como conclusión final de este artículo nos permitimos los autores aconsejar esta herramienta para su utilización en la docencia universitaria. Nuestra impresión es que sus posibilidades son muchas y en este momento se encuentra infrautilizada en la universidad. (12)

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LA DIRECCIÓN DE TRABAJOS DE FIN DE CARRERA EN LA FACULTAD DE ADMINISTRACIÓN Y DIRECCIÓN DE EMPRESAS DE LA UNIVERSIDAD POLITÉCNICA DE VALENCIA DESDE LAS PERSPECTIVAS DE :

LAS TECNOLOGÍAS DE LA INFORMACIÓN Y COMUNICACIÓN Y DE LA GESTIÓN POR COMPETENCIAS.

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Resumen

La dirección de más de 200 Trabajos de Fin de Carrera (TFC), entre los autores del presente trabajo, en la Facultad de Administración y Dirección de Empresas(ADE) de la Universidad Politécnica de Valencia (UPV) entre las titulaciones licenciatura en Administración y Dirección de Empresas y la diplomatura de Gestión y Administración Pública nos han proporcionado la oportunidad de poder experimentar el progreso de nuestros alumnos/as y poder asistir al proceso culmen por el cual consiguen obtener su titulación. La entrega o lectura del TFC es obligatoria para obtener las titulaciones en la UPV y generalmente los alumnos sienten bastante presión y desasosiego en este trance. Es aquí donde nuestro papel de director-tutor cobra importancia para acompañarles y asesorarles desde un punto de vista metodológico, así nos convertimos en sus mentores, en sus animadores y también en árbitros (ponemos límites) para conseguir sacar lo mejor de ellos en este proceso. La metodología utilizada se apoya en un buen e intensivo uso de las TICs agilizando los procesos de comunicación con el alumno/a y por otra parte también les ayudamos a que desarrollen sus competencias desde el saber (conocimiento), el saber-hacer (habilidades), el saber ser o saber –estar (actitudes y valores), despertando su motivación para conseguir su meta: la finalización de su TFC con buena nota; es decir el logro y la excelencia.

Palabras clave: Trabajo Fin de Carrera, Tecnologías de la Información y la Comunicación, Gestión por Competencias.

1. INTRODUCCIÓN.

El papel del director-tutor de un Trabajo Final de Carrera es fundamental a la hora del logro, del éxito y excelencia del alumno cuyo objetivo final es terminar su TFC¹ y obtener buena calificación de éste. El profesor no sólo va a guiar al alumno a nivel metodológico sino que también va a poner límites, proponer reglas y tiempos de ejecución. Por otra parte el profesor-tutor también ayuda a los alumnos para que desarrollen sus competencias desde el *saber* (conocimiento), el *saber-hacer* (habilidades), el *saber ser* o *saber estar* (actitudes y valores), despertando su motivación. El uso intensivo de las TICs se convierte en un instrumento de comunicación rápido y eficaz para el desarrollo de dicho TFC.

2. PROCESO PARA LA REALIZACIÓN DEL TRABAJO FIN DE CARRERA. UTILIZACIÓN DE LAS TICs.

El proceso de dirección de un TFC tendría esta secuencia:

- En primer lugar, el alumno se pone en contacto con el futuro profesor-tutor vía correo electrónico para solicitarle su permiso y disposición para ser su profesor-tutor; si el profesor accede, comienza la relación de tutoría que bien podría formalizarse en un *contrato de enseñanza aprendizaje*. En el correo de respuesta el profesor tutor proporciona al alumno varios ficheros en formato pdf (1) (2) o word y algunos links a páginas web en los que le ilustra de las instrucciones, normas y plazos que regulan la ejecución de dicho TFC (3), así como ejemplos de otros trabajos que en abierto tiene nuestro repositorio llamado "RiuNet" (4), a la vez se marca la membresía del alumno en el grupo de Google+ llamado TFC (5); también se le invita al sistema de mensajería instantánea "hangouts" (6)(antes Talk) y se le invita a formar parte de la lista de distribución en Google Grupos (7). A través de Google Grupos nos comunicamos con el alumno mediante la lista de distribución: comunicando plazos, instrucciones, animando la realización del trabajo y qué alumnos ya han entregado su TFC para la revisión por los tribunales.

- En segundo lugar, se produce la primera reunión del alumno con el profesor para preparar la Propuesta de TFC, documento que inicia el proceso administrativo de la realización del TFC; dicha propuesta, que posteriormente revisará la Comisión de Coordinación de TFCs, se entrega en la secretaría de la Facultad y en dicho documento se solicita la venia para iniciarlo. Dicho documento consta de una carátula firmada por el alumno y autorizada por su profesor en la que constan los datos personales de alumno y profesor, fecha y título del TFC. El título debe reflejar el propósito u objeto del TFC; en el documento a presentar sigue una hoja de Descripción del TFC, que debe contestar a las preguntas ¿Qué voy a hacer?: objeto, ¿Por qué?: motivación y justificación, y ¿Cómo?: metodología y objetivos. Una tercera y

¹

TFC, Trabajo Fin de Carrera.

cuarta hoja para reseñar las asignaturas relacionadas y su justificación, para finalmente proponer un índice a nivel de dos dígitos con la siguiente estructura indicativa, Capítulo 1. INTRODUCCIÓN. 1.1. Resumen. 1.2. Objeto del TFC y Asignaturas Relacionadas, 1.4. Metodología. CAPÍTULO 2. ANTECEDENTES (SITUACIÓN ACTUAL). Capítulo 3 y siguientes DESARROLLO CAPITULAR, ESTRUCTURA Y RESULTADOS, CONCLUSIONES, BIBLIOGRAFÍA y ANEXOS si procede. El trabajo debe ser práctico y aplicado, sirviendo así como puente al ejercicio profesional. La metodología utilizada para hacer el TFC es el método Reloj de Arena que se describe en (8) de tal manera que en unas 75.000 palabras y de forma ordenada y equilibrada se organice el discurso. (9) (10) (11)

- En tercer lugar tendremos reuniones periódicas con el alumno en las que con el avance del trabajo y tras varias consultas electrónicas se vaya perfilando dicho trabajo siempre con un avance significativo de la escritura del TFC de tal manera que en dos o tres reuniones lleguemos a 120-150 páginas de texto, con índices automáticos, gráficos e ilustraciones automáticas, bibliografía automática, con una letra clara, arial 12 por ejemplo, respetando márgenes y páginas de transición entre capítulos, de tal manera que sea fácil y pedagógica su lectura, amena y divertida si es posible, realizando un buen ejercicio de comunicación.

- En cuarto lugar, el profesor, si el trabajo alcanza el nivel de calidad exigido por el centro, autorizará su presentación al tribunal, teniendo en cuenta que es un cuarto árbitro que sólo debe dejar pasar un trabajo que merezca una cualificación alta, que el profesor se examina a la vez que el alumno y que debe ejercitar su motivación para desarrollar lo mejor de sus competencias. Para el proceso de revisión el pdf del trabajo se sube a la Plataforma Digital Poliformat, CMS² de la compañía Sakai.

- Finalmente el tribunal designado por el centro valorará los aspectos formales y los contenidos pertinentes. Para los que opten a las máximas calificaciones se realizará lectura pública con exposición y posterior defensa.

3. LA GESTIÓN POR COMPETENCIAS EN LA REALIZACIÓN DEL TRABAJO DE FIN DE CARRERA.

McClellan (12) definió competencias como *“ las características personales que son la causa del rendimiento eficiente en el trabajo, pudiendo tratarse de razones, enfoques de pensamiento, habilidades o del conjunto de los conocimientos que se aplican”*. Las competencias por tanto centran su objetivo en lo que una persona sería capaz de hacer cuando se le demanda.

²

CMS, Content Management Service.

Boyatzis (13) define competencias como *“aquellas características personales que subyacen o determinan los comportamientos de una persona y que están relacionadas con el desempeño bueno o excelente en un puesto de trabajo”*.

La traducción de estos conceptos a la dirección de Trabajos de Fin de Carrera se circunscribe a la gestión de las competencias que deben adquirir nuestros alumnos al finalizar sus estudios. Estamos hablando del “saber” conjunto de conocimientos técnicos aplicables al aprendizaje de una profesión; del “saber hacer” Habilidades y destrezas, fruto de la experiencia y del aprendizaje y del “saber ser o saber estar” que expresan las relaciones con el entorno y su relación con el medio.

Trabajamos pues con las “creencias”, que son pensamientos, impresiones, juicios y explicaciones; con “valores” que son principios que guían hacia los objetivos y guían nuestro comportamiento; y con las “actitudes” que son evaluaciones que hacemos sobre lo que nos rodea: las personas, las ideas, los objetos, los hechos, etc.

Por todo esto trabajamos en la gestión de las competencias con nuestros alumnos de TFC en el sentido de que desarrollen sus Soft Skills que son las *habilidades sociales*, atributos personales que mejoran las interacciones de un individuo, el desempeño laboral y las perspectivas de carrera.

Se refieren a la capacidad de una persona para interactuar eficazmente con los compañeros de trabajo y profesores, y son de aplicación general, tanto dentro de la Universidad como en el lugar de trabajo. Son (14), de manera sintética, los siguientes:

- La ética en el trabajo. Pretende que el alumno esté motivado y proponga mejoras en el trabajo.
- La actitud positiva. Pretende que el alumno transmita optimismo, energía y buena voluntad.
- Las habilidades comunicativas. Pretende que el alumno sepa hablar, comunicar, escuchar y ser crítico.
- Las habilidades de gestión de tiempo. Para que el alumno sepa priorizar tareas y utilizar el tiempo con inteligencia.
- Las habilidades de resolución de problemas. Para que el alumno los afronte con ingenio, capacidad y sepa delegar.
- Las habilidades para trabajar en equipo. Para que el alumno adquiera la capacidad de trabajar en equipo, sea cooperativo y asuma el liderazgo.
- La confianza en sí mismo. Para que el alumno sepa que puede hacer el trabajo, tenga calma, inspire confianza y contribuya a generar ideas.
- La capacidad de aceptar y aprender de las críticas. Que el alumno sepa manejar la crítica, esté abierto a aprender ya a crecer como persona y como profesional.

- La flexibilidad y la adaptabilidad. Capacidad para adaptarse a nuevas situaciones y desafíos. Aceptar el cambio, estar abierto a nuevas ideas.

- El ser capaz de trabajar bajo presión. Saber manejar el estrés que acompaña a los plazos y a la crisis. Ser capaz de hacer tu trabajo y sobreponerte a los apuros.

Este decálogo lo aceptamos y lo practicamos; así pues es nuestra guía a la hora de formar y asesorar a nuestros alumnos/as de Trabajo de Fin de Carrera.

4. CONCLUSIONES.

Como queda demostrado, tras lo expuesto a lo largo de la comunicación, las TICs son fundamentales a la hora de la agilidad y fluidez en la comunicación director-alumno-desarrollo del discurso. Las habilidades adquiridas por el alumno son competencias básicas que se han ido trabajando de manera transversal, pero es en el momento de realizar el Trabajo de Fin de Carrera cuando se sintetizan y concretan en un producto único, en un prototipo que será una experiencia que ayudará al alumno a hacer una transición mucho más equilibrada desde el mundo académico a su futuro puesto de trabajo en la empresa.

Agradecimientos

Estos trabajos de investigación han sido apoyados por los PIMES 2013-2014 de la Universitat Politècnica de Valencia.

Algunos de los autores pertenecen al Grupo de Investigación e Innovación Educativa en Metodologías activas para el desarrollo y evaluación de competencias genéricas interpersonales (MACGI).

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EL ESTILO DE APRENDIZAJE DE LOS EGRESADOS EN INGENIERIA DE EDIFICACIÓN

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Resumen

El conocer el estilo de aprendizaje de las personas, determina en gran medida las tendencias que se deben realizar para programar su formación. Según el nivel de estudios y la especialidad realizada en la universidad (letras, ciencias o técnicas), marca el estilo solicitado para su formación. En este artículo se ha realizado un estudio sobre los estilos de aprendizaje sobre una muestra de personas egresadas en ingeniería de edificación y arquitectura. Para ello se ha realizado unos cuestionarios CHAEA (Cuestionario Honey-Alonso de Estilos de Aprendizaje), para determinar sus tendencias de aprendizaje y motivaciones para preparar la formación post-grado universitaria de estos profesionales, que induzca un mayor interés en el alumno.

Keywords: Estilo de aprendizaje; formación postgrado; ingenieros edificación

1. INTRODUCCIÓN

Cada persona puede aprender de manera diferente, siendo las teorías sobre estilos de aprendizaje lo que explican por qué cada individuo puede aprender de diferente manera. Otros autores [1-3] plantean que existen suficientes investigaciones que muestran la relación entre los estilos de aprendizaje y el rendimiento, aprendiendo con más efectividad cuando se les enseña con sus estilos de aprendizaje.

Los primeros estudios sobre los estudios de estilos de aprendizaje se realizaron en los años 70, que determinaron cuatro estilos de aprendizajes: activo, reflexivo, teórico y pragmático. Estos fueron definidos por Alonso, Gallego y Honey [2] como:

- ♦ Activo: Se involucra en experiencias nuevas, suele ser entusiasta ante lo novedoso y disfruta del momento presente, dejándose llevar por los acontecimientos lo que le lleva a actuar primero y a pensar después.

- ♦ Le aburre ocuparse de actividades a largo plazo y le gusta trabajar rodeados de gente, pero siendo el centro de éstas.
- ♦ Reflexivo: Analiza sus experiencias desde diversos prismas, profundizando en ellas hasta llegar a una conclusión. Observa y escucha antes de hablar. Para él lo más importante es recoger la información para su posterior análisis. Procura posponer las conclusiones.
- ♦ Teórico: adapta e integra sus observaciones en teorías complejas. Su pensamiento es secuencial integrando toda la información. Se siente incómodo con los juicios subjetivos y con las actividades ilógicas.
- ♦ Pragmático: Prueba ideas, teorías, técnicas y comprueba que funcionan en la práctica inmediatamente. Le impacientan las redundancias en la misma idea. Es práctico y cercano a la realidad al que le gusta tomar decisiones y resolver problemas, siendo éstos un desafío. Siempre busca la mejor manera de hacer las cosas.

Actualmente existe un interés por los modelos de enseñanza, que tratan de alejarse cada vez más de los modelos tradicionales, para centrarse en el estudio y la comprensión de cómo son los modelos de aprendizaje de las personas para adaptarse a la mejor asimilación y comprensión de lo aprendido.

En este artículo se ha realizado un estudio de cómo son las tendencias de aprendizaje de titulados en ingeniería de la edificación mediante entrevistas y el pase de cuestionarios de Honey-Alonso sobre los estilos de aprendizaje, con el fin de determinar las características que definen su manera de aprender, y optimizar esfuerzos ante la realización de cursos post-grado en los que puedan estar matriculados dichos egresados.

2. LOS ESTILOS DE APRENDIZAJE

Hoy en día se muestra un interés por las estrategias didácticas y su relación con los modelos de enseñanza, alejándose de los modelos tradicionales, para centrarse en el estudio y la comprensión del proceso de aprendizaje enfocado a las características de los alumnos hacia los que está dirigida.

Se definen los Estilos de Aprendizaje como las estrategias por las cuales se procesa la información en su proceso de aprendizaje [4]. Los estilos varían con la formación, edad, las materias, el nivel de éxito, la cultura y el género, que pueden ser modificados. Por ello, los docentes deben mostrar interés por descubrir el estilo del alumnado tipo al que va dedicada la enseñanza y adaptarlo a las características de cada situación [1-3, 5].

En los años 70 empieza a mostrarse interés sobre los estudios de estilos de aprendizaje por parte de Honey y Mumford, conceptualizándose después por Alonso, Gallego y Honey [2], definiendo cuatro estilos de aprendizajes: activo, reflexivo, teórico y pragmático. Las personas con dichos estilos se pueden caracterizar:

Estilo Activo. Son personas abiertas, entusiastas, sin prejuicios ante las nuevas experiencias.

Estilo Reflexivo. Son individuos que observan y analizan detenidamente.

Estilo Teórico. Presentan un pensamiento lógico e integran sus observaciones dentro de teorías lógicas y complejas.

Estilo Pragmático. Son personas que intentan poner en práctica las ideas.

Los Estilos de Aprendizaje tienen sus orígenes en el campo de la psicología, a partir de los años 50 [6]. Se analizaron los estilos cognitivos, como manera de percibir y procesar la información de los individuos.

La literatura existente ha estudiado que las personas tienen diferentes formas de aprender [7] y establecen distintas estrategias cognitivas, conocidas como “Estilos Cognitivos” [8], de donde se derivan los estilos de aprendizaje, que indican cómo las personas perciben, interactúan y responden a su proceso de aprendizaje dentro de un ambiente.

Existe una diversidad de clasificaciones sobre los estilos de aprendizaje [9-10], Honey y Mumford propusieron cuatro categorías fundamentales de estilos de aprendizaje (activo, reflexivo, teórico y pragmático), las cuales serán punto de referencia en este estudio.

Analizando los estilos de aprendizaje podemos tener una base para orientar principalmente el saber cómo personalizar el aprendizaje, enseñar a aprender a aprender, posibilitando el conocimiento y destreza necesarios para aprender con eficiencia y apoyarse en las nuevas tecnologías, propiciando la participación y la interacción de las personas, que hagan mejorar la eficiencia del proceso de aprendizaje.

3. METODOLOGÍA UTILIZADA

Para estudiar las características de aprendizaje de los egresados en ingeniería de la edificación se realizó un estudio en base a los cuestionarios y gráficos utilizados según la metodología de Honey-Alonso sobre estilos de aprendizaje, pasando el

cuestionario a 25 titulados en ingeniería de la edificación, analizándose con posterioridad los resultados.

El instrumento utilizado fue el cuestionario de estilos de aprendizaje denominado CHAEA [3]. Dicho cuestionario consta de ochenta ítems de respuesta dicotómica, donde veinte preguntas (distribuidas de manera aleatoria) corresponden a cada estilo de aprendizaje. La puntuación absoluta obtenida por cada sujeto en cada grupo de veinte ítems indica el nivel que éste alcanza en cada uno de los cuatro estilos. Con ello se obtienen los datos precisos para valorar las preferencias de cada persona evaluada en cada uno de los estilos y obtener su perfil de aprendizaje

Las preguntas del cuestionario fueron las siguientes:

CUESTIONARIO HONEY-ALONSO DE ESTILOS DE APRENDIZAJE; CHAEA

C.M.ALONSO,D.J.GALLEGO Y P.HONEY

Instrucciones para responder al cuestionario

- ✓ Este cuestionario ha sido diseñado para identificar su Estilo preferido de Aprendizaje. No es un test de inteligencia, ni de responsabilidad.
 - ✓ No hay límite de tiempo para contestar al Cuestionario. No le ocupa más de 15 minutos.
 - ✓ No hay respuestas correctas o erróneas. Será útil en la medida que sea sincero/a en sus respuestas.
 - ✓ Si está más de acuerdo con que en desacuerdo con el ítem ponga un signo más (+), si por el contrario, está más en desacuerdo que de acuerdo, ponga un signo menos (-).
 - ✓ Por favor, conteste a todos los ítems.
 - ✓ Muchas Gracias.
-
- | | |
|---|--|
| <ul style="list-style-type: none"> <input type="checkbox"/> 1.- Tengo fama de decir lo que pienso claramente y sin rodeos. <input type="checkbox"/> 2.- Estoy seguro de lo que es bueno y lo que es malo, lo que está bien y lo que está mal. <input type="checkbox"/> 3.- Muchas veces actúo sin mirar las consecuencias. <input type="checkbox"/> 4.- Normalmente trato de resolver los problemas metódicamente y paso a paso. <input type="checkbox"/> 5.- Creo que los formalismos coartan y limitan la actuación libre de las personas. <input type="checkbox"/> 6.- Me interesa saber cuáles son los sistemas de valores de los demás y con qué criterios actúan. <input type="checkbox"/> 7.- Pienso que el actuar intuitivamente puede ser siempre tan válido como actuar reflexivamente. <input type="checkbox"/> 8.- Creo que lo más importante es que las cosas funcionen. | <ul style="list-style-type: none"> <input type="checkbox"/> 9.- Procuo estar al tanto de lo que ocurre aquí y ahora. <input type="checkbox"/> 10.- Disfruto cuando tengo tiempo para preparar mi trabajo y realizarlo a conciencia. <input type="checkbox"/> 11.- Estoy a gusto siguiendo un orden, en las comidas, en el estudio, haciendo ejercicio regularmente. <input type="checkbox"/> 12.- Cuando escucho una nueva idea enseguida comienzo a pensar cómo ponerla en práctica. <input type="checkbox"/> 13.- Prefiero las ideas originales y novedosas aunque no sean prácticas. <input type="checkbox"/> 14.- Admito y me ajusto a las normas solo si me sirven para lograr mis objetivos. <input type="checkbox"/> 15.- Normalmente encajo bien con personas reflexivas, y me cuesta sintonizar con personas demasiado espontáneas, imprevisibles. |
|---|--|

- 16.- Escucho con más frecuencia que hablo.
- 17.- Prefiero las cosas estructuradas a las desordenadas.
- 18.- Cuando poseo cualquier información, trato de interpretarla bien antes de manifestar alguna conclusión.
- 19.- Antes de hacer algo estudio con cuidado sus ventajas e inconvenientes.
- 20.- Crezco con el reto de hacer algo nuevo y diferente.
- 21.- Casi siempre procuro ser coherente con mis criterios y sistemas de valores. Tengo principios y los sigo.
- 22.- Cuando hay una discusión no me gusta ir con rodeos.
- 23.- Me disgusta implicarme afectivamente en mi ambiente de trabajo. Prefiero mantener relaciones distantes.
- 24.- Me gustan más las personas realistas y concretas que las teóricas.
- 25.- Me gusta ser creativo, romper estructuras.
- 26.- Me siento a gusto con personas espontáneas y divertidas.
- 27.-La mayoría de las veces expreso abiertamente cómo me siento.
- 28.- Me gusta analizar y dar vueltas a las cosas.
- 29.- Me molesta que la gente no se tome en serio las cosas.
- 30.-Me atrae experimentar y practicar las últimas técnicas y novedades.
- 31.-Soy cauteloso a la hora de sacar conclusiones.
- 32.-Prefiero contar con el mayor número de fuentes de información. Cuantos más datos reúna para reflexionar, mejor.
- 33.-Tiendo a ser perfeccionista.
- 34.-Prefiero oír las opiniones de los demás antes de exponer la mía.
- 35.-Me gusta afrontar la vida espontáneamente y no tener que planificar todo previamente.
- 36.-En las discusiones me gusta observar cómo actúan los demás participantes.
- 37.-Me siento incómodo con las personas calladas y demasiado analíticas.
- 38.-Juzgo con frecuencia las ideas de los demás por su valor práctico.
- 39.-Me agobia si me obligan a acelerar mucho el trabajo para cumplir un plazo.
- 40.-En las reuniones apoyo las ideas prácticas y realistas.
- 41.-Es mejor gozar del momento presente que deleitarse pensando en el pasado o en el futuro.
- 42.-Me molestan las personas que siempre desean apresurar las cosas.
- 43.-Aporto ideas nuevas y espontáneas en los grupos de discusión.
- 44.-Pienso que son más conscientes las decisiones fundamentadas en un minucioso análisis que las basadas en la intuición.
- 45.-Detecto frecuentemente la inconsistencia y puntos débiles en las argumentaciones de los demás.
- 46.-Creo que es preciso saltarse las normas muchas más veces que cumplirlas.
- 47.-A menudo caigo en cuenta de otras formas mejores y más prácticas de hacer las cosas.
- 48.-En conjunto hablo más que escucho.
- 49.-Prefiero distanciarme de los hechos y observarlos desde otras perspectivas.
- 50.-Estoy convencido que deber imponerse la lógica y el razonamiento.
- 51.-Me gusta buscar nuevas experiencias.
- 52.-Me gusta experimentar y aplicar las cosas.

- 53.-Pienso que debemos llegar pronto al grano, al meollo de los temas.
- 54.-Siempre trato de conseguir conclusiones e ideas claras.
- 55.-Prefiero discutir cuestiones concretas y no perder el tiempo con charlas vacías.
- 56.-Me impaciento cuando me dan explicaciones irrelevantes e incoherentes.
- 57.-Compruebo antes si las cosas funcionan realmente.
- 58.-Hago varios borradores antes de la redacción definitiva de un trabajo.
- 59.-Soy consciente de que en las discusiones ayudo a mantener a los demás centrados en el tema, evitando divagaciones.
- 60.-Observo que, con frecuencia, soy uno de los más objetivos y desapasionados en las discusiones.
- 61.- Cuando algo va mal le quito importancia y trato de hacerlo mejor.
- 62.- Rechazo ideas originales y espontáneas si no las veo prácticas.
- 63.- Me gusta sopesar diversas alternativas antes de tomar una decisión.
- 64.- Con frecuencia miro hacia delante para prever el futuro.
- 65.- En los debates y discusiones prefiero desempeñar un papel secundario antes que ser el/la líder o el/la que más participa.
- 66.- Me molestan las personas que no actúan con lógica.
- 67.- Me resulta incomodo tener que planificar y prever las cosas.
- 68.- Creo que el fin justifica los medios en muchos casos.
- 69.- Suelo reflexionar sobre los asuntos y problemas.
- 70.- El trabajar a conciencia me llena de satisfacción y orgullo.
- 71.- Ante los acontecimientos trato de descubrir los principios y teorías en que se basan.
- 72.- Con tal de conseguir el objetivo que pretendo soy capaz de herir sentimientos ajenos.
- 73.- No me importa hacer todo lo necesario para que sea efectivo mi trabajo.
- 74.- Con frecuencia soy una de las personas que más anima las fiestas.
- 75.- Me aburro enseguida con el trabajo metódico y minucioso.
- 76.- La gente con frecuencia cree que soy poco sensible a sus sentimientos.
- 77.- Suelo dejarme llevar por mis intuiciones.
- 78.- Si trabajo en grupo procuro que se siga un método y un orden.
- 79.- Con frecuencia me interesa averiguar lo que piensa la gente.
- 80.- Esquivo los temas subjetivos, ambiguos y poco claros

PERFIL DE APRENDIZAJE

- 1.- Rodee con una línea cada uno de los números que ha señalado con un signo más (+)
- 2.- Sume el número de círculos que hay en cada columna.
- 3.- Coloque estos totales en la gráfica. Así comprobará cual es su estilo o estilos de aprendizaje preferentes.

	I	II	III	IV
3		10	2	1
5		16	4	8
7		18	6	12
9		19	11	14
13		28	15	22
20		31	17	24
26		32	21	30
27		34	23	38
35		36	25	40
37		39	29	47
41		42	33	52
43		44	45	53
46		49	50	56
48		55	54	57
51		58	60	59
61		63	64	62
67		65	66	68
74		69	71	72
75		70	78	73
77		79	80	76

Totales:

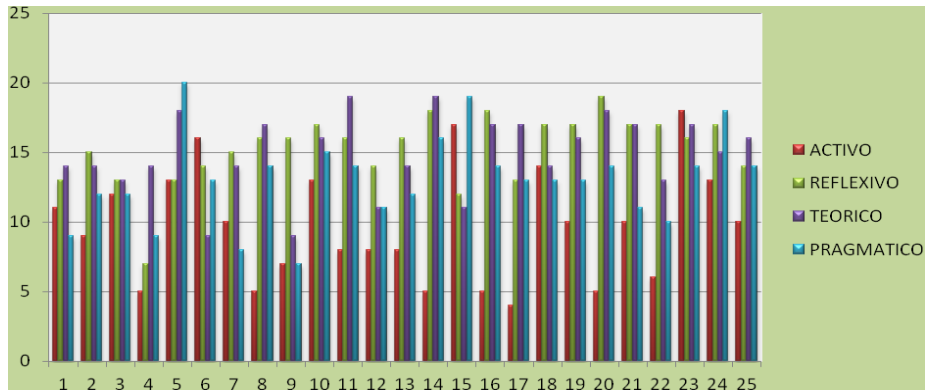
GRUPO:	Activo	Reflexivo	Teórico	Pragmático
--------	--------	-----------	---------	------------

Para procesar la información de los cuestionarios se elaboró una base de datos en el programa Excel®, y, además, se realizaron análisis univariados, descriptivos de media y desviación típica.

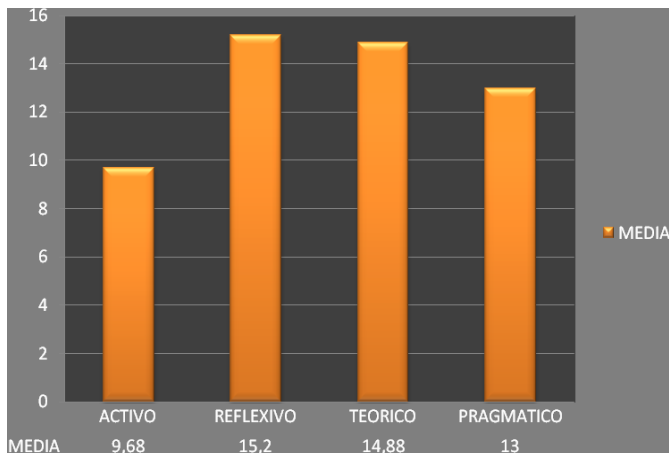
4. RESULTADOS

Para la interpretación de los resultados de los estilos de aprendizaje de las personas intervinientes en el estudio, se propuso identificar el estilo de

aprendizaje fundamental o el más utilizado por estas personas, visionando de igual manera el resto de categorías de aprendizajes complementarios.. Todos los sujetos respondieron el cuestionario y los datos de los resultados se muestran en las gráficas 1 y 2.



Gráfica 1: Resultados del cuestionario por persona analizada en función de los diferentes estilos aprendizaje

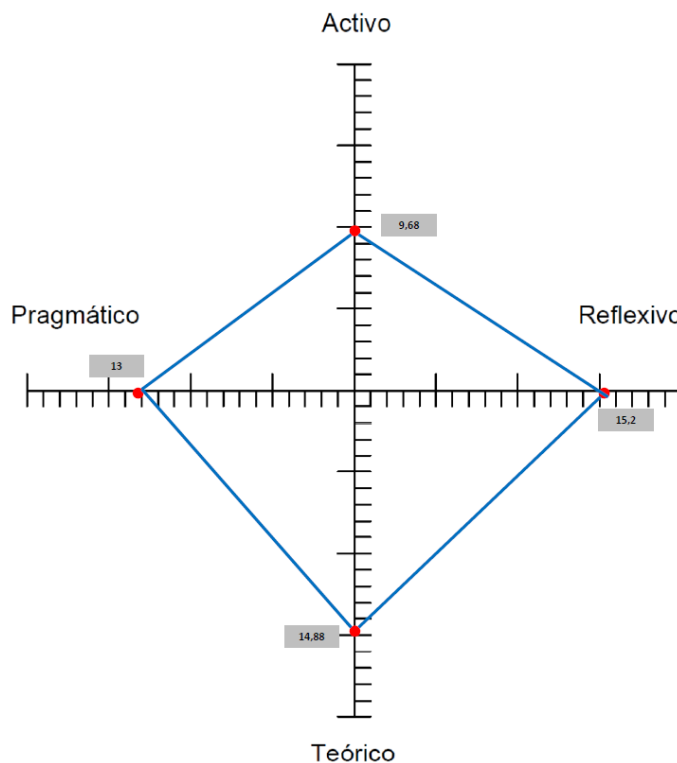


Gráfica 2: Medias de resultados en función de los estilos de aprendizaje

Los resultados mostraron las puntuaciones obtenidas para cada persona en función de los cuatro tipos de estilos de aprendizaje. La media de los resultados obtenidos en esta muestra indican que el estilo predominante era el reflexivo seguido por el estilo teórico, siendo el menor valorado el estilo activo.

5. DISCUSIÓN

Los resultados presentados en este estudio permitieron caracterizar el perfil de aprendizaje de los titulados en ingeniería de la edificación para la muestra analizada. En la gráfica 3 se muestra en las barras de los diferentes estilos de aprendizaje las puntuaciones medias obtenidas, indicando que el predominante es un estilo teórico y reflexivo.



Gráfica 3: Cuadrante de los estilos de aprendizaje del estudio

Según los estudios de Alonso [1-3], los estudiantes universitarios tienen un estilo de aprendizaje propio y, por lo tanto, un “perfil de aprendizaje”, donde se evidencia claramente su tendencia natural por alguna de las cuatro categorías definidas. En nuestro caso la tendencia particular por los estilos de aprendizaje teórico y reflexivo.

En el estilo predominante teórico, se trata de personas metódicas y con criterios objetivos, con un profundo sentido crítico, metódico y disciplinado, que abordan los problemas desde un punto de vista lógico. Prefieren las actividades estructuradas que les permitan comprender sistemas complejos. Prefieren las clases magistrales.

En el estilo reflexivo, se trata de personas analíticas. Prefieren pensar detenidamente sobre el objeto de estudio y trabajar solos. Aumentan la comprensión en pasos lineales, pueden no entender el material, pero logran conectar lógicamente sus partes. Prefieren la elaboración de mapas conceptuales, diagramas de flujo, árboles de problemas.

Estas características definidas pueden ayudar a los docentes de estos titulados ante estudios post-grado a definir los modelos de enseñanza a aplicar a este tipo de estudiantes titulados en ingeniería de la edificación.

Que estas personas sean estudiantes reflexivos nos indica:

- ♦ Capacitados para recoger datos y analizarlos con detenimiento antes de llegar a una conclusión.
- ♦ Prefieren considerar todas las alternativas posibles antes de actuar.
- ♦ No les gusta intervenir hasta que consideran dominada la situación.
- ♦ Estudiantes ponderados, receptivos, analíticos y exhaustivos.
- ♦ Observadores, pacientes, cuidadosos y lentos en su proceso de aprendizaje.

De igual manera ante personas con estilos de aprendizaje teóricos nos aporta:

- ♦ Tienden a ser perfeccionistas en la clase, lo que les inhibe en el momento de participar.
- ♦ Integran los hechos en teorías coherentes.
- ♦ Sienten preferencia por analizar y sintetizar lo aprendido.

Por ello para plantear la docencia se debe buscar estrategias fundamentadas en estos estilos propios, donde los estudiantes tengan la oportunidad de pensar y responder de manera crítica y reflexiva, y estimular el trabajo participativo, con experiencias prácticas como el desarrollo de ejercicios de caso. Todo ello permite generar un razonamiento complejo a través del análisis, síntesis y autoevaluación de sus actividades de formación. El uso de mapas conceptuales, flujogramas, árboles de problemas, guías de estudio y diseño de gráficos favorecerá el aprendizaje efectivo en la población objeto del estudio. El uso de estas estrategias pedagógicas dentro del ámbito de la ingeniería de la edificación permitirá el desarrollo de competencias científicas básicas como la observación formal, el

análisis de datos, el trabajo metódico, sistematizado y lógico propio de las disciplinas experimentales.

En este sentido, con la obtención de los estilos de aprendizaje se observan aplicaciones en el proceso de la acción orientadora de los profesores. Con este estudio, se ha intentado generar una reflexión sobre la importancia de que el docente indague sobre los estilos de aprendizaje de sus estudiantes, como base para el diseño y formulación de las estrategias pedagógicas dentro de cada programa académico, y orientado a las características de formación previa de los alumnos objeto de la enseñanza, propiciando un aprendizaje más efectivo de la enseñanza.

6. CONCLUSIONES

El conocer los estilos de aprendizaje entre los egresados en ingeniería de la edificación ante futuras formaciones de post-grado permite que el estudiante tenga conciencia de su proceso de formación y con ello tomar decisiones que le permitan potenciar con responsabilidad su aprendizaje, marcando las rutas, tiempo, temas, que permitan la comprensión de los nuevos contenidos a desarrollar de una manera más eficiente.

El diagnóstico inicial de esta situación conlleva un compromiso por parte del docente, dirigido a racionalizar su enseñanza favoreciendo el éxito académico del alumnado, teniendo en cuenta cómo se aprende y cómo se enseña. Por todo ello, averiguando los estilos de aprendizaje, nos ofrece una variable fundamental a tener en cuenta para mejorar la docencia.

Esto debe estimular a los docentes que se conviertan en concededores de los estilos de aprendizaje, fomentando una participación bidireccional profesor-alumno.

Al introducir las nuevas tecnologías en la educación se requiere de receptores críticos y emisores creativos, que contribuyan a favorecer la construcción del aprendizaje del alumno mediante una comunicación entre ambos protagonistas. Sin embargo, no basta un buen nivel de información, es necesario tener conciencia de quién transmite, cómo se transmite y quién recibe el mensaje y a través de cuáles nuevas tecnologías de la información; lo cual implicara generar nuevas formas, estilos, tipos y procesos de educación, ya que se usan nuevos esquemas de acceso a la información, por ello será de utilidad realizar el diagnóstico de los diferentes estilos, que permitan a los cuatro actores: docente, alumno, contenido y nuevas tecnologías tener una mejor relación, generando además nuevos estilos de aprendizaje [11].

El aprender haciendo, el entrenamiento y el aprendizaje en ambientes no formales son cada vez más comunes, por ello es necesario considerar estos cambios en las formas de aprendizaje y del manejo del conocimiento entre los egresados en ingeniería de la edificación.

Con el diagnóstico de los estilos de aprendizaje de los alumnos identificamos las características más adecuadas y las herramientas tecnológicas que podrían ser utilizadas para las diversas formas de aprendizaje, que contribuyan a la mejor asimilación de la enseñanza por parte del alumno.

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LA FORMACIÓN EN SEGURIDAD LABORAL EN EL ÁMBITO DE LA EMPRESA

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Resumen

La formación laboral en el ámbito de la empresa tiene dos actores importantes: el docente y el receptor de la docencia. Por lo que esta exige a ambos una adecuada coordinación para que dicha actividad genere los frutos deseados. En general, la formación en el mundo laboral requiere un acertado diseño e implantación, lejos de esa “formación magistral” que se implanta en los centros docentes, pues el receptor suele ser una persona poco habituada a la actividad formativa, ya sea por el abandono temprano del estudio o por haberlo terminado hace bastante tiempo.

La realización de la formación en el mundo laboral es un elemento clave para reducir la siniestralidad en las empresas. De ahí la importancia de considerar todas las variables que pueden afectar a la actividad formativa; tales como: el tipo y nivel cultural de los trabajadores, el temario de la formación y el objetivo que se pretende alcanzar con ella, cuándo realizar dicha formación, las horas y el lugar donde se va a llevar a cabo y, finalmente, la frecuencia de las acciones formativas.

Este tipo de formación, que suele plasmarse en un acto sencillo, requiere un estudio pormenorizado de los motivos que la llevan a cabo y de sus variables. En este artículo se presenta un caso donde el diseño inicial de la formación, en un departamento de una empresa del sector químico, tuvo que ser modificado para reducir la siniestralidad y los resultados, positivos, alcanzados.

Keywords: Formación; información; seguridad laboral; cero accidentes

1. INTRODUCCIÓN

La gestión empresarial reconoce, hoy en día, que la seguridad de sus trabajadores es un elemento de competitividad y valor de la empresa; y, por lo tanto, algo al que dedicar un esfuerzo con objeto de erradicar la accidentalidad laboral y llegar a la meta de Cero Accidentes. Mejorar la seguridad laboral significa mejorar la calidad del trabajo de sus operarios y con ello, también, mejorar la imagen de la empresa.

Esta es la razón por la que en la empresa se desarrollan diversos tipos de actividades preventivas, tales como:

- Mejoras técnicas.
- Información de los riesgos existentes. Mediante la señalización.
- Actividades formativas [1].

Las mejoras técnicas permiten eliminar o, al menos, minimizar los riesgos existentes en la empresa. Con la información se pretende dar a conocer los riesgos que hay en el puesto de trabajo y, así, modificar la actuación del trabajador para evitar el accidente o minimizar sus consecuencias. Pero, con la formación se pretende modificar el comportamiento y la actitud de los trabajadores enfocándolos a mantener una actitud en favor de la seguridad laboral que permita mantener, de forma continua, un espacio libre de riesgos [2], incrementar la cultura preventiva dentro de la empresa y, además, dar herramientas que permitan entender la información que la empresa suministra a los trabajadores.

Alcanzar el objetivo de “cero accidentes” requiere la combinación de los tres tipos de actividades preventivas antes mencionadas. La formación es, tal vez, la actividad preventiva más compleja de organizar para llegar a este objetivo debido a las variables que hay que considerar para que genere los frutos deseados.

En este artículo se pretende mostrar un enfoque particular de la formación así como la aplicación que se hizo en un entorno empresarial del sector químico, junto con los resultados obtenidos.

2. LA FORMACIÓN

La formación relativa a la seguridad laboral, en el seno de la empresa, es una actividad cuyo objetivo es suministrar conocimiento a los trabajadores, para generar en ellos una cultura preventiva que permita mejorar, y mantener, las condiciones de seguridad de la empresa [3, 4]. Una formación adecuadamente planificada y llevada a cabo genera un comportamiento en el trabajador, que evita la aparición de nuevos riesgos, y ayuda a mantener los niveles de seguridad ya establecidos en la empresa. Además, se crea un área de colaboración trabajador-empresa en pro de la seguridad laboral que, adecuadamente encauzado, genera una sinergia aplicable a otros campos dentro de la actividad de la empresa.

La formación requiere dos actores principales:

- La persona que va a impartir la formación.
- Las personas a ser formadas.

El objetivo de una formación es, finalmente, un espacio de trabajo sin accidentes o, al menos, minimizar la accidentalidad laboral. Pero, para ello es necesaria una ade-

cuada planificación de todas las variables que intervienen en el proceso [5]. Estas variables a controlar para una adecuada formación de los trabajadores son:

- El momento de la formación.
- El tiempo de formación.
- El número de personas a participar.
- Los medios físicos (lugar, elementos, etc.) empleados en la formación.
- El tema de formación y el desarrollo de la actividad formativa

El momento de la formación

Elegir el momento en que se debe de desarrollar una actividad formativa con un grupo de trabajadores es crucial para el buen éxito de la formación, sobre todo si dicha formación se va a realizar durante el horario laboral, pues se debe de buscar el momento en que el trabajador esté receptivo para la acción formativa. Por ello, se debe evitar realizar la actividad formativa justo antes, o después de una actividad que exija un esfuerzo físico o intelectual grande. También, se ha de evitar hacer la formación en los momentos de descanso asignado a los trabajadores para no tener a los trabajadores en contra de la actividad formativa.

El momento para realizar una actividad formativa no deben ser ni las horas finales del turno de trabajo ya que, como se dijo antes, los trabajadores pueden estar agotados; ni tampoco la hora inicial de su turno ya que los trabajadores, aunque pueden estar más frescos y por ello receptivos a la formación, pueden no estar en condiciones mentales para recibir la formación, ya sea porque vienen de hacer una comida copiosa que invitan a la somnolencia, o que vengan con la mente en problemas personales recientemente han dejado en casa.

Los mejores momentos pueden ser la 2ª y 3ª hora de trabajo, o las dos horas después del descanso laboral. Incluso, ésta última hora puede permitir que el trabajador descance, físicamente, y lo prepare para, después, realizar su trabajo.

El tiempo de formación

El tiempo que ha de durar la actividad formativa también es importante. Esta variable depende de varios factores: los hábitos formativos de los trabajadores, el tema de la formación, los medios empleados en la formación. Tal vez sea el hábito formativo de los trabajadores el que condicione el tiempo que debe durar una actividad formativa. En trabajadores con un bajo nivel formativo no tiene mucho sentido el tener largas sesiones de formación, recomendándose reducir la sesión a no más de 30 ó 45 minutos. Esto también va a depender de los medios empleados y del tema de formación. Posteriormente, se puede ir incrementando el tiempo de formación. No obstante, una adecuada actividad formativa no debe de durar más de 60 minutos.

El número de personas a formar

La formación debe de hacerse a todos los trabajadores a los que afecte el tema objeto de la actividad formativa. Pero se ha de procurar que sean grupos reducidos. Esto permite controlar a las personas con más facilidad y, de ese modo, no se dispersa la formación por comentarios inapropiados de las personas que participan en la formación, debido a la familiaridad entre ellos. El número ideal no debería ser superior a 10 ó 12 personas. Si el turno de trabajo lo componen más de 10 personas ha de dividirse en grupos. Esto permite mantener la actividad productiva con aquellas personas que están pendientes de recibir la formación. La formación en grupos reducidos es más directa, más participativa y enriquecedora, tanto para el trabajador como para el formador.

La formación en grupos exige un esfuerzo extra al formador, no porque ha de duplicar su trabajo, sino porque la formación la debe impartir de igual forma e iguales mensajes a los grupos a formar. Lo contrario sería un error.

Los medios a emplear en la actividad formativa

Los medios a emplear en una acción formativa dependerán, principalmente, de los hábitos formativos de los trabajadores a formar y del tema formativo. Se propone que la actividad formativa no sea un alarde de medios y de técnicas sofisticadas de formación, ya que estas pueden generar distracción en los trabajadores haciendo que presten más atención a los medios empleados y lo que pueda surgir de éstos, que al tema objeto de la formación.

Los ejemplos prácticos basados en hechos reales acaecidos dentro de la empresa pueden dar mejor resultado que una excelente presentación de PowerPoint. No obstante, de usar ésta herramienta, presentar los temas de forma sencilla, con frases directas. De presentar diagramas y dibujos utilizar colores suaves que no resalten demasiado.

El uso de medios audiovisuales puede ser una buena herramienta formativa, pero no debe de ocupar más de un 20% del tiempo de formación. Estos medios deben de verse con claridad y han de estar enfocados al tema de formativo que se está tratando.

El uso de internet para impartir formación puede ser una herramienta adecuada, si el trabajador que va a recibir dicha formación es una persona que usa este tipo de tecnología [6]. Utilizar esta herramienta con personas que no estén acostumbradas a manejar ordenadores con soltura puede dar lugar a que dicha formación no de los resultados esperados.

El lugar donde se realiza la formación

El lugar donde realizar la formación no tiene que ser un aula clásica. Puede ser un despacho o una sala alrededor de una mesa. Pero si es importante que sea un lugar apartado del lugar de trabajo, con objeto de no ser interrumpida la formación por personas o actividades ajenas a la formación que se está impartiendo [5]. El lugar ha de estar libre de una excesiva ornamentación que genere distracción en los trabajadores. Se ha de procurar que la sala esté libre de olores, bien iluminada (300-500 lux) y las paredes con colores suaves (cremas o blanco).

La entrada al aula o sala donde se lleve a cabo la formación, ha de estar señalado que, durante el momento en que se realiza dicha formación, no se puede entrar y molestar.

El tema de formación y el desarrollo de la acción formativa

El tema objeto de la formación debe estar dirigido a aquellos aspectos que inciden en la seguridad del trabajador, en su empresa. Por ello, debe buscarse, en la Evaluación de Riesgos, cuales son los temas a tratar. Cada punto recogido en dicha Evaluación debe ser tratado como un tema diferente, a fin de no mezclar temas y confundir a los trabajadores. Si el tema no se ajustara a los tiempos, anteriormente indicados, debe de fraccionarse el tema.

El desarrollo de la acción formativa depende en gran medida del formador. Éste ha de ser un buen conocedor del tema a tratar en dicha formación, pues cualquier desliz que muestre una falta de conocimiento sobre el tema puede desautorizarlo para hablar, como persona entendida, del tema a tratar. También puede desacreditarlo para acciones formativas futuras.

El formador no ha de emplear afirmaciones absolutas y rotundas sobre la forma de hacer el trabajo, más bien debe de emplear frases que inviten a pensar que hay formas diferentes de hacer las cosas, ya que hay formas mejores que otras y hay formas peores que otras, para hacer las cosas. En estos casos se debe de invitar a que los trabajadores que participan en la acción formativa presenten sus propios puntos de vista, que han de ser escuchados con atención y respeto.

El mensaje que debe enviar el formador ha de ser claro y directo, apoyándose en frases sencillas y con un vocabulario sencillo. La inclusión de anécdotas que ilustren el tema a tratar siempre es positivo siempre que no se abuse de ellas y cuando no falten al respeto de las personas presentes en el aula.

La formación debe iniciarse planteando el tema y los objetivos de la formación. Debe continuarse con una introducción sencilla y el mensaje más importante junto con los motivos que lo generan debe de ocupar la primera mitad del tiempo de formación [7-8]. La segunda mitad debe de ilustrarse con acciones que deben hacerse y no hacerse, a modo de ejemplo. Posteriormente debe de abrirse un diálogo entre

comunicador y alumno; pero debe de finalizarse siempre con un apartado de conclusiones, en donde se debe volver enviar el mensaje principal con una o dos frases cortas y apoyarlo en ejemplos.

3. EL FORMADOR Y LA EMPRESA

Los pilares, además de lo indicado en el epígrafe 2.0, para el éxito de la actividad formativa son dos: el formador y la empresa.

- El formador, si es trabajador de la empresa, ha de ser una persona cuyas palabras vayan acompañadas con su ejemplo diario en materia de seguridad. Ha de ser respetuoso tanto con las personas, como con las normas de seguridad.
- La empresa, a través de su Dirección, ha de estar comprometida con la seguridad y fomentar el cumplimiento de las normas y la legislación vigente en materia de prevención de os riesgos laborales.

El ejemplo, por parte del docente y de la Dirección de la empresa, es la base sobre la que se impartirá esta formación, y en la que esté cimentada las buenas prácticas de seguridad laboral.

El formador ha de llevar siempre preparado el temario a impartir durante la formación. Su lenguaje ha de ser, como ya se dijo sencillo y directo. El timbre de la voz no ha de ser monótono y puede acompañarlo de gestos no exagerados [9, 10]. Pero una cualidad que se le ha de exigir al formador es que debe saber liderar la actividad formativa.

4. APLICACIÓN DEL MODELO Y RESULTADOS.

Lo indicado en el epígrafe 2.0 se ha implantado en un departamento de fabricación en una empresa del sector químico, en donde los trabajadores no habían recibido formación alguna en materia de seguridad laboral y con objeto de prevenir los riesgos existentes en el trabajo.

Con la colaboración de la persona que dirigía el departamento, y su participación en la formación, se planteó el objetivo de generar una cultura preventiva en los trabajadores del departamento, que hiciera necesario que ellos mismos, en su trabajo, y teniendo en cuenta las nociones recibidas, pudieran aplicarlas a cada actividad diaria y, con ello, reducir la accidentalidad en el departamento.

Durante un periodo de 35 semanas, cada trabajador, en su turno, recibió una formación relacionada con aspectos presentes en sus operaciones de trabajo. Se impartió temas tales como: uso de equipos de protección respiratoria, uso de guantes de protección química, utilización de arnés para trabajos en altura, productos químicos irritantes, productos químicos corrosivos, productos químicos tóxicos, manipulación de cargas, orden, limpieza, etc. Cada actividad formativa no superaba los 30-35 minutos, en grupos reducidos; y siempre entre la 2ª y la 6ª hora del turno de

trabajo. Se impartía la formación en una sala en la que no se permitía el acceso a otras personas durante la actividad formativa y se impuso la norma de que el trabajador podría interrumpir, en cualquier momento, la formación para preguntar o hacer alguna consideración sobre el tema.

Los resultados surgieron ya en la semana 30, a partir de la cual la accidentalidad del departamento se mantuvo siempre sin accidentes (sin baja y con baja) durante 4 años. Sólo se alteró con un accidente, con baja, al 5º año que sufrió un trabajador que había sido incorporado al departamento durante el año anterior al accidente. Hay que indicar que durante los años siguientes se mantuvo una actividad formativa mensual que seguía la estructura presentada en el epígrafe 2.0.

5. CONCLUSIONES

La formación es una herramienta poderosa para reducir la accidentalidad laboral. Esta formación debe ser planificada y llevada a cabo siguiendo unos criterios basados en la realidad diaria a la que los trabajadores se encuentran en su empresa, a su trabajo, al medio físico en el que lo realizan y con los medios que lo realizan. La formación debe de estar apoyada por el respeto de la Dirección de la Empresa al cumplimiento de la legislación vigente en materia de seguridad, para reforzar la acción del docente y de la acción formativa. Impartir una formación en base a lo que debería ser, pero que no es, solo lleva al fracaso de la acción formativa y de las futuras acciones formativas.

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EL PAPEL DE LAS HERRAMIENTAS TECNOLÓGICAS COMO SOPORTE DEL TRABAJO COLABORATIVO EN ENTORNOS EN LÍNEA

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Resumen.

Uno de los aspectos sustantivos que caracterizan al trabajo colaborativo en ambientes virtuales es la utilización de herramientas tecnológicas (tanto de carácter asincrónico como sincrónico). Éstas permiten la generación y desarrollo de espacios de interacción social entre los participantes de la acción formativa, contribuyendo de este modo a facilitar entornos de aprendizaje activos en los que el alumnado puede, entre otros aspectos, intercambiar información, trabajar conjuntamente para la resolución de problemas, compartir conocimientos, debatir ideas, etc.

Partiendo de esta base, en la presente comunicación se analizarán las principales soluciones tecnológicas existentes en el campo del CSCL (Computer Supported Collaborative Learning), para a continuación presentar los resultados obtenidos en un estudio cuantitativo ex post facto de carácter no experimental basado en el método de encuesta.

En la investigación, implementada en el curso 2012-13, participaron 106 estudiantes de cinco asignaturas pertenecientes a los grados de maestro/a de Educación Primaria e Infantil del Centro Superior de Estudios La Salle (Madrid) y que desarrollaron sus materias bajo una metodología basada en CSCL. En concreto, en este trabajo se plasman las percepciones y opiniones de los estudiantes en relación a aspectos como el uso, la idoneidad y suficiencia de las herramientas tecnológicas empleadas como soporte del trabajo colaborativo.

Los resultados obtenidos han permitido identificar las principales fortalezas y debilidades de las tecnologías empleadas en el campus virtual para, de esta forma, poder mejorar el diseño instruccional de las asignaturas que utilizan el trabajo colaborativo como método de aprendizaje.

Igualmente, el alumnado ha manifestado que sus procesos de comunicación grupal mejorarían con la incorporación de herramientas propias del ámbito 2.0 y de aplicaciones sincrónicas basadas en tecnología móvil, lo que nos lleva a pensar en la necesidad de integrar pedagógicamente webtools que contribuyan a la ubicuidad e instantaneidad comunicativa en el marco de procesos de aprendizaje colaborativo.

1. USO COLABORATIVO DE LA TECNOLOGÍA Y TECNOLOGÍA COLABORATIVA

Existen autores [1] que presentan una distinción en cuanto al uso colaborativo de la tecnología y a la tecnología colaborativa. El uso colaborativo de la tecnología se refiere a cualquier tecnología que pueda soportar los aspectos básicos relacionados con el aprendizaje colaborativo y que estos autores identifican con: comunicación, colaboración y coordinación. Por otro lado, la tecnología colaborativa se refiere a herramientas diseñadas y destinadas para la colaboración.

Otros expertos [2], destacan la importancia de seleccionar las tecnologías que soportan el aprendizaje colaborativo, dado que el entorno condiciona la motivación del estudiante y su implicación en el aprendizaje. En esta misma línea [3] señalan que uno de los principales intereses y desafíos en la investigación relacionada con las tecnologías en el CSCL se relaciona con identificar las estrategias computacionales que influyen de forma positiva el aprendizaje en los grupos. [2] se refieren al Informe Horizon 2010 que clasifica en tres categorías las tecnologías que pueden utilizarse en el CSCL:

- calendarización y planificación del trabajo grupal
- organización compartida de contenidos
- comunicación grupal asíncrona o síncrona

[4] aboga por seguir unos principios que guíen las decisiones tecnológicas:

- Su uso debe ser sencillo y eficiente.
- Debería permitir la reutilización de materiales, estructuras y contenidos.
- Debería permitir la gestión sencilla de personas, grupos-cursos y roles, y su posterior reutilización.
- Debería ayudar a organizar los materiales e informaciones.
- Debería facilitar la evaluación del alumnado.
- Debería permitir la generación de productos concretos en colaboración.
- Debería facilitar la evaluación del proceso.
- Debería favorecer los procesos de tutoría y la comunicación eficaz con otros.
- Debería ayudar y fomentar la toma de decisiones.
- Es altamente recomendable que sea “open source”.
- Debería ser estable.
- Debería mostrar una secuencia clara de fases, etapas y tareas.
- No Debería constreñir el proceso educativo.

- Es recomendable la integración de herramientas en una única plataforma.

2. COLLABORATIVE TECHNOLOGY

En cuanto a las herramientas diseñadas y destinadas para el CSCL, [3] señalan que existen 3 tipos de herramientas que facilitan el proceso de aprendizaje del alumno, determinan cómo estructurar el entorno de colaboración y regulan la interacción en el proceso:

1 Herramientas retrato (*mirroring tools*) recogen datos y los devuelven al usuario-alumno o docente. El usuario toma las decisiones en base a este retrato proporcionado por la herramienta.

2 Herramientas meta-cognitivas. Proporcionan a los usuarios las referencias necesarias para el diagnóstico y facilitan que ellos mismos tomen las decisiones.

3 Herramientas Guía. Desarrollan todas las fases en el proceso de gestión de la colaboración y proporcionan instrucciones para remediar las dificultades encontradas, es el propio sistema el que modera la interacción en el grupo.

[5] argumentan que los entornos de CSCL habitualmente proporcionan herramientas de visualización y argumentación en la resolución colaborativa de problemas. Las herramientas de visualización facilitan que los grupos construyan representaciones en colaboración, en forma de mapas conceptuales, diagramas y texto. De este modo los alumnos pueden visualizar la información y analizarla. Por otro lado, las herramientas de argumentación facilitan la estructuración de las interacciones y su representación, orientando a los usuarios hacia la coherencia del discurso y centrándolo en los temas de relevancia. Esta estructuración se centra en guiar a los alumnos a través de categorías del tipo actos de comunicación (*speech acts*), inicios de frases (*sentence openers*), posibilidad de incluir notas o de hacer comentarios y representando las múltiples opiniones recogidas de forma que faciliten el contraste de las mismas y el desarrollo del criterio propio.

[6] aborda las herramientas de visualización y argumentación, resaltando que en ambos casos los modelos han sido diseñados de modo que el profesor ocupe un lugar central en el proceso de colaboración, guiando las interacciones con la ayuda de las herramientas. Introduce la siguiente clasificación en base a un análisis de las herramientas:

- Herramientas de argumentación: CLARE, Negotiation Tool, Academic Talk, FL3 y Knowledge Forum.
- Herramientas de visualización: Covis, Learning through collaborative visualization, Belvedere.

En relación con las herramientas de argumentación, [7] han identificado dos tipos, por un lado la argumentación de estructuras a través de herramientas de representación del conocimiento y por otro la argumentación del proceso a través de herramientas basadas en la discusión/diálogo. En el primer caso las herramientas facilitan la construcción de argumentaciones de modo que tanto la estructura como el contenido correspondan con un argumento válido y proporcionen una guía de las representaciones que inician la negociación de significados. En el segundo caso se proporcionan representaciones gráficas de las argumentaciones de los participantes en las discusiones y se fomentan nuevos entornos de discusión y nuevas formas de negociar y co-construir significados.

Algunos ejemplos de herramientas de argumentación identificadas por [7] son:

1 Argumentación de estructuras: SenseMaker y Belvedere

2 Argumentación de la discusión/diálogo: El entorno CSILE

[8] describen varias de las herramientas diseñadas para apoyar el CSCL, tales como Knowledge Forum , BSCL (Basic Support for Cooperative Learning) , Future Learning Environment (FLE3) y Belvedere.

3. COLLABORATIVE USE OF TECHNOLOGY

En relación con las tecnologías que pueden soportar los aspectos básicos relacionados con el aprendizaje colaborativo, [2] señalan que el correo electrónico y los dispositivos móviles son medios accesibles mientras que los foros o grupos de discusión facilitan la interacción. Relacionan herramientas síncronas como el chat o videoconferencias para favorecer las relaciones espontáneas y para tomar decisiones. Estas autoras recomiendan los blogs, wikis o Google Docs para acceder a contenidos compartidos; en todo caso cabe resaltar que estas herramientas incorporan además espacios para la comunicación así como herramientas para generar contenidos en colaboración. La Universitat Oberta de Catalunya, pionera en el uso de CSCL utiliza las Wikis principalmente como herramienta para que colaboren los grupos.

Otras herramientas que facilitan la generación compartida son: C-Map Tools y Mind-Maps, para crear mapas conceptuales; Trello, en relación con la gestión de proyectos y con aplicaciones Android e IOS; los Blogs, que aunque en formato Bitácora, también se pueden tratar como herramientas de grupo o para la interacción; y las Redes Sociales. Los mundos virtuales como Virtual World, Second Life o Whyville también facilitan el contacto del grupo a través de avatares generados en el sistema, y es posible asignar espacios de trabajo y moderarlos de forma asíncrona y síncrona. De hecho, parece que la mayoría de las herramientas que se desarrollan casi a diario para compartirse en la Web están enfocadas a poner en contacto a las personas.

4. METODOLOGÍA Y RESULTADOS

Se llevó a cabo una investigación con una metodología cuantitativa de carácter no experimental de tipo encuesta en la que participaron 106 estudiantes de grado de magisterio en Infantil y Primaria, agrupados en cinco asignaturas que implementaron CSCL en el Centro Superior de Estudios La Salle.

La encuesta elaborada estaba formada por un total de 139 ítems que seguían una escala Likert de 5 puntos. No obstante, en la presente comunicación nos centraremos en analizar aquellos ítems específicamente relacionados con la percepción de los estudiantes en relación a aspectos como el uso, la idoneidad y suficiencia de las herramientas tecnológicas empleadas como soporte del trabajo colaborativo.

Tal y como se puede observar en la tabla 1, los resultados obtenidos constatan que el alumnado considera que las herramientas del campus virtual han facilitado en un nivel alto (4056%) y muy alto (31,13) la posibilidad de desarrollar acciones de trabajo colaborativo (ítem 1).

Igualmente, los estudiantes consideran que el espacio de debate del equipo ha permitido el intercambio fluido de información (ítem 2). En concreto, un 57,54% de las respuestas se distribuyen entre las categorías “alto” y “muy alto”.

	Ítem 1	Ítem 2	Ítem 3	Ítem 4	Ítem 5	Ítem 6	Ítem 7	Ítem 8	Ítem 9
n									
NS/NC	2	3	3	1	3	3	3	5	3
%									
NS/NC	1,887	2,830	2,830	0,943	2,830	2,830	2,830	4,717	2,830
n									
Muy	4	4	11	1	0	14	22	7	3

	Ítem 1	Ítem 2	Ítem 3	Ítem 4	Ítem 5	Ítem 6	Ítem 7	Ítem 8	Ítem 9
Bajo									
% Muy bajo	3,774	3,774	10,377	0,943	0,000	13,208	20,755	6,604	2,830
n Bajo	6	4	6	2	0	7	14	11	1
% Bajo	5,660	3,774	5,660	1,887	0,000	6,604	13,208	10,377	0,943
n Medio	18	19	21	14	0	23	20	24	8
% Medio	16,981	17,925	19,811	13,208	0,000	21,698	18,868	22,642	7,547
n Alto	43	42	32	47	22	28	22	36	25
% Alto	40,566	39,623	30,189	44,340	20,755	26,415	20,755	33,962	23,585
n Muy Alto	33	34	33	41	81	31	25	23	66
% Muy Alto	31,132	32,075	31,132	38,679	76,415	29,245	23,585	21,698	62,264
Ítem 1. Las herramientas del campus virtual han facilitado la colaboración.									
Ítem 2. El espacio de debate del equipo ha permitido el intercambio fluido de información.									
Ítem 3. El espacio de debate del equipo ha permitido establecer vínculos personales.									
Ítem 4. Considero importante aprender a colaborar mediante herramientas virtuales.									
Ítem 5. Además del espacio de debate del equipo, hemos utilizado otros medios para comunicarnos.									
Ítem 6. El chat se ha utilizado como medio para coordinarse y tomar decisiones.									
Ítem 7. El chat ha permitido establecer vínculos personales.									
Ítem 8. Considero suficientes las herramientas que se nos proporciona en el campus virtual para el desarrollo de las tareas colaborativas.									
Ítem 9. Los procesos de comunicación con mi equipo de trabajo podrían mejorar si se pudiesen utilizar otras herramientas TIC (whatsapp, wikis, redes sociales, blogs, audio-blogs, etc.)									

Tabla 1. Frecuencias y porcentajes de los ítems relacionados con las herramientas TIC utilizadas como soporte del trabajo colaborativo.

En lo que se refiere a si el espacio de debate del equipo ha permitido establecer vínculos personales (ítem 3), la inmensa mayoría de los estudiantes están de acuerdo con esta afirmación.

Respecto al ítem 4 (“Considero importante aprender a colaborar mediante herramientas virtuales”), un 44,34% lo considera importante y un 38,67% muy importante.

El cuanto al ítem 5 que dice: “además del espacio de debate del equipo, hemos utilizado otros medios para comunicarnos”, un abrumador 76,41% han utilizado con gran regularidad otras herramientas aparte de las facilitadas por el campus virtual.

Por otra parte, a nivel de distribución, existen porcentajes muy similares en torno al grado de uso del chat como herramienta para la coordinación y toma de decisiones. Así, tal y como se refleja en la tabla 1, nos encontramos con un 21,69% de estudiantes que otorgan un nivel de uso “medio” al chat, un 26,41% con un nivel de utilización “alto” y un 29,24% “muy alto”.

Respecto al ítem 7 (el chat ha permitido establecer vínculos personales), las respuestas del alumnado se distribuyen con porcentajes bastante equilibrados entre las diversas categorías, lo que nos indica la variabilidad en la distribución de respuestas de los estudiantes.

Respecto a si los alumnos consideran suficientes las herramientas que se proporciona en el campus virtual para el desarrollo de las tareas colaborativas, la mayoría del alumnado considera que éstas son suficientes. No obstante, hay un 39,62% de sujetos cuyas respuestas se concentran entre las categorías de “muy bajo” “bajo” y “medio”.

Finalmente, en respuesta a la pregunta del ítem 9 en la que se indica si “los procesos de comunicación con mi equipo de trabajo podrían mejorar si se pudiesen utilizar otras herramientas TIC (whatsapp, wikis, redes sociales, blogs, audio-blogs, etc.)”, el alumnado distribuye sus respuestas como altas (23,58%) y muy altas en relación con esta afirmación (62,26%).

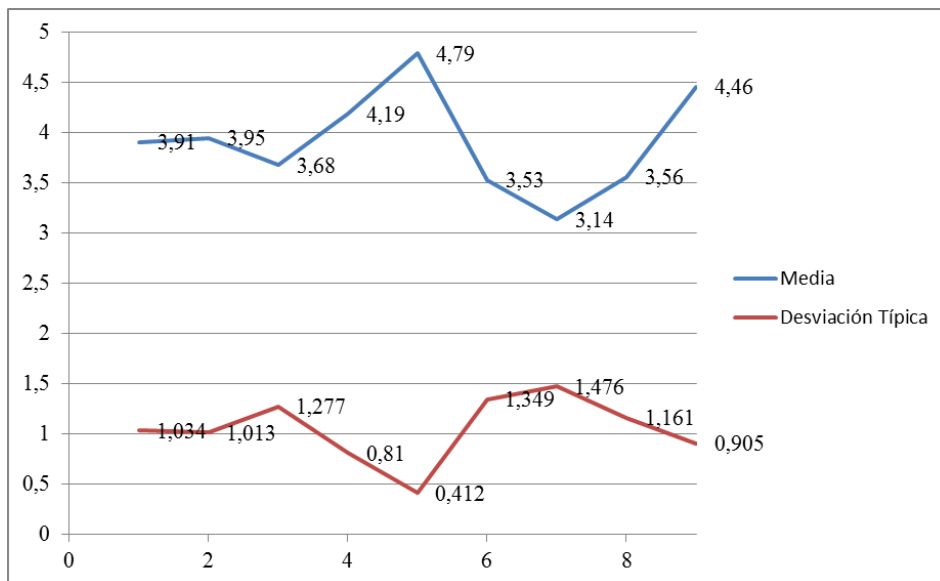


Gráfico 1. Medias y desviaciones típicas de los ítems analizados

En el gráfico 1 se recopilan las medias y desviaciones típicas de los ítems redactados en la tabla 1. Como se puede apreciar en dicho gráfico son los ítems 5 (Además del espacio de debate del equipo, hemos utilizado otros medios para comunicarnos) y el ítem 9 (Los procesos de comunicación con mi equipo de trabajo podrían mejorar si se pudiesen utilizar otras herramientas TIC (whatsapp, wikis, redes sociales, blogs, audio-blogs, etc.) los que obtienen unas puntuaciones medias más altas (4,79 y 4,46, respectivamente); mientras que el ítem 7 (El chat ha permitido establecer vínculos personales) es el que ha alcanzado una puntuación media más baja (3,14). Igualmente es éste el ítem que ha alcanzado una mayor desviación típica (1,476), seguido del ítem 6 con 1,349 (El chat se ha utilizado como medio para coordinarse y tomar decisiones).

5. CONCLUSIONES

Los resultados evidencian que los alumnos valoran la utilidad de las herramientas proporcionadas en el campus virtual; los foros y los chats destinados al intercambio grupal, para desarrollar las tareas de trabajo colaborativo y consideran que les han ayudado a generar vínculos personales, desarrollando así la Dimensión social relacionada con el CSCL.

A pesar de ello, los alumnos parecen reclamar otro tipo de herramientas no presentes en el campus, señalando que con frecuencia han utilizado otras herramientas y valorando como mejora la incorporación de otro tipo de herramientas como WhatsApp, wikis, redes sociales, blogs o audio-blogs.

Tanto esta demanda, como el hecho de que valoren de forma muy positiva el hecho de aprender a colaborar mediante herramientas virtuales son aspectos que merecen ser explorados en el futuro, cara a analizar qué tipo de herramientas serían las que los alumnos preferiría utilizar y entre ellas seleccionar las más adecuadas para desarrollar el CSCL partiendo de una planificación que contemple los elementos pedagógicos, organizativos y tecnológicos de forma integrada.

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VALORACIONES CRUZADAS ENTRE COMPAÑEROS

G. RIUS-SOROLLA, A. JUAREZ, J.M. ALBARRACÍN y M. PALMER

Resumen.

El trabajo expone la experiencia de una actividad de formación, motivación y evaluación, de una competencia genérica como es la comunicación en público. Realizada mediante la valoración cruzada online, entre los alumnos, con los criterios previamente establecidos de una rúbrica.

Los ponentes fueron valorados por sus propios compañeros, de forma anónima, con interesantes comentarios y puntualizaciones. Con el ejercicio, los alumnos pudieron repasar los criterios de medición de una defensa oral, reflejados en la rúbrica, unas 15 veces, con cada presentación de un nuevo compañero. Además, pudieron recibir, de forma anónima, las valoraciones subjetivas de todos sus compañeros sobre su exposición. Las sesiones se realizaron durante las presentaciones de los distintos trabajos dentro de la asignatura Diseño, Planificación y Gestión Sistemas Producción de Ingeniería de Organización Industrial de la UPV.

1. INTRODUCCIÓN

Cada vez son más valoradas las competencias genéricas, tanto en la formación escolar, como en la universitaria y al mismo tiempo en el mercado profesional. (Dochy et al., 1999; Rodríguez Esteban, 2007). Dada su importancia, en los próximos meses, se pondrá en marcha un currículo personal de competencias genéricas para los futuros estudiantes de la UPV, con lo que los titulados dispondrán tanto de un currículo de sus asignaturas, como otro de la valoración de sus competencias genéricas.

Una forma de desarrollar estas competencias y al mismo tiempo aumentar el rendimiento académico, en competencias específicas, es mediante la autoevaluación y la evaluación por iguales, verificado en diversos estudios (Gibbs y Simpson, 2004). Los distintos sistemas de evaluación, que implantemos, tendrán una incidencia directa en el aprendizaje global de los alumnos, con más importancia, incluso, que la propia técnica de enseñanza (Gibbs, 2009; Sambell y McDowell, 1998; Snyder, 1971).

El concepto introducido en la evaluación orientada al aprendizaje (Carless, 2007), insiste en valorar la evaluación como una herramienta más y no una meta, que nos permite incidir en mejorar el aprendizaje en nuestros alumnos.

La capacidad de evaluar el trabajo de sus compañeros, como al mismo tiempo su propio trabajo, les proporciona habilidades que les serán útiles en su futuro profe-

sional, sobre todo, cuando en su área de trabajo se valore y fomente el trabajo en equipo (Marín-García, 2009).

Por otro lado, es de destacar, que la competencia “comunicación” está recogida en la mayoría de las universidades del mundo como una de las competencias genéricas básicas que deben tener sus titulados.(Universidad Peruana Cayetana Heredia, 2011).

La evaluación entre iguales, en la enseñanza universitaria, ha sido estudiada en diferentes países, materias y contextos (Sáiz et al., 2012) y no deja de ser una forma específica de aprendizaje colaborativo. Con toda esta información, hemos diseñado nuestra actividad docente buscando el desarrollo del aprendizaje genérico y específico de la asignatura, pero manteniendo los sistemas habituales de valoración. Con el objetivo final, de mejorar los resultados académicos de los alumnos.(Prins et al., 2005)

Para la exposición y elaboración de la metodología de la actividad, se han seguido las pautas recomendadas por el ICE, Instituto de Ciencias de la Educación UPV(Instituto de Ciencias de la Educación, 2006) para la descripción de una actividad docente, tal y como se describe el siguiente apartado. Posteriormente se presentan los resultados y finalmente las conclusiones posteriores a la realización de la actividad.

2. DESCRIPCIÓN DE LA ACTIVIDAD DOCENTE

La actividad docente pertenece a la asignatura “Diseño, Planificación y Gestión Sistemas Producción” asignatura troncal de segundo del segundo ciclo de la titulación de Ingeniería de Organización Industrial de la UPV. La asignatura es anual con una asignación de 5.5 créditos. Está organizada con sesiones magistrales, solución de problemas conjuntos y sesiones de laboratorio. La experiencia que presentamos en este trabajo, ha sido realizada en las sesiones de laboratorio, donde se combinaban actividades de investigación, con actividades de presentación orales de los trabajos realizados por los distintos equipos. Los equipos están constituidos con un máximo 3 alumnos.

La asignatura es evaluada en un 40% con de los trabajos realizados en las prácticas de laboratorio y el 60% restante con los exámenes trimestrales. Los exámenes de evaluación se estructuran en los apartados de teoría, cuestiones prácticas y solución de problemas.

Tema

El tema de la sesión de laboratorio era el de modelar un sistema de MRP (Material Requirements Planning) para la fabricación de unos productos según una demanda planificada, procedente de sesiones previas. En las sesiones previas, habíamos tra-

bajado el análisis de la previsión a partir de datos históricos, y la optimización de la planificación agregada mediante métodos cuantitativos. Para la realización de la práctica, los alumnos disponen de un programa desarrollado por CIGIP [Centro de Investigación en Gestión e Ingeniería de Producción de la UPV, www.cigip.org/]. Dicho programa tiene todos los elementos esenciales, como cualquier programa comercial de gestión del MRP, estructura de producto, calendario, inventario, lanzamiento y control de órdenes de producción/compras, cálculo de costes de inventario y lanzamiento. Además, el programa tiene desarrollado un módulo de análisis de algoritmos de agrupación de órdenes de producción, con el objetivo de optimizar los costes globales.

Momento y número de alumnos

El curso cuenta con 38 alumnos, las prácticas de laboratorio se realizaron en dos grupos, uno por la mañana y otro por la tarde. Las sesiones fueron los días 19/11 y 17/12/2013.

Técnica de actividad docente

La primera sesión fue el lanzamiento de una gestión de MRP, con datos de prueba, en el aula informática, por cada alumno, con la dirección del profesor y las guías preparadas para asistir al alumno en la gestión del programa de cálculo del MRP. En la segunda sesión, se realizó la presentación oral del lanzamiento del MRP, a partir de los datos desarrollados por cada grupo. Los datos de cada grupo fueron obtenidos de empresas reales y analizados en las distintas prácticas previas. Los alumnos disponen del software desarrollado “MRPCIGIP”, para instalárselo en sus ordenadores personales, y poder preparar las presentaciones de sus distintos trabajos.

3. OBJETIVOS

Las sesiones tienen una variedad de objetivos, todos ellos enmarcados en el fin de desarrollar las competencias tanto genéricas como específicas de la asignatura. Estos siguen la adaptación de las titulaciones al Espacio Europeo de Educación Superior (Amer-Boixareu et al., 2012).

La asignatura pretende ofrecer al alumno una visión general del sistema productivo en relación con las demás áreas funcionales de la empresa (Sistema de Planificación y Control de Operaciones). En estas sesiones, se pretende conocer la metodología de Planificación de Requerimiento de Materiales, en el contexto de lo que se considera demanda dependiente. Por otro lado, desarrollar su capacidades de comunicación tanto oral (presentación de resultados a los compañeros) como escrita (informe de la práctica). Además, en estas sesiones, se buscó desarrollar las capacidades de evaluación de sus compañeros, a partir de criterios previamente establecidos.

Desarrollo

En la primera sesión, cada alumno, con un ordenador del aula informática, fue trabajando las distintas opciones del programa, de la ayuda de la guía y los datos preparados para el caso. En las sesiones previas magistrales, se habían analizado los conceptos gestionados por la Planificación de Requerimiento de Materiales. También se habían realizado ejercicios de cálculo de órdenes de fabricación siguiendo los pasos de un MRP.

En la segunda sesión, los alumnos debían presentar sus distintos trabajos, tanto por escrito, como en defensa pública. Los trabajos eran en grupos de un máximo de tres alumnos. Donde, debían crear un sistema de MRP con una estructura producto y unos requerimientos del mercado. Para el correcto desarrollo de sus presentaciones, se les había facilitado una rúbrica de “valoración de presentaciones orales”(Marín-García, 2009) con detalles de cada nivel de valoración. En las clases previas se les había comentado los criterios de dicha rúbrica, “Toma en cuenta a la audiencia”, “Mirada”, “Control de los nervios”, “Movimiento”, “Volu-

men/velocidad(voz)”, “Expresión de la voz”, “Transmisión del mensaje”, “Texto ayudas visuales legibles”, “Texto ayudas visuales esquematizadas”, “Ayudas visuales”, “Control del tiempo”. También se revisó conjuntamente los niveles o puntos (0-3) que determina dicha rúbrica. Todo ello con el objetivo, de que pudieran autoevaluar sus propias presentaciones.

Encuesta MRP GRUPO 1

Valoración de la presentación de la práctica MRP

*Obligatorio

PONENTE ESTHER *

	0	1	2	3
Toma en cuenta a la audiencia	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mirada	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Control de los nervios	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Movimiento	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Volumen / Velocidad (voz)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Expresión en la voz	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Transmisión de mensaje	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
TEXTO Ayudas Visuales legibles	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
TEXTO Ayudas Visuales esquematizadas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
AYUDAS VISUALES(dibujos y uso del color)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Control del tiempo	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Comentarios o recomendaciones (ponente Esther):

Figura 1. Evaluación online.

https://docs.google.com/forms/d/1HDA8YGXe_EtIIIe_gyKS7Nn6x92QWu0XgInnckg8whCM/viewform

En la segunda sesión, al inicio, se les informó que debían evaluar las exposiciones de sus compañeros, mediante la rúbrica que les habíamos facilitado en las sesiones previas. Para realizar la evaluación, contaban con un cuestionario online para cada ponente y grupo.(Fig1). Se les comentó, que dicha evaluación sería anónima(Dochy et al., 1999) y que no formaría parte de la nota de las presentaciones de sus compañeros. Además, el hecho que recibirían de forma personalizada, las valoraciones de sus compañeros al finalizar las sesiones.

El cuestionario añadía además, un apartado de “Comentarios o recomendaciones”, para que cada evaluador/alumno pudiera sugerir a sus compañeros ciertas aclaraciones que considerase relevantes.

Se insistió en la sesión, que la información que ellos reflejasen en sus valoraciones era totalmente anónima, y por tanto, se les apeló a su responsabilidad de ser críticos constructivos, que realizasen una evaluación enfocada al aprendizaje. Recordando, que todos iban a ser evaluados por sus distintos compañeros, y que el resultado de sus evaluaciones, solo las recibiría el evaluado, con el único fin, de poder conocer cómo era visto por sus iguales.

La aplicación de las encuestas, permite al creador de la encuesta, controlar el número de respuestas recibidas, en tiempo real. Por lo que, les recordábamos si había alguna pendiente por realizar, antes de pasar al siguiente grupo. Las encuestas de cada grupo se habrían antes de cada presentación (informando a todos de la dirección web donde debía ir) y cerrando la encuesta al recibir la totalidad de las evaluaciones posibles.

Evaluación

Para la evaluación, partíamos de los criterios definidos en la asignatura. Dichos criterios son públicos en la descripción de la asignatura, y presentados en la primera sesión del curso “Interés, aplicabilidad y dificultad del problema”, “Modelado, resolución y análisis de resultados” y “Presentación sobre papel y exposición pública” para todas las prácticas de laboratorio.

Al finalizar la sesión, la evaluación realizada por el profesor, se expone públicamente desglosada con los tres criterios. La nota final es la suma ponderada de los criterios. Los criterios tienen un peso relativo de 20%, 50%, 30% respectivamente.

Las prácticas tienen un peso en la nota final del 40% y el otro 60% son los exámenes. Se realizan un total de 6 prácticas durante todo el curso de la asignatura.

Tiempos

Las sesiones son de 2 horas, en dos grupos de aproximadamente 19 alumnos. Las presentaciones de los alumnos son de 10 minutos, posteriormente se reserva 5 minutos para comentar incidencias o hechos resaltados. En esta sesión, después de las

presentaciones, se utilizaron otros 5-10 minutos para permitir a los alumnos finalizar sus encuestas online.

La sesión exige un trabajo previo individual y en grupo de 2 a 3 horas para la realización del modelado, el informe y los soportes para la defensa del trabajo en público.

Material

Para la sesión fue necesario, el programa de MRP, ordenadores para cada alumno y proyector para los trabajos.

Observaciones

Los alumnos suelen estar poco motivados por aquellas actividades que no van directamente relacionadas con su evaluación. Pero en la medida en que insistíamos, que iban a recibir información de todos sus compañeros, mostraron mayor implicación. Las actividades han permitido que cada alumno revisara los criterios de evaluación de una presentación oral, más de 15 veces, entre las explicaciones conjuntas y la evaluación a cada compañero. El programa de encuestas permite ver los comentarios que van enviando, en tiempo real los alumnos, por lo que se les podía recordar la importancia de la evaluación constructiva, etc.

Recomendaciones

Recodar a los alumnos que las valoraciones de las competencias genéricas de sus compañeros suelen ser más críticas o por debajo que las habituales de un profesor (Rodríguez et al., 2011). La actividad les permitía identificar mejor sus fortalezas y debilidades. Y poder tomar conciencia del proceso de evaluación, dado que será habitual en su vida profesional tener que evaluar a sus compañeros y sus subordinados. También, fue necesario, actuar sobre las reticencias habituales de participar, en actividades que impliquen la evaluación entre iguales o los miedos a recibir una retroalimentación. (Sáiz et al., 2012)

4. RESULTADOS

Los resultados obtenidos de la sesión han sido muy fructíferos, los alumnos interiorizaron los criterios de una presentación en público. Donde se pudo identificar en las exposiciones, una gran mejora, en la planificación de sus presentaciones. Se pudo ver como intentaban asegurarse la mirada del público, o buscar acciones que consiguiesen cautivar a los oyentes. Se consiguieron defensas públicas que completamente sedujeron al público, por su originalidad y exposición.

El hecho de tener que evaluar a sus compañeros, asegura que presten más atención a los otros trabajos, y mantengan el interés a los distintos aspectos de las presenta-

ciones, como se puede constatar en los comentarios adjuntos. El trabajo mejoró el interés por la asignatura y su desarrollo.

Por otro lado, ciertos alumnos presentaron ciertas reticencias iniciales a ser evaluados por sus compañeros. Pero, en la medida en que las evaluaciones solo las recibirían cada uno de ellos, aceptaron el reto. Además, fueron animados por sus propios compañeros en participar, dado que les permitiría conocer sus propias fortalezas y debilidades.

La valoración de los alumnos al ser totalmente anónimas, fueron muy críticas con sus iguales, se adjuntan algunos ejemplos:

” Bastante mejoría desde la última presentación, pero no has sabido desenvolverte con el léxico de tu práctica y te has trabado varias veces. Si no te sientes cómo improvisando, prepara la práctica y te saldrá muy bien.”

Otra para el mismo ponente *“presentación muy bien montada, pero la presentación un poco monótona, falta un poco de vidilla o cambios de tono en la voz. Pero buena presentación”*.

Otros comentarios de otro trabajo *” tenias malas transparencias, mucha letra y mucho royo de acuerdo, pero no nos has mirado casi y nos has enganchedo más bien nada : (“*

O el caso de cierto alumno que llegó tarde por tener una entrevista de trabajo *“una lástima no haber llegado a tiempo, como no nos habéis podido evaluar creo que no es justo que os evalué por lo que un 0 a todos los del grupo”*

Ciertas críticas constructivas *”Estas muy nervioso y nos das mucho la espalda cuando hablas”* o *”Muy buena presencia delante del público, pero realizas muy aburrida tu presentación debido a la velocidad y el tono de voz que utilizas. Dale mas viveza y expresividad.”* o *“entras demasiado en detalles y con ello haces un poco aburrida la presentación y pierdes parte de la atención de la gente.”*

Y felicitaciones a los buenos trabajos *“La presentación ha sido brutal, me habéis dado un gran idea. Gracias.”*

Por otro lado, se esperaba una correlación directa entre el entusiasmo logrado y las notas del examen del cuatrimestre, tal y como reflejaban estudios previos (Gibbs y Simpson, 2004), pero no ha sido tan fuerte como se puede apreciar en la gráfica. (fig 2). En la gráfica se podemos encontrar la media de las valoraciones sobre cada ponente por sus compañeros, de todos los criterios de la rúbrica, y la otra curva registra los resultados obtenidos por cada alumno, en su examen del cuatrimestre.

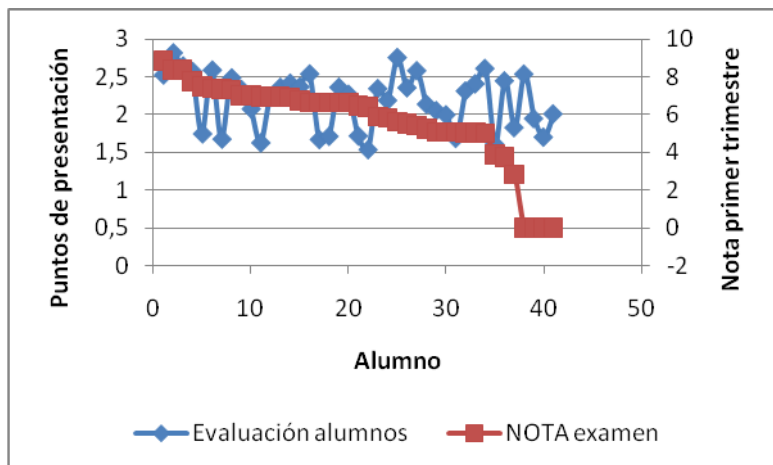


Figura 2. Media evaluación presentaciones y notas del primer cuatrimestre

5. CONCLUSIONES

El ejercicio de evaluar ha permitido que la competencia de comunicar sea aprendida por el mecanismo más desarrollado de la taxonomía de Bloom (Bloom, 1979), la evaluación. Los alumnos han repasado los criterios para realizar una buena presentación más de 15 veces, con la evaluación a iguales, asegurando la interiorización de los conceptos para una mejor aplicación para sus presentaciones.

Recibir la valoración de iguales, que suelen ser extremistas, puede generar cierto desasosiego a los participantes, por lo que es necesario recordarles que deben revisar las valoraciones de sus compañeros como una oportunidad de mejora.

En próximos estudios intentaremos profundizar la relación entre la mejora de las competencias genéricas y los resultados de evaluación de las competencias específica, con el fin de mejorar estas últimas. Otro punto, sería analizar la correlación entre la evaluación del profesor, con respecto a las evaluaciones de los alumnos, para incluir en futuras evaluaciones las valoraciones de los alumnos.

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IMPORTANCIA DE LA AUTOEVALUACIÓN.

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Resumen

La autoevaluación puede ser un potente instrumento para que el alumnado de enseñanza superior pueda tomar conciencia de sus avances y dificultades en el estudio de una materia. La reflexión que el alumnado debe hacerse después de la autoevaluación puede ser clave en su desarrollo competencial. La autoevaluación debe ser introducida de manera gradual en el curso, el alumnado debe habituarse a dicha actividad y considerarla como una herramienta más para su progreso.

Sabemos que defender la autoevaluación es una posición que, a veces, ha sido muy criticada. En este trabajo se presentará y valorará la actividad de autoevaluación más generalizada en nuestros centros, la que se realiza vía “campus virtual”. Se hará una mención especial a la evaluación realizada por los propios alumnos, a trabajos presentados por sus compañeros de clase, ensayada como la capacidad para valorar su propia labor como evaluadores dentro de la autoevaluación.

Palabras clave: e-evaluación, evaluación entre iguales, enseñanza superior.

IMPORTANCE OF SELF-EVALUATION.

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Abstract

Self-assessment can be a powerful tool for students in higher education. They need to control their progress and difficulties in the study of a subject. The students should be made to consider the results of the self-assessment because this could be an important key in the development of their skills. The self-assessment should be introduced gradually in the course; students should consider it as a tool for their educational progress. Activities such as e-evaluation and peer-assessment are performed via "virtual campus".

We know that defending self-assessment is a position which has sometimes been criticized. In this paper we present and evaluate the activity of self-assessment which is widespread in our centres. Students were asked to evaluate works submitted by their classmates, in order to enhance their ability to assess their own work as evaluators within the self-evaluation.

The student's opinion on the matter of self-assessment and peer-assessment deserves special attention. In our experience the feedback of the students is represented in two groups, positive and negative reactions.

Keywords: e-assessment, peer assessment, higher education.

1. INTRODUCCIÓN

Según el Diccionario de la Real Academia Española de la Lengua [1], autoevaluación es:

1. f. Evaluación que alguien hace de sí mismo o de algún aspecto o actividad propios.

A partir de esta definición se puede señalar que, en nuestro contexto, "autoevaluarse" es la capacidad que tiene el alumnado para considerar si consigue dominar el aprendizaje y todos los factores que intervienen en el estudio de una determinada materia o asignatura. Representa saber qué se ha hecho o qué no se ha hecho para alcanzar dicho dominio y qué se puede hacer para corregir los errores y mejorar o los resultados.

Como profesorado universitario y de ciclos formativos de grado superior nuestra posición es de defensa de este tipo de evaluación (autoevaluación) y por ello la impulsamos entre nuestro alumnado. Creemos que el trabajo que el alumnado de educación superior debe realizar para su autoevaluación le ayudará a conseguir las metas que se ha propuesto, entre ellas trabajar en el siglo XXI.

La autoevaluación debe ser introducida de manera gradual, debe ser enseñada y practicada para que el alumnado se pueda habituar a dicha actividad y pueda considerarla como una herramienta para su progreso. En caso contrario la verá como un impedimento para el avance en sus estudios, aspecto éste que el profesorado debería evitar y corregir.

Para que el alumnado pueda autoevaluarse de forma eficiente es necesario que los criterios de la autoevaluación estén bien definidos así como los resultados que se exigen para superar la prueba.

El resultado de estas autoevaluaciones no puede presentar ambigüedades, debe ser de “apto” o bien dejar claro que aún no se está preparado para seguir adelante con otros ejercicios más complicados.

Una vez terminada la autoevaluación el alumnado debe ser capaz de evaluar su propio resultado y, en cada caso, elaborar un plan junto al profesorado para mejorar las partes de la asignatura que aún no se han superado.

2. AUTOEVALUACIÓN Y TICS.

Según [2] *“La autoevaluación es la estrategia por excelencia para educar en la responsabilidad y para aprender a valorar, criticar y reflexionar sobre el proceso de enseñanza y aprendizaje individual.”* Sus beneficios se ponen de manifiesto ampliamente en la etapa de la Enseñanza Secundaria Obligatoria (ESO) ya que, además de ser una fuente de motivación, permite que el alumnado profundice en su progreso individual y desarrolle su capacidad de autonomía en el estudio. Al mismo tiempo, el profesorado puede utilizar esta estrategia para ocuparse de la diversidad en el aula y abordar los distintos ritmos de aprendizaje que pueden presentar los jóvenes en dicha etapa educativa.

En los últimos años y, en referencia a la educación superior, observamos un creciente impacto de las tecnologías de la información y comunicación (TIC) en el proceso de enseñanza-aprendizaje [3] que exige nuevos roles al profesorado o, si se quiere, aplicar nuevas metodologías educativas relacionadas con las TIC. Para ello, el profesorado utiliza las plataformas conocidas como “campus virtual”, dos ejemplos donde se usa el sistema Moodle acrónimo de *“Module Object-Oriented Dynamic Learning Environment”* se encuentran en [4, 5] y corresponden a las plataformas de trabajo de los autores.

Estos innovadores métodos permiten que el alumnado se implique en la valoración de sus propios avances. Pero llegados a este punto, la labor del profesorado es de vital importancia ya que deberá proporcionar e instalar los medios necesarios para facilitar el trabajo de su alumnado en el “campus virtual”, desde la simple incorporación de materiales y tareas hasta el diseño y confección de las e-autoevaluaciones. Además, para que el alumnado alcance sus objetivos de aprendizaje, la orientación

del tutor [6] es también primordial ya que la finalidad última será que el alumnado sea capaz de utilizar el aprendizaje autónomo a lo largo de su vida [7, 8].

Está demostrado [9] que la e-autoevaluación favorece la participación activa de los estudiantes y permite una “auto” reflexión sobre su grado de conocimiento y desarrollo de habilidades. Asimismo, se considera que esta implicación del alumnado va más allá y consigue que se involucre en el propio proceso de autoevaluación.

3. EVALUACIÓN INICIAL. CUESTIONARIO INICIAL Y MOTIVACIÓN.

El primer día de clase, después de las presentaciones de rigor, el alumnado debe enfrentarse a una prueba de los conocimientos, sobre la materia en cuestión, que deberían haber adquirido en los cursos o etapas precedentes.

Esta prueba, está diseñada para que tenga una duración de unos 10-15 minutos, consta de 8-10 preguntas, en algunas de ellas se debe marcar si la sentencia es cierta o falsa mientras que en el resto, preguntas con respuestas múltiples, se debe marcar aquella que sea la correcta.

Para facilitar la aceptación de la prueba por parte del alumnado, previamente, se les indica que lo único que se pretende es conocer el grado de conocimiento de la materia en el global de la clase y, para ello, la prueba no lleva el nombre del alumnado lo que permite unas respuestas más directas e imaginativas y se evita, en parte, que las respondan consultando a otros compañeros.

En la misma sesión el alumnado debe rellenar un cuestionario, con nombre y apellidos, sobre sus motivaciones para el estudio del grado y de la asignatura de química en particular, en relación a sus hábitos en clase, en casa, etc., algunos ejemplos de estas preguntas sobre la motivación del alumnado, que cada profesor puede ampliar o variar según su opinión, se exponen en la Tabla 1.

Tabla 1. Cuestionario de motivación sobre el estudio.		
Asignatura:	Curso:	Fecha:
Nombre:	NIUB:	
¿Qué situaciones me motivan (o no) para seguir el ritmo de la clase?		
¿Qué actuaciones del profesorado me motivan (o no) para estudiar química?		
Observaciones.		

¿Qué me motiva (o no) para entregar el trabajo académico propuesto?

¿Qué me motiva (o no) para estudiar en casa?

Observaciones.

Los resultados de la corrección de la evaluación inicial y su discusión junto con el cuestionario de motivación muestran evidencias del grado de conocimiento que el alumnado tiene sobre la química, en nuestro caso. Ello permite que el alumnado sea consciente de sus carencias formativas en dicha asignatura lo que les lleva a plantearse la necesidad de abordar nuevas actividades de aprendizaje como las evaluaciones y las autoevaluaciones entre otras, que les permitirá ampliar sus conocimientos y competencias.

La mayoría de aportaciones del alumnado en dicha discusión se referían a la toma de conciencia de sus limitaciones. Es importante resaltar que varias respuestas valoraron muy positivamente el poder disponer de autoevaluaciones a lo largo del curso, aspecto este que como profesores tuvimos muy presente.

e-ejercicios y e-evaluaciones

La mayoría de los ejercicios para ampliar conocimientos de una asignatura y las evaluaciones que se realizan dentro del “campus virtual” están constituidas por unas preguntas o ejercicios que deben ser resueltas por el alumnado, dentro de un periodo determinado de tiempo.

El profesorado debe determinar el tiempo de la prueba y, como es evidente en el caso de las evaluaciones, también debe introducir una variable aleatoria en todas las preguntas para que no se repitan entre el alumnado.

Estos ejercicios, preguntas o problemas, dependiendo del tipo de materia, presentan un amplio abanico de posibilidades:

- Cierto-falso, el alumnado debe marcar en cada sentencia (pregunta) si es correcta o no.
- Preguntas con múltiple respuesta, el alumnado debe marcar cual de ellas es la, generalmente, única correcta.
- Problemas numéricos con múltiple respuesta, el alumnado debe marcar cual de ellas es la, generalmente, única correcta.
- Ejercicios para que el alumnado presente en el “campus virtual” fotos o videos mostrando su propia participación en una determinada actividad.
- ...

También hay un amplio abanico de formas de dar el resultado de la evaluación:

- Si es finalista, al terminar el ejercicio el alumnado recibe una puntuación, según los aciertos o errores realizados, que forma parte del global de su evaluación.
- Si no es finalista y lo único que se pretende es que el alumnado amplíe sus conocimientos y sea consciente de su avance puede:
 - Recibir una puntuación con los errores cometidos sin más.
 - Recibir una puntuación que, según la valoración introducida por el profesorado, le obligue a repetir el ejercicio hasta que se haga de forma correcta o le permita avanzar en la realización de más ejercicios sobre el tema o asignatura tratados.
- ...

4. EVALUACIÓN POR IGUALES Y AUTOEVALUACIÓN.

Para valorar la capacidad del alumnado como evaluadores, competencia que se puede juzgar dentro de cualquier evaluación, en nuestro caso, se ha aprovechado para que realizaran la evaluación de los trabajos presentados públicamente por sus compañeros de clase. Al mismo tiempo se ha utilizado dicha evaluación para que se realizara su propia autoevaluación.

El alumnado de enseñanza superior de una determinada clase y materia se distribuye en grupos o equipos de trabajo de tres a cinco miembros [10]. Como estos grupos se deciden al empezar el primer curso, todavía no han surgido las afinidades frecuentes entre ellos por lo que, generalmente, la distribución la decide de forma aleatoria el profesorado.

Decidir los grupos con cierta antelación permite una rápida y ágil comunicación entre los miembros de cada grupo lo que redundará en una relación más fluida y una forma comprometida de trabajar.

Al finalizar el periodo lectivo de la materia, cada grupo, después de entregar al profesorado el trabajo realizado en forma escrita, hace una presentación a toda la clase de dicho trabajo.

Todo el grupo debe dominar el trabajo ya que solo el profesorado decide quien empieza con la presentación y quien la continua, sabiendo que absolutamente todos los miembros del grupo presentarán una parte.

Al terminar dicha presentación se abre un turno de preguntas, generalmente iniciado por el profesorado y al que se añade el alumnado asistente.

Cada alumno debe hacer una evaluación propia y de todo su grupo (autoevaluación) justificando las puntuaciones que otorga a cada uno. Además, se deberá valorar (evaluar) cada una de las otras presentaciones, justificando las puntuaciones que otorgue cada alumno/a, todo ello rellenando la Tabla 2.

Participación del alumnado en la autoevaluación.

Como se observa en la Tabla 2, cada alumno/a debe autoevaluarse y evaluar a cada miembro del grupo justificando la puntuación otorgada que va de 1 (muy mal) hasta 5 (excelente). Con relación al propio alumno y al equipo formado se debe evaluar su participación en la parte escrita, su participación en la realización del power point de la presentación pública, su participación en la presentación global y el resultado de trabajar en grupo.

Tabla 2. Trabajos de QUÍMICA Grado: BIOQUÍMICA				
Nombre:		Apellidos:		
Justifica la puntuación, 1 a 5, de cada miembro de tu grupo.	Particip en la parte escrita	Particip en PwPt	Present Global	Trabajo en grupo
(tu mismo/a)				
Puntúa, de 1 a 5, justificando quien lo han hecho mejor y peor del Grupo:	Explicación Química	Present Global	Aprov en clase	Respuest pregunt

De cada una de las otras presentaciones se debe valorar de forma justificada, entre 1 y 5, quien ha estado mejor y quien peor en referencia a si se ha entendido la explicación relacionada con la materia (química en el ejemplo de la Tabla 2), sobre la presentación global, si el trabajo sirve para profundizar o mejorar lo explicado sobre el tema en clase y si se han contestado de forma rápida y correcta las preguntas que tanto el profesorado como el propio alumnado hayan formulado después de finalizada la exposición.

Todas las valoraciones son recogidas por el profesorado que las compara con las suyas de cada exposición. Es interesante observar que, en general, el alumnado es bastante más severo en su puntuación que el profesorado que tiene la responsabilidad de aquella materia. La valoración dada por el alumnado no se hace pública sino que solo sirve para la valoración del profesorado.

Al analizar los resultados se observa que las autoevaluaciones de cada miembro de un grupo indican quien o quienes no han trabajado lo que el grupo esperaba de ellos. En relación a las evaluaciones que un equipo da del resto de grupos, a veces se aprecia una pequeña variación entre la valoración dada por el alumnado y la anotada por el profesorado. La justificación de cada valoración hace que las discrepancias sean mínimas y, siempre, prevalece la calificación del profesorado.

Opinión del alumnado. Pros y contras de la autoevaluación.

Ya se ha mencionado anteriormente que los autores son firmes defensores de este tipo de e-evaluación y/o autoevaluación. Pero también se ha querido saber cual es la opinión del alumnado con respecto a ambas, para ello cada alumno y alumna del curso ha indicado, en un máximo de un folio, cuales son a su parecer los aspectos positivos y cuales los negativos de este tipo de evaluación. Los resultados obtenidos después de analizar las justificaciones alegadas por el alumnado se sintetizan, en los apartados (pros y contras), a continuación.

Aspectos positivos (pros).

En este resumen los aspectos positivos no han sido modificados ni un ápice de lo que el alumnado ha escrito y/o sugerido, se han trasladado a este artículo directamente de sus escritos y apreciaciones.

- *Los alumnos deben prestar atención a lo que sus compañeros explican para después puntuarlos. Esto aumenta el grado de concentración en la clase durante la exposición lo que ayuda a tener menos nervios a los que están exponiendo y como consecuencia de ello se adquiere más conocimiento de la materia en cuestión.*
- *El hecho de analizar el trabajo que presentan los compañeros hace que se eviten posibles errores que podríamos cometer en nuestra presentación.*
- *El hecho de escuchar a toda la clase exponiendo permite analizar el comportamiento de cada uno y ello puede ser de ayuda a la hora de escoger nuevos compañeros para realizar otro trabajo.*
- *Este ejercicio de puntuar a los demás enseña a evaluar el trabajo de los demás sin tener en cuenta las relaciones personales dentro de la clase, con ello se gana en objetividad y madurez en nuestras decisiones ya que nuestra puntuación y justificación no pueden estar alejadas de las del profesor.*

- *Permite reconocer el trabajo que todos están realizando, las dificultades en responder las cuestiones planteadas por el profesor.*
- *Nos permite entender las dificultades que debe tener el profesorado a la hora de evaluarnos.*

Aspectos negativos (contras).

En este resumen los aspectos negativos tampoco han sido modificados de lo que el alumnado ha escrito y/o sugerido. Después de cada “contra” se ha añadido nuestra propia reflexión sobre dicho aspecto que se comentó en clase.

- *Dificultad de ser objetivos sin tener presente la relación de compañeros. La objetividad será importante en su ámbito profesional.*
- *Es difícil saber los criterios a seguir ya que realmente el profesorado es el experto en la materia. El límite de los criterios a seguir va parejo con el conocimiento que cada alumno tiene de la materia en cuestión.*
- *La parte del ppt expuesta puede no coincidir con la que el alumno/a ha preparado. De hecho se pretende que todo el grupo sea capaz de explicar todo el trabajo realizado.*
- *Esta evaluación no es siempre un buen camino para saber cual es la visión personal de cada estudiante acerca de las explicaciones de cada trabajo. El alumnado debe ser “responsable” de sus valoraciones y saber si sus conocimientos son los adecuados para realizar dicha evaluación.*
- *Debería eliminarse la posibilidad de hacer preguntas sobre nuestras dudas al terminar cada exposición porque no sabemos si nuestros compañeros sabrán contestarlas y ello les puede poner en un aprieto. Si las hacemos después de clase, en un ambiente más relajado podemos aprender todos. Con las preguntas se pretende que toda la clase participe y que cada grupo sepa que al terminar habrán una serie de preguntas por lo que el grupo debe prepararse el trabajo a conciencia.*

Es importante poner de manifiesto que dentro de estos aspectos negativos no ha surgido ninguna referencia a la propia autoevaluación. Preguntado el alumnado en clase del por qué de esta ausencia, la respuesta mayoritaria fue que apreciaban la autoevaluación para seguir progresando en la asignatura. A una pequeña parte del alumnado no les gusta la autoevaluación pero simplemente porque les “fiscaliza el tiempo y aquello que deben aprender y trabajar cada semana”.

5. CONCLUSIONES

El alumnado de la enseñanza superior, en general,

- Se involucra en el programa de la evaluación y de su autoevaluación.
- Analiza sus necesidades formativas profesionales.
- Analiza su propio conocimiento de una materia para mejorarlo.

A tenor de los primeros resultados obtenidos podemos concluir que en la enseñanza universitaria la e-autoevaluación no solo es posible, sino deseable y recomendable.

A partir de estos resultados se puede concluir que el proceso de evaluación en la enseñanza superior debe involucrar activamente al alumnado ya que en muchas de sus salidas profesionales el aprendizaje abarcará toda su vida. Por ello, es necesario recomendar el uso tanto de la autoevaluación, la e-evaluación y la evaluación entre compañeros en dicho ámbito.

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VALORACIÓN DE MICROECONOMÍA POR ALUMNOS DEL GRADO EN ADMINISTRACIÓN Y DIRECCIÓN DE EMPRESAS

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Resumen

El llamado “proceso de Bolonia” trajo consigo diversos cambios importantes tanto para los docentes como para los alumnos universitarios. En este contexto de cambio, el objetivo del artículo se centra en analizar la valoración que hacen los alumnos de Microeconomía de la facultad de Administración y Dirección de Empresas, con las características determinantes del proceso de Bolonia. Los resultados permitirán a los docentes mejorar en aquellos aspectos no logrados y reforzar los valorados positivamente. El alumno valora muy positivamente el cambio, su participación en aula ha dejado de ser pasiva para convertirse en activa, se precisa del alumno para impartir la asignatura. Se ha abandonado la clase magistral, en donde el estudiante se limitaba a tomar apuntes, y las clases se han convertido en dinámicas de grupo donde todos tienen una función. Este cambio ha conseguido que Microeconomía pase a ser una materia gratamente aceptada y aprovechada por el estudiante.

1. Introducción

La disciplina de Microeconomía impartida en la Facultad de Administración y Dirección de Empresas (FADE) de la Universidad Politécnica de Valencia (UPV) pertenece al primer curso del Grado y consta de 6 créditos ECTS (European Credit Transfer System). El enfoque de la materia sirve como puerta de entrada para aprender el método de razonamiento de la economía y su aplicación a problemas básicos. En el diseño de la estrategia docente es importante tener en cuenta al estudiante, se le debe dar herramientas para el futuro desarrollo de actividades profesionales. Además, no es aconsejable que el alumno reciba conocimientos aislados para aumentar su sabiduría, sino formarlo para saber relacionar temas microeconómicos con problemas de la economía real.

Por otra parte, el estudiante tiene nociones previas sobre la materia, a partir de las cuales se enfocará su nuevo aprendizaje. En el caso concreto de Microeconomía I, en bachiller han tenido un primer contacto en el ámbito de la economía, estudiando una asignatura de economía general. De manera que el objetivo inicial del curso será asentar los conceptos adquiridos, proporcionando un conocimiento global de la materia.

El llamado “proceso de Bolonia” trajo consigo diversos cambios que, de acuerdo con el Libro Blanco del Título de Grado en Economía y Empresa (ANECA, 2005) “... son múltiples y afectan no sólo a la estructura de las actuales titulaciones oficiales, sino que suponen definir los contenidos y el perfil profesional de cada titulación; establecer objetivos curriculares básicos que capaciten para el ejercicio profesional; expresar la duración en número de créditos europeos; acercar la duración real de los estudios al número de años que tienen las titulaciones; introducir nuevas titulaciones basadas en contenidos y perfiles profesionales de actualidad; respetar la identidad nacional (tradición cultural y científica); etc.”

Asimismo, supone modificar los elementos del diseño curricular (objetivos, métodos de enseñanza, tutorías, sistemas de evaluación, etc.), y otorgar un mayor protagonismo al profesorado y a los estudiantes al dirigir sus esfuerzos hacia el aprendizaje en lugar de a la enseñanza pasiva. Resulta esencial, por tanto, observar que este proceso, lejos de ser un mero cambio de plan de estudios, afecta en gran medida a la filosofía de la enseñanza universitaria.

El profesor deja de centrarse en el suministro de información para concentrarse en los resultados de aprendizaje. Este cambio enfatiza la función del docente como gestor del proceso pedagógico. Bajo este nuevo paradigma no resulta adecuado utilizar únicamente el modelo de evaluación final, son necesarias nuevas metodologías, tendentes a primar más la evaluación continua frente a una exclusivamente final.

En este contexto de cambio en el ámbito universitario, el objetivo del artículo se centra en analizar la valoración que hacen los alumnos de de Microeconomía I de FADE, la cual actualmente se ha impartido durante tres cursos (2010/11, 2011/12 y 2012/13) con las características determinantes del proceso de Bolonia. La valoración se instrumentará a partir de un cuestionario “ad hoc” para la asignatura y del cuestionario general que diseña el Instituto de Ciencias de la Educación (ICE) para todas las asignatura de la facultad. Los resultados permitirán a los docentes mejorar en aquellos aspectos no logrados y reforzar los valorados positivamente.

El resto del artículo se estructura de la siguiente forma. En la sección 2 se hace una descripción de la asignatura objeto de estudio. En la sección 3 se detalla la metodología de aprendizaje utilizada. En la sección 4 se describe el cuestionario “ad hoc” y el general, como herramientas necesarias para conseguir la valoración y las características de los estudiantes representativos de la muestra. En la sección 5 se detallan los resultados de los cuestionarios, que mostrarán las fortalezas y debilidades logradas hasta el momento. Por último, la sección 6, resume las principales conclusiones de la investigación.

2. Metodología de aprendizaje en la asignatura de Microeconomía I

En el nuevo marco de Espacio Europeo de Educación Superior (EEES) se establece que el sistema de metodología docente debe centrarse en conseguir el desarrollo de habilidades por parte del alumno en un proceso de auto-aprendizaje guiado por el profesorado. Éstas hacen referencia a la capacidad de aprender, resolver problemas, manejar información o trabajar en grupos, entre otras. El docente adopta el papel de guía en el proceso de adquirirlas. Su figura pasa a ser la de un experto que, entre otros roles, promueve la realización de dinámicas de grupo y otras actividades para que los alumnos puedan obtener sus competencias. Los recursos para el desarrollo docente son básicamente: Pizarra, diapositivas, transparencias y materiales multimedia.

Los profesores de Microeconomía I, para la preparación del curso, diseñan el contenido de una guía docente donde quedan expuestas las características de la nueva metodología y los requisitos para la superación de la asignatura. Además, la guía es un referente del alumno, sirviéndole durante el desarrollo del curso como instrumento orientador para saber afrontar la materia con éxito. Así, se estructura en los siguientes apartados: Descripción general de la asignatura, Competencias, Conocimientos recomendados, Selección y estructuración de la Unidades Didácticas, Distribución de créditos, Evaluación y Bibliografía.

Las actividades de trabajo presencial programadas son las siguientes:

- Clase presencial: Exposición de contenidos mediante presentación o explicación por parte del profesor, incluyendo demostraciones.
- Clase práctica: Supone el aprendizaje basado en problemas. Enfoque educativo donde los alumnos abordan problemas reales en pequeños grupos y bajo la supervisión de un tutor.
- Laboratorio: Actividades desarrolladas en espacios adaptados con equipamiento especializado (aulas de informática).
- Tutoría: Periodo de instrucción realizado por un tutor con el objetivo de revisar y discutir los materiales y temas presentados.
- Evaluación: Conjunto de pruebas escritas, orales, prácticas, proyectos, etc, utilizados en la valoración.

Mientras que las actividades de trabajo autónomo programadas son:

- Trabajos teóricos: Preparación de seminarios, lecturas, investigaciones, memorias, etc. Todos ellos serán expuestos o entregados en las clases teóricas.

- Trabajos prácticos: Elaboración de actividades a exponer o entregar en las prácticas.
- Estudio teórico: Aprendizaje de los contenidos relacionados con la teoría. Incluye cualquier tarea no computada en el apartado anterior (preparar exámenes, trabajo en biblioteca, lecturas complementarias, hacer problemas y ejercicios, etc.).
- Estudio práctico: Relacionado con la resolución de problemas adaptados a la vida real.
- Actividades complementarias: Son tutorías no académicas y acciones formativas voluntarias relacionadas con la asignatura pero no con la preparación de exámenes o con la calificación (lecturas, seminarios, asistencia a congresos, conferencias, jornadas). También otras de gestión y auxiliares como pasar apuntes, gestiones de biblioteca, realización de fotocopias, etc.

La evaluación de la asignatura de Microeconomía I se divide en tres exámenes eliminatorios compuestos por preguntas tipo test y varios problemas, suponiendo éstos el 85% de la nota final. Los casos a resolver en las prácticas representan el otro 15%. El alumno deberá obtener al menos 4 puntos sobre 10 en cada uno de los métodos de valoración utilizados para aprobar la asignatura.

En el apartado de bibliografía, los textos básicos utilizados a lo largo del curso son: Andrés y Martí (2006) y Pindyck y Rubinfeld (2009). El primero fue elaborado por parte del profesorado y está adaptado íntegramente al temario impartido. Este libro constituye una referencia básica para los alumnos, en cada unidad didáctica puede encontrarse: las transparencias utilizadas en las clases teóricas, preguntas tipo test y problemas numéricos tanto resueltos como propuestos que le ayudarán a prepararse para la evaluación. Por su parte, el manual de Pindyck y Rubinfeld es un clásico muy consolidado en la enseñanza de la Microeconomía Intermedia, se renueva periódicamente incorporando los avances más recientes.

Las metodologías activas propuestas se clasifican en dos grandes apartados. Por un lado, los seminarios y, por otro, las prácticas de laboratorio. Estas últimas se imparten en grupos de 20-25 alumnos, los cuales a su vez se organizan en equipos de 3-4 personas. Se tratan estudios de casos breves que permiten relacionar situaciones de la vida real –prensa, normativa...- con determinados conceptos tratados en las clases teóricas. En su desarrollo se originan discusiones intra-grupos y luego inter-grupos para que los alumnos mutuamente se ayuden a establecer estas conexiones entre los contenidos de la asignatura y la realidad.

Los seminarios son de dos tipos. Unos sirven para que los estudiantes comprueben si están siguiendo la asignatura y a la vez “ensayen” un modelo de examen, y otros, les acercan a temas de actualidad. Entre estos cabe destacar la impartición de una conferencia magistral por parte de un profesor de otra Universidad aprovechando una estancia en la UPV, y también estudios del caso relacionados con los determinantes del comportamiento reciente de un mercado.

3. Descripción de la asignatura de Microeconomía I

La Economía es, ante todo, un método de razonamiento, una forma de interpretar el mundo real y una herramienta de análisis del comportamiento humano. Esto significa que cualquier cuestión relacionada con la distribución de recursos en contexto de escasez puede ser analizada con criterios económicos. Tradicionalmente, los problemas de elección, mercedores del interés preferente de la economía, han sido los relacionados con la satisfacción de las necesidades y los deseos materiales de los hombres. Consumir (ahorrar, invertir), producir (trabajar) e intercambiar son las actividades económicas por excelencia. Su estudio es sumamente complejo, porque depende de numerosos factores que difícilmente pueden ser reproducidos o investigados en un experimento de laboratorio. Por todo ello, la economía es una ciencia social que necesita recurrir a simplificaciones o abstracciones de la realidad, denominadas “modelos”, cuya utilidad radica en facilitar la explicación y predicción de los sucesos relacionados con los mercados y las variables económicas asociadas (precios, rentas, ventas, etc).

La microeconomía -también llamada economía neoclásica- se sigue enseñando en todas las facultades y escuelas, de grado o posgrado, donde los alumnos estudian economía en cualquier título que incorpore esta formación. Debido al reduccionismo de sus supuestos básicos -consistencia de los agentes, racionalidad, individualismo, maximización o equilibrio-, esta disciplina continua siendo una de las partes mejor conectada con el espíritu científico de la economía, capaz de encontrar las leyes que rigen el comportamiento de precios, mercados y actores participantes en ellos.

Aunque la economía experimental y la conductual abren nuevos espacios y soluciones a los problemas básicos, modificando algunas de sus hipótesis, la llamada microeconomía de Marshall sigue siendo altamente formativa, porque obliga a pensar sobre los problemas y las relaciones fundamentales entre las variables. Esta disciplina nació con un elevado componente conceptual y gráfico, sumamente útil para visualizar las principales funciones económicas y entender los cambios en el equilibrio. Estas lecciones, si van acompañadas de ejercicios teóricos y prácticos, resultan mucho más útiles, obligan al alumno a realizar un esfuerzo adicional y entender lo que hay detrás de las curvas y funciones genéricas. Igualmente, le transmite la importancia de cuantificar, por difícil que resulte, los cambios producidos en una variable cuando se modifican los valores de otras con las que está relacionada.

Un inicio clásico en el estudio de la economía consiste en analizar las variables influyentes los precios. Con pocos elementos teóricos y un modelo sencillo de oferta y demanda es posible aplicar estos conocimientos a cualquier mercado, pudiendo realizar predicciones relacionadas con el precio y las cantidades comercializadas. Se supone que el comportamiento de los consumidores está representado por una función de demanda dependiente del precio, la renta, las preferencias, etc. En el caso de los productores, su conducta se cuantifica en una función de oferta cuyas variables independientes son el precio, los costes de producción y el conocimiento tecnológico. A partir de este sencillo modelo contestan a preguntas del siguiente tipo: ¿Por qué cambia el precio en un mercado?, ¿Puede haber excedentes?, etc.

Por otra parte, manejando adecuadamente las curvas de oferta y demanda se puede predecir el sentido de la variación de los precios y cantidades intercambiadas en el mercado. Sin embargo, en muchas ocasiones a las empresas y los analistas les interesa, no solo ver *cómo* variará el precio y la cantidad, sino *en cuánto* lo harán. Para ello es fundamental introducir el concepto de elasticidad, el cual permite que las predicciones económicas den un primer paso en el ámbito de lo cuantitativo. La elasticidad indica el grado de sensibilidad o respuesta de las cantidades (ofertadas o demandadas) -o variables dependientes en general- ante cambios en las principales variables explicativas (precios, rentas, etc). Se trata de un concepto fundamental para comprobar en qué medida productores y consumidores se ven afectados por variaciones en alguno de los determinantes del equilibrio.

Finalmente, es necesario estudiar cómo el gobierno puede interferir en el funcionamiento de los mercados, mostrando las consecuencias de sus decisiones. Existen diversas formas de intervención de las administraciones públicas: impuestos, subvenciones, aranceles (en países pequeños) y sistemas de precios mínimos y máximos.

La esencia de la empresa en la microeconomía neoclásica es su naturaleza productiva. Su actividad principal consiste en transformar factores en outputs. La función de producción es la expresión analítica formal de esa relación física, y permite hacer predicciones acerca de cuál es el volumen de output que se puede obtener a partir de una determinada combinación de recursos. Se trata de una relación técnica, pero no estrictamente económica, al no explicar qué cantidad de factores va a utilizar el empresario ni cuánto podrá vender en el mercado.

La fabricación de cualquier bien o servicio tiene un coste, es decir, exige emplear recursos que tienen usos alternativos y es necesario pagar un precio por ellos. La capacidad productiva está limitada por la disponibilidad física de factores y sus precios. El empresario debe decidir qué clase de factores y en qué cantidad desea emplearlos; además tiene que contratar sus servicios y retribuirles por su contribución a la producción final. En definitiva, la empresa necesita conocer cuánto le cuesta la elaboración del output para poder adoptar decisiones económicas correctas, las cuales se apoyarán en su función de costes.

No todas las empresas desarrollan su actividad en el mismo tipo de mercado. Las dos estructuras extremas y opuestas son la competencia perfecta y el monopolio. Entre ellas se encuentran formas intermedias (oligopolio y competencia monopolística) que se corresponden con la mayoría de los mercados de la economía real. La razón de explicar la competencia

perfecta y el monopolio se debe más a su utilidad como referente para comprender la realidad existente que a su correspondencia con estructuras puras, actualmente en extinción.

La importancia de las características del mercado radica en la determinación de los niveles de producción y precios, limitando el margen de maniobra disponible por las empresas. En el caso extremo de la competencia perfecta, tan sólo se elige el volumen de producto que maximiza los beneficios, por el contrario, el monopolio puede fijar también el precio de venta. En ambos casos, conociendo los costes de las empresas y las características del mercado, la teoría económica pretende hacer predicciones referidas a sus decisiones productivas.

4. Descripción del cuestionario y muestra de estudiantes

La valoración de la asignatura se ha realizado a partir de un cuestionario “ad hoc” cumplimentado por los estudiantes del Grado en ADE. Está compuesto por 16 preguntas, relacionadas con los siguientes aspectos:

1. Temario y estructura de la clase
2. Evaluación de la asignatura
3. Proceso de estudio
4. Valoración general de la disciplina

Las preguntas llevan asociadas cuatro posibles respuestas con el objetivo tener homogeneidad en las contestaciones y poder establecer criterios y valoraciones más exactas. El primer grupo de cuestiones relacionadas con el temario y la estructura de la clase pretenden identificar cuáles son los temas preferidos, así como su satisfacción en la forma de recibir la docencia.

1. *¿Cuál es la parte de Microeconomía I que más te ha gustado?*
2. *¿Cuál es la parte de Microeconomía I que menos te ha gustado?*
3. *¿Cómo mejorarías las clases teórico/prácticas del aula?*
4. *¿Te gustaría una mayor participación de los alumnos en el aula?*

En las dos primeras preguntas, enfocadas a las preferencias de los alumnos por los temas a tratar en Microeconomía I, deben de elegir entre las siguientes materias: La teoría de demanda y oferta, la intervención del Estado en los mercados, producción y costes y el mercado de competencia perfecta. Por su parte, las preguntas 3 y 4 hacen referencia al funcionamiento de la clase, donde tienen la posibilidad de contestar que están totalmente de acuerdo con el procedimiento seguido, tal y como se ha explicado en la sección anterior. Además, el grado de respuesta oscila entre si les gustaría una clase con más aplicaciones a la vida real, más participación activa del alumno o más problemas.

En segundo lugar, el conjunto de preguntas sobre la evaluación trata de averiguar la conformidad del estudiante con el sistema actual, en caso negativo se le propone cambiar la ponderación del test y los problemas o la dificultad del examen.

5. *¿Estás de acuerdo en la evaluación realizada?*
6. *¿Cómo valorarías el grado de dificultad de los exámenes?*

La preparación de la asignatura requiere saber cuánto cree el alumno que aprende en clase, así como sus hábitos de estudio, material utilizado y forma de resolver las dudas surgidas en el aprendizaje.

7. *¿Cuál ha sido tu forma de aprendizaje?*
8. *¿Cómo te has preparado la asignatura?*
9. *¿Con qué frecuencia has estudiado la asignatura?*
10. *En el proceso de estudio si te han surgido dudas ¿Cómo las has resuelto?*

En primer lugar, se le plantea al estudiante que conteste entre un rango del 30% al 70% cuánto aprende asistiendo a clase. La intención es conocer cuál es el rendimiento en el aula y su grado de implicación en la misma. En la segunda pregunta se cuestiona qué herramientas utiliza para preparar la materia, si solo yendo a clase, con apuntes y manuales o tan solo con apuntes de un compañero. En la siguiente cuestión relacionada con la frecuencia de estudio se

da la opción de un rato cada semana, o cuantos días antes del examen. Dada la insistencia por parte del profesor de que la asignatura no puede asimilarse en un solo día, es importante saber si los alumnos han captado el mensaje en su trayectoria de aprendizaje. Por último, se les pregunta sobre la forma de resolver sus dudas planteando la asistencia a tutorías, el estudio con otros compañeros, la consulta a manuales o, simplemente, las dudas se quedan sin resolver.

La valoración general de la materia se centra en una comparativa con otras asignaturas del curso y su predisposición a seguir estudiando en un futuro Microeconomía Avanzada. Esta última en caso de ser positiva en la mayoría de encuestados supondría un éxito tanto para el profesor como para la metodología aplicada, representaría una satisfacción significativa del estudiante.

11. *En comparación con otras materias del primer cuatrimestre de 1º ADE ¿cómo valorarías la asignatura de Microeconomía I?*
12. *¿Crees que la asignatura es útil para la vida real?*
13. *Una vez finalizada la asignatura ¿Cuál de las siguientes competencias específicas crees que has logrado?*
14. *¿Has encontrado útil la guía docente?*
15. *¿Estudiarías una asignatura optativa que fuera Microeconomía Avanzada en 4º curso de ADE?*
16. *En relación con las otras asignaturas del Grado, la Microeconomía I ¿la definirías cómo?*

Por otra parte, para completar la valoración de la asignatura junto con la actividad del docente se han comparado los resultados de la encuesta diseñada por el ICE durante varios cursos académicos que recogen un antes y un después del Proceso de Bolonia. En concreto se especifican las siguientes dimensiones:

1. Conocimiento de la materia
2. Organización y planificación
3. Desarrollo/Metodología docente
4. Motivación/Interacción/Ayuda
5. Satisfacción general con la labor del profesor

La muestra utilizada la constituyen alumnos de 1º curso del Grado de ADE de la UPV. Se trata de un conjunto de estudiantes donde el 60% tienen 18 años y un 44% son hombres. La asistencia a clase es por la mañana, hecho que casi siempre indica su dedicación exclusiva al estudio. Tienen la obligación de asistir al menos al 60% de las clases, sin posibilidad de cambio de grupo.

5. Resultados de la valoración de la asignatura

Realizada la encuesta a los alumnos los resultados muestran que, en general, se aprecia una satisfacción notoria en la valoración de Microeconomía I. En relación con el temario, hay una preferencia por la primera unidad didáctica, teoría de la demanda y la oferta, ello puede ser motivada porque algunos estudiantes tenían conocimientos básicos aprendidos en la asignatura de economía en bachiller. Sin embargo, el tema de producción y costes es el peor valorado, la utilización de los instrumentos matemáticos comienza a ser más compleja, se precisa del cálculo de derivadas o gráficas.

Respecto a la forma de impartir la docencia existe un 34,4% de los encuestados que están totalmente de acuerdo en la metodología de aprendizaje desarrollada, hecho que aporta satisfacción al profesor por su gran aceptación. A otro 34,4% le gustaría que hubiera más aplicaciones a la vida real, siendo en ocasiones difícil por las hipótesis de partida de los modelos utilizados o el encaje matemático aplicado a la materia, no obstante se debería hacer un esfuerzo por mejorar este aspecto. Además, los estudiantes están de acuerdo en su participación en clase, solo al 18% le gustaría aumentarla.

El sistema de evaluación es aceptado plenamente en un 64%, y están de acuerdo con el nivel exigido un 59%. Estos resultados manifiestan que al alumno le gusta la evaluación continua aplicada porque le obliga a ir trabajando la asignatura a lo largo de todo el cuatrimestre.

La valoración del aprendizaje de la materia en la clase oscila entre un 70% y un 60%, esto supone que el rendimiento existente dentro del aula es considerablemente alto. El estudiante aprovecha el tiempo en clase y sale de ella con más de la mitad de la materia aprendida. Por otra parte, este rendimiento en la clase viene acompañado por una preparación de la asignatura en casa de forma correcta en más del 50% de los alumnos, utilizando tanto apuntes como los manuales recomendados para facilitar su asimilación.

La frecuencia de estudio es correcta en el 44% de los encuestados, manifestando una dedicación periódica cada semana, siendo el 31% los que lo hacen tres días antes y el 19% los dos días previos. El profesor debería insistir en la necesidad de cambiar estos hábitos para conseguir un mejor aprendizaje.

La asistencia a tutorías es el punto más débil de toda la valoración, bien por su falta de tiempo libre para asistir a ellas, o bien por desconocer su utilidad, la gran mayoría no aprovechan adecuadamente este recurso. La disponibilidad del profesor es máxima, se les aplica el sistema de tutorías a demanda, de forma que hay una flexibilidad total para compatibilizar los horarios del alumno con los del docente, aún así la asistencia es muy baja. En la encuesta solo el 9,8% indican su utilización cuando tienen dudas, mayoritariamente (64%) toman la opción de estudiar con otros compañeros para resolverlas.

En comparación a otras materias del primer curso del Grado en ADE, el alumno está satisfecho con la asignatura de Microeconomía I, el 67% la consideran entre las dos más interesantes y solo un 1% manifiesta su insatisfacción. No obstante, la percepción de ser una materia útil para la vida real es escasa, debido a todo su entramado matemático y las hipótesis tan restrictivas que se alejan bastante de la realidad. Por otra parte, dentro de las competencias logradas está preferentemente la de aportar soluciones creativas en la resolución de problemas y sintetizar de forma crítica información proveniente de fuentes diversas. Se ha apreciado que se debe reforzar más la comunicación oral y escrita en la lengua nativa. Además, casi el 50% se leyó la guía docente, hecho que revela una curiosidad inicial por conocer la metodología de aprendizaje.

La posibilidad de cursar una optativa relacionada con la Microeconomía es otra pregunta que indica el interés por la materia. La respuesta de los estudiantes ha sido relativamente alta, el 14,7% la elegiría seguro y el 72% depende de las otras optativas, sin descartarla inicialmente. Todo ello muestra un indicio de éxito de la motivación por la materia.

Por último, el grado de dificultad comparado con las otras asignaturas del curso no ha sido muy diferente según opinan el 73,7% de los estudiantes, incluso el 16,3% la han calificado como la más fácil. Resulta un poco sorprendente porque la utilización de funciones matemáticas, gráficas, y otros aspectos hacen que en ocasiones la consideren como más complicada de lo que es.

En resumen, y tras el análisis de las respuestas del cuestionario “ad hoc”, se puede apreciar bastante satisfacción del alumno con la asignatura y la metodología de aprendizaje. Sin olvidar, la poca asistencia a tutorías debiendo ser estimulada por el profesor para próximos cursos.

Analizando los resultados del cuestionario general diseñado por el ICE (Tabla 1) se puede comparar e identificar las diferencias de los cursos antes del Plan Bolonia y después.

Tabla 1. Resultados de la encuesta de opinión del alumno diseñada por el ICE. Asignatura de Microeconomía

DIMENSIONES	LOU		Plan Bolonia		
	08/09	09/10	10/11	11/12	12/13
Conocimiento de la materia	6.46	7.21	8.85	8.34	6.53
Organización y planificación	7.38	6.9	8.38	7.43	6.68
Desarrollo/Metodología docente	6.17	6.57	8.61	7.59	5.85
Motivación/Interacción/Ayuda	5.82	5.88	7.61	6.48	5.18

Satisfacción general con la labor del profesor	7.12	7.03	9.15	7.89	6.45
Media global	6.52	6.69	8.45	7.51	6.11

Fuente: Elaboración propia

Los mejores resultados se observan en el primer año del cambio de Plan, donde la expectativa y la buena disposición de los estudiantes fue fundamental para un correcto funcionamiento del curso. De las cinco dimensiones analizadas la “satisfacción general con la labor del profesor” es de las mejores puntuadas.

6. Conclusiones

La adopción del EEES ha obligado al sistema universitario español a modificar sus titulaciones a la normativa europea establecida. Ha sido necesario poner en marcha un profundo proceso de revisión, tanto a nivel global de los centros, como más particular de materias impartidas. El objetivo de este nuevo marco educativo es garantizar una armonización europea de los estudios superiores, facilitando la movilidad de estudiantes, profesores e incluso graduados.

Se puede afirmar que la globalización ha llegado a las universidades. Es necesario preparar a los estudiantes para la realidad laboral a la que van a enfrentarse, caracterizada por una elevada competitividad, actualmente, internacional. Las empresas, públicas o privadas, demandan cada vez más personas preparadas, resolutivas, capaces de adaptarse a entornos cambiantes. El sistema formativo necesita adaptarse a esta nueva realidad, debe formar trabajadores que puedan incorporarse al mercado laboral europeo con garantía de éxito.

Este nuevo contexto está provocando que las materias impartidas en el marco del EEES han precisado de grandes modificaciones, exigiendo cambios tanto al profesorado como al alumnado. La docencia se ha orientado hacia el alcance de competencias, es decir, al alumno se le va a preparar para adquirir destrezas, habilidades, no sólo teorías. La evaluación de las asignaturas abandona su forma original de examen, para convertirse en una valoración de resultados de aprendizaje.

Dada la reciente incorporación de este nuevo marco estudiantil, es necesario que en la literatura existan documentos que orienten al docente para facilitarle su correcta adaptación. Con esta finalidad en este artículo se ha perseguido ofrecer al mundo académico la experiencia de la implantación de la asignatura Microeconomía I en el Grado de ADE. Los resultados avalan la gran aceptación de este nuevo proceso de aprendizaje.

El alumno valora muy positivamente el cambio, su participación en aula ha dejado de ser pasiva para convertirse en activa, se precisa del alumno para impartir la asignatura. Se ha abandonado la clase magistral, en donde el estudiante se limitaba a tomar apuntes, y las clases se han convertido en dinámicas de grupo donde todos tienen una función. Este cambio ha conseguido que Microeconomía I pase a ser una materia gratamente aceptada y aprovechada por el estudiante. Las actividades desarrolladas han permitido lograr los resultados de aprendizaje establecidos inicialmente.

En resumen, se puede concluir que la metodología de aprendizaje aplicada a Microeconomía I es correcta, y por tanto, la mayor participación del alumno en el aula, junto con la evaluación continua están consiguiendo que el interés de los estudiantes por esta materia sea cada vez mayor. Sirviendo de ejemplo para otros docentes que impartan la misma asignatura en centros de educación superior.

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CREACIÓN DE PRUEBAS DE EVALUACIÓN PARA VALORAR EL PROGRESO Y ACREDITACIÓN DE COMPETENCIAS EN LA ASIGNATURA VIBRACIONES MECÁNICAS

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Resumen.

La puesta en marcha de los nuevos planes de estudio englobados en el Espacio Europeo de Educación Superior (EEES) implica un cambio en el enfoque de la enseñanza universitaria. Estos planes de estudio están basados en una formación en competencias, tanto genéricas (o transversales) como específicas de la titulación. En el actual trabajo se presenta una metodología para evaluar el grado de adquisición de las distintas competencias trabajadas en una asignatura. Se muestra la aplicación a la asignatura Vibraciones Mecánicas, correspondiente al plan de estudios de Grado en Ingeniería Mecánica (GIM).

1. INTRODUCCIÓN

Con la implantación del EEES aparece un cambio en el planteamiento de los nuevos planes de estudios. Uno de los cambios centrales es la apuesta decidida por focalizar la atención de los procesos formativos en los aprendizajes de los estudiantes y más concretamente en los resultados de aprendizaje expresados en términos de competencias [1].

Bajo el término de competencia, se entiende un saber hacer complejo que se apoya en la movilización y la combinación eficaz de una variedad de recursos internas y externos dentro de una familia de situaciones [2]. La OECD define el término competencia como la habilidad para enfrentarse a demandas complejas poniendo en acción, en situaciones concretas, recursos psicológicos, habilidades y actividades [3].

Se puede distinguir entre competencias genéricas (o transversales) y específicas. Por una parte, las competencias genéricas son comunes a todos los perfiles profesionales o disciplinas, mientras que las competencias específicas son aquellas que determinan un espacio profesional concreto [3].

El nuevo paradigma de formación en competencias implica la necesidad de un cambio en el proceso de evaluación [5]. Por un lado, el hecho de evaluar las competencias específicas no implica introducir grandes cambios en las asignaturas con respecto a las que se venían impartiendo antes del EEES. Sin embargo, esto no sucede con las competencias genéricas, ya que no formaban parte de forma explícita de los antiguos planes de estudio y no se tenían en cuenta en el diseño de las asignaturas. Además, para poder evaluar estas competencias, se deberán trabajar dentro de las distintas asignaturas que componen la titulación.

En el presente trabajo se describe por una parte la metodología seguida para la creación sistemática de pruebas de evaluación de las distintas competencias asociadas a una asignatura o materia, y, por otra parte, el trabajo en aula y la evaluación de la competencia genérica asociada a la comunicación efectiva. Esta metodología se ha aplicado a la asignatura Vibraciones Mecánicas (código 12577) correspondiente a la titulación de Grado en Ingeniería Mecánica impartida en la ETSID de la Universitat Politècnica de València (UPV). Este trabajo se encuentra enmarcado dentro de la convocatoria de Proyectos de Innovación y Mejora Educativa (PIME) 2013-2014 de la UPV.

En primer lugar se realiza un breve análisis de las competencias asociadas a la asignatura y se enumeran algunos de los correspondientes resultados de aprendizaje. En segundo lugar, se describe la metodología empleada para diseñar las pruebas de evaluación con el fin de medir el grado de adquisición de cada competencia, así como la forma de trabajar y de medir el grado de adquisición de la competencia genérica asociada a la comunicación efectiva. En tercer lugar se muestra la aplicación a la asignatura Vibraciones Mecánicas. Finalmente se presentan las conclusiones de este trabajo.

2. ANÁLISIS DE COMPETENCIAS DE LA ASIGNATURA

En este apartado se realiza un breve análisis de las competencias asociadas a la asignatura Vibraciones Mecánicas. Estas competencias se muestran en la Tabla 1. Dos de éstas son específicas de la titulación y la otra, genérica. Según la guía docente de la asignatura [6], las tres competencias tienen el mismo nivel de implicación.

La competencia 1, específica, está directamente asociada a los contenidos trabajados en la asignatura. Por otro lado, la competencia 2, también específica, se refiere a la resolución de problemas en el contexto de la asignatura, pero teniendo en cuen-

ta materias básicas, principalmente matemáticas y física. Está relacionada con los conocimientos previos, la capacidad de abstracción y el razonamiento. Finalmente, la competencia 3 es genérica, y se refiere a la competencia lingüística de la comunicación por escrito (redacción de informes). Esta competencia está asociada a la dimensión competencial (DC) UPV de “comunicación efectiva”, DC6 [7]. El hecho de considerar esta competencia genérica de forma explícita tiene como finalidad, aparte de formar parte de los objetivos de aprendizaje de la asignatura, el hacer visible esta capacidad que se pretende que los alumnos adquieran en la asignatura [8].

Tabla 1. Competencias asociadas a la asignatura. Adaptado de [6].

Competencias		Tipo	Nivel
1	Calcular, diseñar y ensayar máquinas según los conceptos asociados a la ingeniería mecánica y de materiales	Específica	Necesaria (3)
2	Resolución de problemas en el campo de la ingeniería a partir de la aplicación de materias básicas y tecnológicas.	Específica	Necesaria (3)
3	Comunicar y transmitir conocimientos, habilidades y destrezas en el campo de la ingeniería industrial	Genérica	Necesaria (3)

En la Tabla 2 se muestran algunos de los resultados de aprendizaje correspondientes a cada competencia. Para la competencia asociada a la comunicación efectiva se utiliza el resultado de aprendizaje definido para asignaturas de grado, según la redacción propuesta por los técnicos del Instituto de Ciencias de la Educación (ICE) de la UPV.

Tabla 2. Resultados de aprendizaje asociados a las competencias trabajadas en la asignatura.

C.	Resultados de aprendizaje	
1	1.1	Modelar sistemas mecánicos en el ámbito de las vibraciones mecánicas
	1.2	Calcular las frecuencias naturales y modos de vibraciones de sistemas mecánicos discretos
	1.3	Calcular la respuesta de sistemas en condiciones de vibraciones libres
	1.4	Calcular la respuesta de sistemas en condiciones de vibraciones forzadas
	1.5	Obtener el contenido el frecuencia de una señal de excitación periódica
	1.6	Identificar los problemas asociados a la medida de vibraciones y saberlos resolver
2	2.1	Diagnosticar el comportamiento de un sistema bajo distintas condiciones de funcionamiento
	2.2	Expresar matemáticamente el planteamiento de un problema complejo y resolver dicho problema.
	2.3	Identificar y justificar las diferencias entre un resultado calculado de forma teórica y una medida experimental

	2.4	Diseñar un sistema básico de excitación y/o medida de vibraciones para un sistema mecánico dado
	2.5	Rediseñar un sistema mecánico para mejorar su comportamiento en vibraciones
3	3.1	Redactar textos y documentos con un contenido coherente de la especialidad, en lengua propia, con un nivel básico de corrección ortográfica y gramatical y con la estructura y el estilo adecuados según el tipo de público y los objetivos de la comunicación.

3. METODOLOGÍA

En este punto se presenta, brevemente, la metodología empleada para evaluar el grado de adquisición de cada competencia. Para aplicar este procedimiento, se debe asegurar:

- que las competencias se trabajen adecuadamente en la asignatura, y
- que los actos de evaluación incluyan cuestiones relativas a cada una de las competencias, evaluadas de forma correcta.

El procedimiento se aplicará para evaluar las competencias específicas de las asignaturas involucradas y la competencia genérica asociada a la DC de comunicación efectiva, expresada mediante el resultado de aprendizaje de redacción de textos en lengua propia. Considerando la competencia genérica, una prueba de evaluación escrita será adecuada para evaluar su grado de adquisición.

Definición de variables

Las variables utilizadas son las siguientes:

- p_i es el peso del acto de evaluación i , donde $i = 1, 2, \dots, m$, siendo m el número de actos de evaluación consideradas. Estos pesos se asignan en función de la ponderación de los distintos actos de evaluación según la guía docente.
- \bar{p}_i es el valor normalizado de los pesos de las pruebas de evaluación, de tal forma que

$$\sum_{i=1}^m \bar{p}_i = 1 \quad (1)$$

- w_j es el peso de la competencia j , donde $j = 1, 2, \dots, n$, siendo n el número de competencias trabajadas en la asignatura. Los pesos relativos de las competencias se asignan en función del nivel de implicación de la competencia dentro de cada asignatura, tal como se indica en la guía docente. En la UPV se utiliza la escala: 0, no contribuye, 1, recomendable, 2, conveniente, 3, necesaria y 4, indispensable. Se podría utilizar otra distribución de pesos.
- \bar{w}_j es el valor normalizado de los pesos de las competencias, de tal forma que

$$\sum_{j=1}^n \bar{w}_j = 1 \quad (2)$$

- $c_{i,j}$ es la nota obtenida (sobre 10) en la prueba de evaluación i asociada a la competencia j . Si no se evalúa la competencia j en la prueba i , $c_{i,j} = 0$. Estas calificaciones se pueden ordenar en forma de matriz ($[c_{i,j}]$).
- C_i^E es la nota global de la prueba de evaluación i . C_j^C es la nota global de la competencia j .
- $\delta_{i,j}$ es la relación entre pruebas de evaluación y competencias. $\delta_{i,j} = 1$ si la competencia j se evalúa en la prueba de evaluación i ; $\delta_{i,j} = 0$ en caso contrario.

Al efectuar el diseño de las pruebas de evaluación, se debe construir la matriz $[\delta_{i,j}]$, que contiene 0 y 1 y que tiene tantas filas como actos de evaluación (m) y tantas columnas como competencias (n). Se debe asegurar que esta matriz esté lo *suficientemente* llena para que las distintas competencias se evalúen con un número *suficiente* de ejercicios.

Cálculo de las calificaciones asociadas a las pruebas de evaluación

La calificación de cada prueba de evaluación i se calcula según la ponderación de las notas $c_{i,j}$ según los pesos de cada competencia \bar{w}_j , aplicando la fórmula

$$C_i^E = \frac{\sum_{j=1}^n \bar{w}_j c_{i,j}}{\sum_{j=1}^n \bar{w}_j \delta_{i,j}} \quad (3)$$

Para poder aplicar la fórmula, se debe asegurar que el denominador no sea nulo. Esto se consigue con un diseño correcto de las pruebas de evaluación en las que incluyan ejercicios que permitan medir el grado de adquisición de cada competencia (con lo que se consigue una matriz $[\delta_{i,j}]$ suficientemente llena, como se ha comentado anteriormente).

Y la contribución en la nota final de la asignatura de las pruebas de evaluación consideradas se calcula como

$$\sum_{i=1}^m \bar{p}_i C_i^E \quad (4)$$

Este enfoque sería equivalente al enfoque clásico en el que se ofrece una nota para cada prueba de evaluación, ponderada según los pesos que figuran en la guía docente. Quizá la contribución presentada en este trabajo es ponderar el peso de las distin-

tas competencias, para cada prueba de evaluación, según la intensidad con que se trabaje cada competencia.

El peso equivalente de las preguntas asociadas a cada competencia en cada prueba de evaluación se calcula, según (3), como

$$\frac{\sum_{j=1}^n \bar{w}_j}{\sum_{j=1}^n \bar{w}_j \delta_{i,j}} \quad (5)$$

Cálculo de las calificaciones asociadas a las competencias

En esta sección se presenta el enfoque alternativo: considerando las notas en los distintos ejercicios de las pruebas de evaluación ($c_{i,j}$), se obtiene el grado de adquisición de cada competencia. Este enfoque pretende obtener la calificación para cada alumno, desagregada según las competencias de la asignatura.

Para el cálculo de las calificaciones asociadas a las competencias, se lee la matriz $c_{i,j}$ por columnas (en lugar de por filas, como en el caso anterior). La calificación global asociada a una determinada competencia j , se calcula como una suma ponderada de las notas $c_{i,j}$ según los pesos de cada prueba de evaluación \bar{p}_i , aplicando la fórmula

$$C_j^C = \frac{\sum_{i=1}^m \bar{p}_i c_{i,j}}{\sum_{i=1}^m \bar{p}_i \delta_{i,j}} \quad (6)$$

Y la contribución en la nota final de la asignatura de la competencia considerada se calcula como

$$\sum_{j=1}^n \bar{w}_j C_j^C \quad (5)$$

Trabajo de la competencia asociada a la comunicación efectiva

Como se ha mencionado anteriormente, uno de los requisitos para poder evaluar una competencia, es haberla trabajado durante el curso. El resultado de aprendizaje que se evalúa es la redacción de textos cortos con un contenido coherente de la especialidad, en lengua propia, con un nivel básico de corrección ortográfica y gra-

matal y con la estructura y el estilo adecuados según el tipo de público y los objetivos de la comunicación [9]. Se tratará de textos breves o muy breves (menos de 100 palabras).

Para ello se incluyen en las sesiones presenciales ejemplos sobre diversos ejercicios. Estos textos cortos se comentan desde el punto de vista puramente semántico (según los contenidos de la asignatura), así como el léxico empleado, la estructura y el orden gramatical.

Evaluación del grado de adquisición de la competencia de comunicación efectiva

Se debe diseñar un instrumento para la evaluación de la competencia asociada a la comunicación efectiva que cumpla dos condiciones:

- Que sea transversal, es decir, que sirva para evaluar los resultados de aprendizaje asociados a la competencia, para cualquier asignatura impartida en la universidad.
- Que sea eficiente, es decir, que tenga una aplicación muy fácil y rápida. Esta característica se busca porque se va a usar en muchos ejercicios, en distintas pruebas de evaluación, y en asignaturas cursadas por muchos alumnos.

Esta lista de control tiene cuatro elementos:

- Contenido (25%): para conseguir la máxima puntuación en este apartado, debe contestarse exactamente a lo que se pide, utilizando el léxico correspondiente, con concreción y sin lugar a ningún tipo de ambigüedades. En este apartado se penaliza el añadir información no relevante, con lo que se obtendría como máximo un 12,5%.
- Estructura (25%): El texto presentado, aunque sea corto, debe seguir un cierto orden, sin que se vaya *saltando* de un elemento a otro. Por ejemplo, se puede partir de lo general a lo particular, hacer la descripción de izquierda a derecha, siguiendo un orden cronológico o un orden creciente en frecuencia, etc.
- Ortografía, gramática (25%): El texto debe estar escrito de forma correcta, tanto la escritura ortográfica ('b'/'v', 'll'/'y', con o sin 'h', acentos gráficos que se utilizan en castellano), como las estructuras gramaticales (por ejemplo oraciones subordinadas en las que aparezca una relación de causa, finalidad, consecuencia, disyunción...). Si se tiene un error, se obtiene la mitad de la puntuación en este apartado; con dos errores, se obtiene un cero.
- Concisión (25%): Los textos deben ser cortos (se da la indicación de menos de 100 palabras, aunque no se evalúa de forma tan estricta). Se tiene un cero en este apartado si la respuesta tiene una longitud de una página. Se evalúa la capacidad de síntesis y de concreción.

Puesto que se pretende evaluar el contenido coherente en la especialidad, si el texto escrito no tiene relación con la pregunta realizada, directamente se descarta la respuesta y se evalúa con un cero.

4.APLICACIÓN A LA ASIGNATURA VIBRACIONES MECÁNICAS

Diseño de las pruebas de evaluación

La metodología descrita en el apartado anterior se ha aplicado en el diseño de las pruebas de evaluación asociadas a las sesiones de laboratorio. En estas pruebas de evaluación se usa la metodología del Caso ya que supone el análisis y la resolución de una situación planteada que presenta problemas de solución múltiple, a través de la reflexión y el diálogo para un aprendizaje grupal, integrado y significativo [6]. Hay un total de 11 sesiones de laboratorio.

La Tabla 3 muestra el diseño seguido para el diseño de las pruebas de evaluación asociadas a las sesiones de laboratorio. Hay 11 sesiones de laboratorio (PL1,...PL11) y tres competencias (C1, C2 y C3).

Tabla 3. Matriz $[\delta_{i,j}]$ que relaciona las distintas pruebas de evaluación con las competencias de la asignatura.

		Competencias			p_i	\bar{p}_i
		C1	C2	C3		
Pruebas de evaluación	PL1	1	0	0	2,27	0,09
	PL2	1	0	0	2,27	0,09
	PL3	1	1	1	2,27	0,09
	PL4	1	1	1	2,27	0,09
	PL5	0	1	0	2,27	0,09
	PL6	1	0	0	2,27	0,09
	PL7	1	1	1	2,27	0,09
	PL8	1	1	1	2,27	0,09
	PL9	1	1	1	2,27	0,09
	PL10	1	1	1	2,27	0,09
	PL11	1	1	0	2,27	0,09
w_j		3	3	3		
\bar{w}_j		0,33	0,33	0,33		

Las primeras sesiones están dedicadas a trabajar contenidos de la asignatura, por lo que se evalúan resultados de aprendizaje asociados a la competencia 1. En cambio, a partir de la tercera sesión, ya se introducen ejercicios asociados al resto de competencias. Con el diseño presentado se puede ver que la matriz δ está suficientemente llena, esto es, se evalúan las distintas competencias en la mayoría de las pruebas de evaluación.

Comunicación efectiva

En esta sección se presentan algunos ejemplos de los ejercicios que se han introducido con el objeto de evaluar la competencia asociada a la comunicación efectiva:

- Describir un sistema basándose en sus características viscoelásticas e inerciales.
- Evaluar un comportamiento en vibraciones de un determinado sistema mecánico, según sus condiciones de funcionamiento.
- Justificar, razonadamente, la elección de un modelo o asunción de una hipótesis simplificadora con el objeto de resolver un problema complejo.
- Describir el procedimiento en que se ensayaría un sistema mecánico para identificar su comportamiento en vibraciones.

4. CONCLUSIONES

El presente trabajo muestra una metodología propuesta para el diseño de las pruebas de evaluación. Esta metodología permite obtener una calificación desagregada para cada una de las competencias, de tal forma que pueda figurar en el expediente de cada alumno, junto a la calificación global de la asignatura.

Se muestra un ejemplo de aplicación a la asignatura Vibraciones Mecánicas, en la que se trabajan dos competencias genéricas y una competencia específica asociada a la comunicación efectiva.

Para la evaluación de la competencia específica se ha creado un instrumento basado en una lista de control. Este instrumento constituye una herramienta muy eficiente y que puede aplicarse a diferentes asignaturas de distintas titulaciones.

Finalmente, una vez recogidas las muestras, se hace necesario el procesado matemático de estos datos y su posterior vertido al programa de registro de notas de la universidad.

Agradecimientos

Los autores del trabajo agradecen la ayuda prestada por los técnicos del ICE de la Universitat Politècnica de València (UPV). Este trabajo ha sido financiado por el Vicerrectorado de Estudios, Calidad y Acreditación y la Escuela Técnica Superior de Ingeniería del Diseño (ETSID) a través de la convocatoria de ayudas para PIME 2013-2014 de la UPV, con el proyecto código B15/13.

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GRADO DE ADQUISICIÓN DE COMPETENCIAS ESPECÍFICAS Y TRANSVERSALES EN LA ASIGNATURA DE ESTADÍSTICA: DIFERENCIAS EN LOS MÉTODOS DE EVALUACIÓN

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Resumen.

La situación de la universidad en la actualidad se ha modificado respecto a la que existía hace unos años. Con la creación del Espacio Europeo de Educación Superior el papel de la universidad debe adaptarse a las demandas de la sociedad actual, y por tanto, las asignaturas deben ajustarse a estos cambios para que las necesidades del mercado laboral y la universidad estén alineadas. Con el nuevo concepto de aprendizaje por competencias, la orientación de las asignaturas debe cambiar.

En este trabajo, se ha evaluado el grado de adquisición de dos competencias específicas de la asignatura de Estadística, a través de tres métodos de evaluación distintos. Esta primera fase, nos sirve de base para el desarrollo de métodos de evaluación de algunas competencias genéricas comunes a otras asignaturas de Grado de Ingeniería, concretamente la competencia asociada a la comunicación efectiva.

1. INTRODUCCIÓN

A partir de la construcción del Espacio Europeo de Educación Superior (EEES), se presenta a las universidades una gran oportunidad para que se establezcan las reformas necesarias que faciliten la adaptación a la nueva realidad social. Uno de los retos principales que propone la sociedad del siglo XXI al sistema universitario es formar profesionales capaces de afrontar las demandas del ámbito laboral [1]. En esta línea, un objetivo fundamental de la universidad es pasar del contenido al aprendizaje. Este cambio de planteamiento focaliza la atención en los procesos formativos de los estudiantes, y más concretamente, en los resultados de aprendizaje expresados en términos de competencias [2].

Según Tardif [3] la competencia es un “Saber actuar complejo que se apoya en la movilización y la combinación eficaz de una variedad de recursos internos y externos dentro de una familia de situaciones”. La OECD [4] define el término competencia como “la habilidad para enfrentarse a demandas complejas poniendo en acción, en situaciones concretas, recursos psicológicos, habilidades y actividades”.

En el ámbito del EEES las competencias se pueden dividir en dos grupos, las competencias específicas y las competencias genéricas o transversales. Aquellas competencias que se definen como comportamientos observables que se relacionan directamente con la utilización de conceptos, teorías o habilidades propias de la titulación, estarían dentro de las específicas. Sin embargo, en las competencias transversales, nos centraríamos en elementos comunes a cualquier titulación, es decir, que van más allá de una sola disciplina.

Los planes de estudios actuales se basan en la evaluación por competencias, sin embargo la mayoría de los profesores desconocemos como enfocar nuestra asignatura ante este nuevo planteamiento. Estas competencias tienen que ser evaluables, a través de los correspondientes resultados de aprendizaje. Aunque el objetivo final sea planificar por competencias para promover el aprendizaje [5], el primer paso debería ser determinar un método para evaluar el grado de adquisición de las competencias.

Este artículo se centra en determinar el grado de adquisición de dos competencias específicas de la asignatura de Estadística a través de los diferentes métodos de evaluación propuestos en la guía docente. Por otro lado, un estudiante de ingeniería no sólo debe ser capaz de conocer técnica y científicamente su disciplina, sino que además debe saber leer y comunicar verbalmente y por escrito sus ideas [6],[7]. Por tanto, también se va a evaluar la competencia transversal asociada a la comunicación efectiva de forma escrita. Para este último fin, se propone una rúbrica que contempla los aspectos más básicos.

2. OBJETIVOS

Dentro de la asignatura de Estadística, impartida en 2º curso de Grado de Ingeniería Electrónica, existen diversas competencias específicas y transversales (o genéricas) [8]. De todas ellas, nuestro interés se centra en medir el grado de adquisición de dos de ellas: *Resolver problemas matemáticos* (nivel 4) y *Resolver problemas de ingeniería aplicando herramientas informáticas para el análisis de la información* (nivel 3). Además, se propone la evaluación de la competencia transversal redactada como *Comunicar y transmitir conocimientos, habilidades y destrezas en el campo de la ingeniería industrial*.

Actualmente, se emplean tres métodos distintos de evaluación: preguntas de respuesta objetiva (30%), preguntas de respuesta abierta (50%) y entregables (20%).

Las preguntas de respuesta objetiva se realizan para evaluar la parte práctica de la asignatura, que es el uso de un programa informático de estadística para resolver problemas. Las preguntas de respuesta abierta se utilizan con el fin de evaluar la parte teórica. Buscamos estudiar la correlación que existe entre los resultados de ambas pruebas, puesto que los contenidos evaluados son similares.

Tabla 1. Descripción de los tipos de evaluación en la asignatura de Estadística [8].

Nombre	Descripción	N. Actos	Peso
Prueba escrita de respuesta abierta	Prueba cronometrada, efectuada bajo control, en la que el alumno construye su respuesta. Se le puede conceder o no el derecho a consultar material de apoyo.	2	50%
Pruebas objetivas (tipo test)	Examen escrito estructurado con diversas preguntas o ítems en los que el alumno no elabora la respuesta; sólo ha de señalarla o completarla con elementos muy precisos.	2	30%
Portafolio	Conjunto documental elaborado por un estudiante que muestra la tarea realizada durante el curso en una materia determinada.	1	20%

En esta asignatura, las dos competencias específicas que son objeto de estudio, son realmente complementarias. El objetivo final es resolver problemas estadísticos del área de la ingeniería, ya sea *a mano* o con la ayuda de un programa informático. Aunque se está evaluando de forma distinta (prueba de respuesta objetiva y prueba de respuesta abierta), la base teórica que debe conocer el alumno es la misma. Sin embargo, a veces los resultados de ambas pruebas no están correlacionados. Nuestra duda se centra en determinar con qué método estamos favoreciendo más el aprendizaje del alumno y permitiendo, por tanto, una mayor adquisición de las competencias estudiadas. En esta primera fase, el objetivo inicial es entender cómo responden los alumnos ante las distintas pruebas y cuál es su percepción.

Por otro lado, la comunicación efectiva es una competencia transversal indispensable en nuestra asignatura. No sólo hay que saber resolver un problema estadístico, sino que el alumno debe expresarse con claridad. El hecho de considerar esta competencia de forma explícita tiene como finalidad, aparte de formar parte de los objetivos de aprendizaje de la asignatura, el hacer visible esta capacidad que se pretende que los alumnos adquieran en la asignatura [9].

3. METODOLOGÍA

Muchas veces realizamos cambios basándonos en nuestra experiencia profesional como docentes, pero nuestro objetivo es poder realizar estos cambios basándonos en un estudio previo contrastado y no en meras suposiciones. Para poder evaluar los resultados de los análisis propuestos, nos basaremos en dos tipos de evidencias, uno de tipo cuantitativo y otra de tipo cualitativo. El análisis cuantitativo se basará en el estudio estadístico de la correlación de las notas de un alumno, entre las pruebas escritas de respuesta abierta y de respuesta objetiva. Se realizará un análisis descriptivo para conocer mejor la muestra que estamos estudiando y un t-test de muestras apareadas. Utilizamos este tipo de test, ya que son los mismos alumnos los que realizan las dos pruebas (objetiva y de respuesta abierta). Con esta metodología, podemos calcular la diferencia entre ambas notas para cada uno de ellos, de forma que se eliminan los efectos de todos los demás factores salvo el que diferencia a las pruebas. Por otro lado, para comprobar la relación que existe entre ambas variables de forma global se ha utilizado un modelo de regresión lineal simple. Los datos se han analizado a través del programa informático Statgraphics.

Especifica en qué medida te ha ayudado la realización de la siguiente actividad para prepararte la asignatura: 1. Realización de los ejercicios de prácticas con el Statgraphics

1 2 3 4 5

Ninguna utilidad Mucha utilidad

2. Realización de problemas a mano para entregar en las sesiones prácticas

1 2 3 4 5

Ninguna utilidad Mucha utilidad

3. Asistencia a las clases de teoría

1 2 3 4 5

Ninguna utilidad Mucha utilidad

4. Asistencia a las clases de prácticas

1 2 3 4 5

Ninguna utilidad Mucha utilidad

5. Estudio personal en casa (consultando otros libros, haciendo los problemas propuestos, etc.)

1 2 3 4 5

Ninguna utilidad Mucha utilidad

Dentro de las pruebas de evaluación, ¿cuál te ha resultado más difícil de preparar? Señala una sola opción.

Los contenidos de los exámenes y de otros trabajos evaluados han estado en correspondencia con los objetivos del curso y el énfasis que ha puesto el profesor en cada tema.

1 2 3 4 5

Totalmente en desacuerdo Totalmente de acuerdo

Figura 1. Encuesta opinión del alumnado sobre adquisición de conocimientos.

La parte cualitativa estaría representada por la opinión del alumnado. Para ello, se realizó una encuesta en la que los alumnos especificaron que les facilita la adquisición de conocimientos de cara a prepararse la asignatura (Figura 1).

El análisis de las competencias específicas se realizó con datos del curso 2012-2013. En el curso actual, se está evaluando también la competencia transversal relativa a la comunicación efectiva. Los diferentes factores se evaluarán mediante el uso de una rúbrica, como puede verse en la Tabla 2. La rúbrica se está aplicando en la parte del portafolio, donde el alumno debe entregar por escrito unas prácticas resueltas mediante el programa Statgraphics.

Tabla 2. Rúbrica empleada para la evaluación de la comunicación efectiva en prácticas.

NOTAS	10-7.5	7.5-5	5-2.5	2.5-0
Orden y Organización	El trabajo es presentado de una manera ordenada, clara y organizada que es fácil de leer.	El trabajo es presentado de una manera ordenada y organizada que es, por lo general, fácil de leer.	El trabajo es presentado en una manera organizada, pero puede ser difícil de leer.	El trabajo se ve descuidado y desorganizado. Es difícil saber qué información está relacionada.
Terminología y Notación	La terminología y notación correctas fueron siempre usadas haciendo fácil de entender lo que fue hecho.	La terminología y notación correctas fueron, por lo general, usadas haciendo fácil de entender lo que fue hecho	La terminología y notación correctas fueron usadas, pero algunas veces no es fácil entender lo que fue hecho.	Hay poco uso o mucho uso inapropiado de la terminología y la notación.
Explicación	La explicación es detallada y clara.	La explicación es clara.	La explicación es un poco difícil de entender, pero incluye componentes críticos.	La explicación es difícil de entender y tiene varios componentes ausentes o no fue incluida.
Conceptos matemáticos	La explicación demuestra completo entendimiento del concepto matemático usado para resolver los problemas.	La explicación demuestra entendimiento sustancial del concepto matemático usado para resolver los problemas.	La explicación demuestra algún entendimiento del concepto matemático necesario para resolver los problemas.	La explicación demuestra un entendimiento muy limitado de los conceptos necesarios para resolver problemas o no está escrita.

Esta asignatura se imparte en el segundo cuatrimestre, y tiene dos períodos de evaluación que coinciden aproximadamente a principios de abril y a mediados de junio (final de curso). Los análisis aquí propuestos, se realizaron al finalizar el primer período de evaluación.

4. RESULTADOS

Análisis cuantitativo

En primer lugar presentamos unos estadísticos descriptivos sobre las notas obtenidas para cada uno de los exámenes. En la Tabla 3 se recogen tanto la nota promedio como la desviación típica para los exámenes de la prueba de respuesta abierta (RA) y respuesta objetiva (RO) de la parte inicial del temario.

Tabla 3. Estadísticos descriptivos de las notas obtenidas por tipo de examen.

Tipo de Examen	Recuento	Promedio	Desviación Estándar
RA	61	5,41148	2,39319
RO	61	7,10393	2,07463

Con objeto de facilitar la comparación entre ambos tipos de examen, la Figura 2 muestra la distribución de notas, según un gráfico de caja y bigotes (o Box-Whisker). Puede verse que el examen de respuesta objetiva obtiene mejores resultados pues tiene mayor media y menor dispersión, mientras que el de respuesta abierta tiene menor media y mayor dispersión.

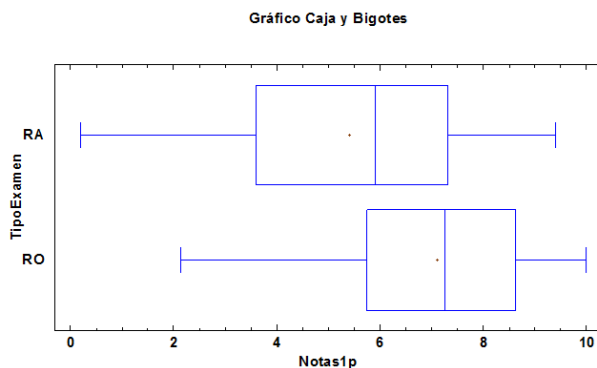


Figura 2. Gráfico de caja-bigotes para comparar los resultados de las diferentes pruebas en el primer parcial.

Por otro lado, para realizar el t-test, consideramos que la variable **1p_RA** se corresponde con la nota obtenida por los alumnos en el primer parcial de la asignatura,

evaluados mediante una prueba de respuesta abierta y **1p_RO** se corresponde con la nota obtenida por los alumnos en el primer parcial de la asignatura, evaluados mediante una prueba de respuesta objetiva. La prueba-t evalúa la hipótesis de que la media de **1p_RA-1p_RO** es igual a 0 versus la hipótesis alternativa de que la media de **1p_RA-1p_RO** es no igual a 0. A través del test de hipótesis comprobamos que las notas medias de los exámenes evaluados mediante pruebas objetivas y pruebas de respuesta abierta son distintas. Las notas obtenidas en las pruebas objetivas son mayores que las obtenidas con las pruebas de respuesta abierta, como podemos observar en el intervalo de confianza (con un NC=95%) donde la diferencia de media esta desplazada hacia valores negativos. Los resultados obtenidos son los siguientes:

Intervalos de Confianza para 1p_RA - 1p_RO

Intervalos de confianza del 95,0% para la media: -1,69246 +/- 0,523413 [-2,21587; -1,16905]

Intervalos de confianza del 95,0% para la desviación estándar: [1,73449; 2,48805]

Prueba t

Hipótesis Nula: media = 0 vs Alternativa: no igual

Estadístico t = -6,46799 ; Valor-P = 2,00602E-8; Se rechaza la hipótesis nula para alfa = 0,05

Además se ha realizado un análisis de regresión para comprobar la relación que existe entre ambas variables de forma global. Utilizamos un modelo de regresión lineal simple, obteniendo un grado de ajuste bastante bueno (R -cuadrada = 89,4%). Como ya habíamos apuntado antes, los resultados en los conocimientos evaluados mediante pruebas de respuesta abierta son ligeramente inferiores a los evaluados mediante pruebas de respuesta objetiva. Obtenemos el modelo de regresión que se muestra en la ecuación 1, y a continuación se presenta el resultado del análisis estadístico de regresión.

$$1p_RA = 0,755441 \cdot 1p_RO \tag{1}$$

Regresión Múltiple - 1p_RA

Variable dependiente: 1p_RA

Variables independientes: 1p_RO

		Error	Estadístico	
Parámetro	Estimación	Estándar	T	Valor-P
1p_RO	0,755441	0,0335812	22,4959	0,0000

Análisis de Varianza

Fuente	Suma de Cuadrados	Gl	Cuadrado Medio	Razón-F	Valor-P
Modelo	1904,2	1	1904,2	506,07	0,0000
Residuo	225,765	60	3,76276		
Total	2129,97	61			

R -cuadrada = 89,4%; Error estándar del est. = 1,93978; Error absoluto medio = 1,51239

Análisis cualitativo

A continuación, vamos a comentar los resultados obtenidos en la encuesta de opinión. La estructura de las clases es semanal, distribuida en dos sesiones de dos horas cada una. En la primera sesión se revisan los conceptos teóricos de la unidad temática correspondiente y se realiza algún problema para reforzar los contenidos estudiados, será lo que denominamos *Clase de Teoría* en la encuesta. En la otra sesión, que denominamos *Clase de Prácticas*, resolvemos problemas sobre la unidad temática estudiada, utilizando el software estadístico Statgraphics o a mano. Los problemas que se resuelven con el Statgraphics están dentro de un cuadernillo de prácticas, que deben entregar cada semana. Sin embargo, los problemas resueltos a mano, se entregan el mismo día de la práctica.

El grado de utilidad para prepararse la asignatura que le adjudican los alumnos a los ejercicios realizados con el Statgraphics y los ejercicios realizados a mano no es el mismo. Mientras que los ejercicios de prácticas realizados con el Statgraphics sólo un 34% contesta que le ha sido de bastante o mucha utilidad, en el caso de los ejercicios resueltos a mano aumenta hasta un 57%. El contenido de los ejercicios es similar, la diferencia es que los ejercicios a mano se corrigen y entregan al cabo de unas sesiones, mientras que los del Statgraphics la nota se les da al final de curso. Aquí entra en juego un factor muy importante como es la realimentación a los alumnos. Aunque los ejercicios de prácticas con el Statgraphics se hacen en clase, y se van supervisando durante la sesión, les falta la confirmación formal de que lo han hecho bien.

Con relación a la utilidad que tiene para los alumnos asistir a las clases de teoría respecto a las clases de prácticas, observamos nuevamente una discrepancia entre los resultados. Sólo el 31% considera que asistir a las clases de teoría es de bastante o mucha utilidad para prepararse la asignatura, mientras que la asistencia a las clases de prácticas este porcentaje es mayor, concretamente del 44%. En la clase de prácticas, donde los grupos son más reducidos, es donde se pueden aplicar metodologías docentes más participativas, mientras que en la de teoría, principalmente se aplica la clase magistral.

Por último, el 57% de los alumnos afirma que la prueba que más difícil le ha resultado de preparar es la de respuesta abierta, mientras que sólo un 22% afirma que ha sido la de respuesta objetiva. Estos resultados están totalmente correlacionados con el análisis estadístico que hemos realizado en el anterior apartado. Efectivamente, no sólo en el análisis cuantitativo se observa que la prueba de respuesta abierta es más difícil, sino que también se corrobora con la opinión de los propios alumnos.

5. CONCLUSIONES

A partir del análisis de los resultados anteriormente expuestos, llegamos a una serie de conclusiones sobre esta fase inicial del estudio.

En el caso de la competencia “*Resolver problemas matemáticos*” se desglosa en una serie de resultados de aprendizaje. Cada una de las pruebas permite en mayor o menor medida la adquisición de ese resultado de aprendizaje. A cada una de las pruebas se le ha asignado un valor en función del grado que consigue, tal como está planteado el sistema en la actualidad (Tabla 4).

Tabla 4. Resultados de aprendizaje vs Pruebas

Resultados de aprendizaje	Prueba RA	Prueba RO	Portafolio
Identificar las componentes y dificultades del problema	Nivel Alto	Nivel Medio	Nivel Medio
Plantear correctamente el problema antes de su resolución	Nivel Alto	Nivel Alto	Nivel Medio
Combinar elementos previamente estudiado para dar solución a un problema o situación nueva.	Nivel Alto	Nivel Medio	Nivel Medio

A la prueba de respuesta abierta se le ha asignado un nivel alto en todos los resultados de aprendizaje, porque es la más completa. En la prueba de respuesta objetiva, se le ha puesto nivel medio en dos de los apartados, porque no tienes que desarrollar la respuesta y muchas veces se exigen respuestas cortas, en las que no es necesario combinar elementos de diferentes temas. Con relación al portafolio, también se le ha asignado nivel medio en todos los apartados porque sólo consiste en la realización de problemas matemáticos, pero a un nivel más básico.

Las conclusiones que se han obtenido a partir del análisis se pueden dividir en tres grupos: relación entre las notas obtenidas con pruebas de respuesta objetiva y de respuesta abierta, adquisición de conocimientos a través del portafolio y adquisición de conocimientos a través de las clases prácticas y teóricas.

- 1) Las notas obtenidas para las pruebas de respuesta objetiva y pruebas de respuesta abierta para un mismo alumno son ligeramente distintas, obteniendo mejores resultados en las pruebas de respuesta objetiva. Las pruebas de respuesta abierta les han resultado más difícil de preparar, puesto que tienen que desarrollar la respuesta. Esto se observa tanto en los resultados obtenidos, como en las propias apreciaciones de los alumnos.
- 2) Aquellos ejercicios del portafolio sobre los que tienen realimentación (*feedback*) son los que consideran que les ayudan más en la adquisición de conocimientos.

- 3) En relación a las clases, consideran que las clases prácticas les ayuda más en la adquisición de conocimientos que las clases teóricas. Las clases prácticas son más participativas y la atención es más personalizada.

Todas estas conclusiones se traducen en una serie de mejoras para el próximo curso:

- 1) La prueba de respuesta objetiva se debería rediseñar para facilitar la consecución de los resultados de aprendizaje previstos y que se alcance un nivel alto en todos los ítems.
- 2) Se debería sacar más partido al portafolio, realizando otro tipo de ejercicios en los que se mejore el nivel de adquisición de los objetivos y aumente la realimentación.
- 3) Deberíamos rediseñar la planificación de la asignatura para que tengamos más flexibilidad, y poder introducir diferentes tipos de metodología docente más participativa en la clase teórica. Esta parte se podría evaluar a partir de una especie de portafolio, con lo que también mejoraríamos la adquisición de las competencias del estudio.

Agradecimientos

Los autores del trabajo agradecen la ayuda prestada por los técnicos del ICE de la Universitat Politècnica de València (UPV). Este trabajo ha sido financiado por el Vicerrectorado de Estudios, Calidad y Acreditación y la Escuela Técnica Superior de Ingeniería del Diseño (ETSID) a través de la convocatoria de ayudas para PIME 2013-2014 de la UPV, con el proyecto código B15/13.

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PROPUESTAS DE EXPERIENCIAS DOCENTES EN EL DESARROLLO Y EVALUACIÓN DE LA COMPETENCIA “TRABAJO EN EQUIPO Y LIDERAZGO”

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Resumen.

La acreditación internacional a través de certificaciones como ABET (Accreditation Board for Engineering and Technology), pone de manifiesto la necesidad tanto de trabajar de forma coordinada las competencias transversales en las titulaciones, como de desarrollar herramientas validadas que permitan evaluar y cuantificar el grado de adquisición de dichas competencias por parte de los estudiantes a fin de poder certificar la consecución de los niveles mínimos recogidos en la titulación de Grado.

Esta comunicación aborda dos propuestas de desarrollo y evaluación de la competencia “liderazgo y trabajo en equipo”, que constituye la dimensión competencial nº8 de la Universitat Politècnica de València. Son experiencias docentes que si bien están adaptadas a grupos reducidos de las titulaciones de grado en Biotecnología y grado en Arquitectura Técnica, por su enfoque generalista pueden ser extrapolables a otras titulaciones. Los puntos comunes son el desarrollo de un código de buenas prácticas para el trabajo cooperativo, así como una evaluación basada en la autoevaluación y en la coevaluación, involucrando a los estudiantes en la medición objetiva de la competencia.

Palabras clave: buenas prácticas, coevaluación, autoevaluación, EEES

1. INTRODUCCIÓN Y OBJETIVOS

La presente ponencia es consecuencia de un proyecto de innovación y mejora educativa con título “Desarrollo de metodologías de adquisición y evaluación de la competencia trabajo en equipo y liderazgo”, formado por un grupo de profesores de distintas disciplinas de la Universitat Politècnica de València (UPV).

La competencia de “trabajo en equipo y liderazgo” es definida por Villa y Poblete [6] como la integración y colaboración de forma activa en la consecución de objetivos comunes con otras personas, áreas y organizaciones, influyendo sobre las personas y/o grupos, anticipándose al futuro y contribuyendo al desarrollo personal y profesional. De acuerdo con estos autores se trata de una de las competencias clave (core competence), pues suponen pensar analítica y sistemáticamente, administrar el tiempo de trabajo, participar en toma de decisiones y en gestión de objetivos y proyectos.

La evaluación de estas competencias debería ser llevada a cabo por tanto, no sólo por el profesor sino que también debe de incluir una autoevaluación y una evaluación de pares como complemento, puesto que son ellos quienes mejor conocen el funcionamiento del grupo. Los instrumentos clásicos utilizados son las entrevistas y sesiones de seguimiento, la planificación de objetivos, las hojas de rutas y plantillas de evaluación (rúbricas) [1]. Sin embargo otros autores como Golobardes et al [3] sostienen la dificultad de establecer un sistema de rúbricas eficiente y enuncian una serie de indicadores objetivos tales como homogeneidad de calificaciones, diferencias entre la nota de grupo y las individuales, calidad de las notas obtenidas y presencialidad.

Por lo tanto, según lo expuesto, parece necesario no sólo desarrollar instrumentos que nos faciliten la evaluación de las competencias y por tanto trasladar progresivamente nuestro sistema a una “evaluación POR competencias”, sino que también resulta imprescindible integrar dichas competencias en las asignaturas, plasmándolas en actividades. No podemos plantearnos llevar a cabo la evaluación sin previamente haber enseñado el objeto de lo que va a ser evaluado.

2. PROPUESTA DE EXPERIENCIA DOCENTE EN EL GRADO DE ARQUITECTURA TÉCNICA

Justificación /motivación

Tras detectar de nuestra experiencia docente las carencias de dicha competencia por parte de los alumnos en las distintas disciplinas, entendimos necesario compartir las experiencias propias e intentar formular unos parámetros comunes para su desarrollo y evaluación y, además, que fuera posible su extrapolación para todo el ámbito de la UPV.

Por un lado, la inmadurez personal de los alumnos, asociado en la mayoría de las ocasiones a su edad, y que algunos padecen vergüenza por hablar en público, les formula, en primer lugar, una barrera para desarrollar algunas de las competencias, en especial la de trabajo en equipo.

Por otro, la falta de motivación e incluso el pasotismo generado por la intención por parte de un sector de los estudiantes de aprobar las asignaturas con el mínimo esfuerzo, hace que los trabajos en equipo puedan constituir un trauma para algunos grupos porque siempre existe algún alumno que apenas participa y esa carencia debe ser suplida por el resto de componentes, llegando a existir disputas y mal ambiente en las aulas.

Objetivos

En relación a la citada dimensión competencial de “trabajo en equipo y liderazgo” en el campo de Ingeniería de la Edificación, se establece la experiencia y la innovación en la asignatura Construcciones Históricas.

Se detecta existe una carencia global en varios de los aspectos fundamentales en el trabajo en grupo, como serían la poca participación e implicación por parte de algunos de los componentes, aspecto fundamental para el éxito de un equipo de trabajo.

Debido a estas carencias, se pretende desarrollar una innovación docente para que el trabajo en equipo sea atractivo y que con la participación de los mismos desarrollen la iniciativa, siendo uno de las claves del liderazgo, cuya base principal radica en el conocimiento de la materia.

En la vida profesional, serán los máximos dirigentes de un proceso de trabajo y, en otras, formarán parte de un equipo multidisciplinar con el fin de llevar a cabo una tarea determinada.

En ambos aspectos, se necesita la asunción de ciertos códigos deontológicos y humanos para ser líderes y para formar parte de un equipo de trabajo y que consideramos necesarios sean asumidos en su formación universitaria.

Los alumnos estudiantes del Grado de Ingeniería de la Edificación, tienen en su futuro profesional ser los Directores de Ejecución de Obra en edificación, serán los Jefes de Obra o project manager en pequeñas o grandes empresas; estas dos últimas tareas encargados de un correcto proceso de obra y una óptima coordinación de la obra para que esta sea fluida. Además, es un cargo en el que en la mayoría de las ocasiones tienen el control económico de la obra.

La asignatura de Construcciones Históricas (4’5 créditos) pertenece al grupo de las asignaturas troncales de tercer curso en el citado grado, tiene una duración de un cuatrimestre y son muchos los conceptos que se imparten, debido a que se les inicia en el comportamiento estructural de las estructuras históricas y se estudia la evolu-

ción de las construcciones desde la Antigua Grecia (siglo VII a.C.) hasta los inicios de la revolución industrial, finalizando a inicios del siglo XX.

Las propuestas que se lanzan en dicha asignatura del citado grado, son la de activar e impulsar el ingenio personal, que con el conocimiento y asimilación de conceptos teóricos previos, desarrollar la competencia de trabajo en equipo y liderazgo. De esta forma se entiende se facilita el proceso de aprendizaje de una asignatura cuatrimestral y que es fundamental para aquellos alumnos que se dedicarán profesionalmente a la restauración y/o rehabilitación del patrimonio arquitectónico. Por otro lado, el formar parte de un grupo de trabajo, existen otros factores como:

- Permite alcanzar objetivos que una sola persona no podría.
- Incrementa la seguridad personal.
- Mejora la autoestima.

Metodología

En la citada asignatura, al estar desglosada en parte teórica y parte práctica se establece una propuesta para trabajar esta competencia en las sesiones establecidas como prácticas.

Se explica las tareas a realizar en la práctica y se conforma un grupo de trabajo de 4 componentes, las mismas partes que compone la práctica, conocida como fase de FORMACION. La práctica debe tener una duración de una hora y cuarenta y cinco minutos, teniendo como documentación de trabajo los apuntes relativos al citado temario. La duración queda establecida con la misma duración de la que dispondrán en los dos exámenes globales establecidos por la Dirección del centro.

Lo que se pretende en las citadas prácticas es que cada componente asuma el rol de “portavoz” de su grupo en la corrección de la práctica, tarea realizada en clase y que se considera como la tercera sesión. La primera sería la sesión teórica, estableciendo por parte del profesor intervalos de teoría de una duración de unos veinte minutos con tareas como el “one minute paper” o “feed back” para comprobar la asimilación de los conceptos por parte del alumno; debiendo existir un alto compromiso del profesor para que comprendan el temario y sea un aprendizaje efectivo.

Es en esta primera sesión cuando el profesor establece un primer contacto con los alumnos y por la participación de estos según hayan asimilado el contenido teórico ya predetermina qué alumnos han comprendido la materia y bosqueja una aproximación a los que serán un ejemplo de liderazgo, basado básicamente en su conocimiento de la materia a la hora de trabajar los alumnos sin la presencia del profesor.

La segunda sesión estaría realizada fuera del aula, pero que los alumnos que forman el grupo ya deben consensuar el lugar, horario y forma de trabajo para su productividad y llegar a obtener el incentivo de la práctica bien resuelta. Es aquí donde em-

pieza la verdadera tarea del liderazgo y la asunción de los roles por parte de los componentes del equipo, porque siempre estará el alumno que tome iniciativa y sea el que establezca el consenso entre todos (FASE DE TORMENTA).

En la resolución de la práctica, por la similitud de algunos conceptos en los distintos bloques, deben realizar como un negociado de qué parte debe considerarse y en qué forma parte de un bloque o de otro o en qué medida considerarlo. En las arquitecturas históricas, los métodos constructivos, los aspectos estructurales y medios auxiliares están intrínsecamente relacionados, por lo que cada alumno que se encarga de un bloque en cuestión debe reflexionar al respecto, despertando la curiosidad por el aprendizaje y el profundizar en la materia, aspecto que podríamos considerar como propio de un aprendizaje.

La tercera sesión será la corrección en clase e independientemente de la corrección de la práctica, se establecen a los alumnos cuestiones más profundas sobre la materia y en el que puede participar en primer lugar, cualquier componente del grupo, y en caso de no conocer la respuesta o no dar con la respuesta acertada, se abre la pregunta para el resto de los grupos, favoreciendo una sana rivalidad en la clase y competitividad, además, de ser más ameno el aprendizaje. Estas dos últimas partes de la práctica, serían la FASE DE DESEMPEÑO.

Además, tras esta resolución de cuestiones en el que el alumno debe haber adquirido ciertos conocimientos el profesor puede explicar nuevos aspectos más complejos o profundizar a un nivel de mayor rigor científico.

Por otro lado, se trabaja la competencia en cuestión “trabajo en equipo y liderazgo”, que es uno de los requisitos de la innovación docente, pero en el que tenemos cierta complejidad a la hora de evaluar.

Evaluación

El incentivo que se establecía hasta la fecha era el determinado por la entrega obligatoria de las prácticas para aprobar la asignatura y la demostración del aprendizaje, pero se detecta que avanza el número de alumnos que por cursos pasados tienen resueltas parcialmente las citadas prácticas y no llegan a alcanzar el nivel deseado de conocimiento de la materia.

Una de las propuestas de innovación e investigación que se pretende realizar viene determinada en la evaluación, uno de los aspectos que se considera deficiente, si lo deseamos establecer con criterios objetivos. En este aspecto, cabe citar que la misma UPV con su departamento del Instituto de Ciencias de la Educación (ICE) está realizando una investigación para establecer los parámetros objetivos sobre las dimensiones competenciales, desarrollando aspectos prácticos de medición como las rúbricas, por ejemplo.

Los resultados que se pretenden conseguir con esta innovación docente, es la adquisición de la competencia por parte del alumno a través de un baremo objetivo para maximizar su interés y participación en el equipo de trabajo, con el fin de que su paso al mercado laboral sea determinado con cierto éxito, ya que van a adquirir desde el primer día responsabilidad civil y penal.

3. PROPUESTA DE EXPERIENCIA DOCENTE EN EL GRADO DE BIOTECNOLOGÍA

Esta propuesta ha sido diseñada para llevarse a cabo en un grupo de primer curso del grado de Biotecnología de la UPV, dentro de la asignatura “Economía de la empresa biotecnológica”. En esta asignatura se pretende familiarizar al alumno con el vocabulario técnico específico económico, identificar los distintos subsistemas que integran una empresa biotecnológica y aportar los conocimientos básicos para la correcta resolución de problemas de índole económico.

Se trata de un grupo ARA (Alto Rendimiento Académico), en el cual la docencia de las asignaturas se realiza en inglés. Son alumnos de un perfil académico diferenciado, que acceden normalmente a la titulación con notas superiores en Bachillerato y Selectivo. El grupo cuenta con aproximadamente 50 alumnos y se desdobra en dos grupos para las prácticas y seminarios.

Justificación

La asignatura trabaja diversas competencias, tanto genéricas como específicas. En la tabla 1 se recogen las competencias actuales recogidas en la guía docente de la asignatura, entre las que figura específicamente “trabajar en equipos multidisciplinares y multiculturales”.

Tabla 1. Competencias recogidas en la guía docente de la asignatura *Economía de la empresa biotecnológica* en la UPV

Genéricas	Específicas
Capacidad para la búsqueda y utilización de información	Asesorar en el ámbito de la biotecnología
Competencia para el aprendizaje continuo y en entornos cambiantes	Utilizar herramientas matemáticas
Capacidad de resolver problemas complejos.	Participar en investigación, desarrollo e innovación
Diseñar estrategias experimentales	Combinar conocimientos de disciplinas básicas y aplicadas
Desarrollar un espíritu creativo y emprendedor	Crear y gestionar empresas biotecnológicas
Capacidad de evaluación crítica	Definir nuevos mercados y oportunidades de negocio

Trabajar en equipos multidisciplinares y multi-culturales	Manejar e interpretar la normativa propia de la Biotecnología
Capacidad de utilizar los medios de comunicación	Dirigir, redactar y ejecutar procesos y servicios
Desarrollar una actividad profesional comprometida	Valorar el impacto social y ambiental

Fuente: UPV [5]

Dado que esta asignatura constituye la primera aproximación de los alumnos a la materia de Economía resulta especialmente adecuado trabajar en pequeños grupos durante las sesiones de prácticas y seminarios, de esta forma se potencia el aprendizaje, se crea un sentido de seguridad grupal y se trabaja la comunicación.

Se ha decidido por tanto dotar de herramientas a los alumnos para potenciar este aspecto de su formación, enseñándoles activamente cómo lograr que el trabajo en equipo sea efectivo y evaluando sus progresos en este sentido.

Objetivos

Los alumnos al finalizar sus estudios universitarios deben mostrar su competencia en los aspectos incluidos en la titulación correspondiente. Las competencias genéricas o transversales, respondiendo a su denominación, se desarrollan a lo largo de los estudios, trabajándose en diversos niveles. Es evidente que no esperaremos los mismos resultados de un trabajo en equipo en un grupo de alumnos de primero que en uno de tercero.

Los objetivos fijados en relación a la competencia “trabajo en equipo y liderazgo” para el grupo de primer curso se fijan para el grupo en conjunto e individualmente:

Objetivos relativos al funcionamiento del grupo:

- Ser capaz de elegir un responsable que coordine el grupo y facilite la toma de decisiones
- Ser capaz de dividir el trabajo en tareas y asignarlas junto con plazos y responsables
- Definir un estándar de calidad para el trabajo que se va a realizar
- Asumir de forma conjunta la responsabilidad del trabajo presentado

Objetivos individuales:

- Colaborar activamente en la toma de decisiones del grupo
- Desempeñar el papel asignado dentro del grupo
- Cumplir las tareas encomendadas en tiempo y forma

Desarrollo de la competencia “trabajo en equipo y liderazgo”

Como núcleo fundamental en este apartado se propone el trabajo en base a un “código de buenas prácticas”, elaborado de forma conjunta por profesores de diversos ámbitos. Dicho código será relativamente sencillo y estará adaptado a los diversos niveles de complejidad de las competencias. La intención es proporcionar un documento de referencia a los alumnos para ayudarles en el desarrollo de los trabajos en equipo.

A lo largo del curso los alumnos realizan 5 seminarios en aula. Se trata de sesiones que abordan elementos concretos del temario en los que, por su complejidad, resulta más adecuado su trabajo en pequeños grupos. En estas sesiones se realiza una pequeña introducción por parte del profesor para a continuación trabajar en grupo actividades diseñadas en relación a la materia. Se han seleccionado tres sesiones que por sus características refuerzan las habilidades de trabajo en equipo y liderazgo:

- Sesión 1 (semana 5). En la introducción el profesor planteará no sólo la actividad en sí sino también –basándose en el código de “buenas prácticas” desarrollado- comentará las actitudes y la forma de trabajar en equipo de forma exitosa. La tarea a desarrollar está basada en el juego “The Zin Obelisk” [2], habiendo sido adaptada a los contenidos de la asignatura. El grupo debe trabajar de forma conjunta para conseguir alcanzar una solución que es única. A continuación se realiza una segunda actividad basada en los distintos perfiles (facilitador, mediador, líder, gestor, etc.) que desarrollan los miembros de un equipo, a fin de caracterizar el papel que desempeñan cada uno de ellos de forma predominante en su grupo y reflexionar sobre ello.
- Sesión 2 (semana 7). Esta sesión constituye uno de los núcleos del programa de la asignatura, en ella los alumnos forman grupos de 5 personas y deben elaborar una parte de un plan de empresa. Para ello se les facilita información sobre una empresa real, un guión de contenidos mínimos del plan y la rúbrica con la que posteriormente serán evaluados. El trabajo comienza en el aula pero se desarrolla fundamentalmente de forma no presencial. Cada grupo deberá distribuir responsabilidades entre sus miembros y realizar una planificación del trabajo que será presentada al profesor.
- Sesión 3 (semana 12). Los grupos formados presentan el trabajo en clase.

Evaluación de la competencia “trabajo en equipo y liderazgo”

Siguiendo la máxima de “lo que no se mide, no existe”, en esta asignatura se evalúan y califican todas las sesiones de seminarios. La novedad a incluir en base a este proyecto es la introducción del desempeño individual en el trabajo grupal. Este hecho es de vital importancia de cara a reconocer plenamente de cara al alumno la

importancia que tiene este contenido transversal. Caer en el error de no calificarlo o incluso peor aún no evaluarlo, da a entender al alumno que se trata de un elemento secundario en su formación, por detrás de los contenidos formales de la sesión. Es por tanto un mensaje no coherente con las acciones que hemos llevado a cabo e impediría la consecución de los objetivos fijados.

No obstante es evidente que existe una dificultad clara en el hecho de evaluar y calificar una actividad a la que no tenemos acceso como profesores, es por ello que nuestra propuesta reside en delegar esta tarea a los propios alumnos, haciéndoles responsables tanto de su propia calificación como la de los compañeros de su grupo. La propuesta concreta que se realiza es que el profesor evalúa y califica el resultado presentado por el grupo, asignando una nota numérica. Dicha nota será multiplicada por el número de miembros del grupo y serán ellos mismos los que deberán repartir dichos puntos entre ellos. De esta forma existe la posibilidad de que lleguen a una solución de compromiso en la que todos reciben la misma nota o es posible que decidan reconocer el trabajo de quienes han contribuido en mayor medida a alcanzar los objetivos y decidan un reparto individualizado.

Partimos de la hipótesis de que posiblemente en las primeras experiencias bajo este sistema de evaluación los alumnos tenderán a evitar el conflicto, asumiendo todos la misma nota pero que con el tiempo y la experiencia –hay que recordar que esta competencia se trabaja a lo largo de toda la titulación- atenderán a criterios objetivos a la hora de realizar el reparto.

La evaluación se realizará de la siguiente forma:

- Sesión 1 (semana 5). La evaluación de esta primera sesión será individual. Se realizará a través de Poliformat (plataforma de teleformación de la UPV) con una combinación de preguntas de tipo test y abiertas o semiabiertas para evaluar conocimientos adquiridos y la experiencia del trabajo en grupo.
- Sesión 3 (semana 12). Los grupos formados presentan el trabajo elaborado en clase. La evaluación de la presentación y contenidos es llevada a cabo tanto por sus compañeros como por el profesor. La calificación recibida, multiplicada por el número de miembros es entregada a cada grupo para que asignen de forma autónoma la nota que crean que les corresponde a cada uno de ellos en función de cómo ha funcionado el grupo y de su contribución al mismo.

4. CONCLUSIONES

Es una realidad que el EEES ya está implantado en el sistema de educación superior en España, ha supuesto un considerable esfuerzo para todos los estamentos de la universidad y sin embargo todavía adolece de ciertas carencias. Entre ellas queda la cuestión del tratamiento de las competencias genéricas, la coordinación para su

desarrollo a lo largo del Grado y la acreditación del grado de consecución, la evaluación.

Este trabajo pretende contribuir con dos propuestas docentes en este aspecto, abordando una competencia que ha sido definida como “dimensión competencial” en la UPV y que razonablemente estará integrada también en la mayoría de los planes de estudio de las diversas titulaciones.

No obstante creemos que debe incrementarse el conocimiento sobre este tipo de experiencias, que nos enriquecen profesionalmente, mejoran nuestra actividad, refuerzan nuestro compromiso docente y nos animan a continuar en la mejora de las metodologías de aprendizaje.

Agradecimientos

Los autores del trabajo agradecen la ayuda prestada por los técnicos del ICE de la Universitat Politècnica de València (UPV). Este trabajo ha sido financiado por el Vicerrectorado de Estudios, Calidad y Acreditación y la Escuela Técnica Superior de Ingeniería Agronómica y del Medio Natural (ETSIAMN) a través de la convocatoria de ayudas para PIME 2013-2014 de la UPV, con el proyecto código B14/13.

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EXPERIENCIA DE APRENDIZAJE COOPERATIVO MEDIANTE PUZLE DE ARONSON: APLICACIÓN EN INGENIERÍA DE ORGANIZACIÓN

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Resumen

Este trabajo describe los resultados de la aplicación de la técnica conocida como Puzzle de Aronson a dos grupos de diferentes asignaturas del área de Ingeniería en Organización. Los alumnos pertenecían a dos grados de Ingeniería (en Organización y en Tecnologías Industriales). La experiencia es planteada para lograr objetivos de aprendizaje cooperativo, en los que los participantes resuelven una parcela de una tarea más extensa, dependiendo de la labor de los compañeros para alcanzar el éxito en la misma. La percepción de los estudiantes demuestra la utilidad de la actividad hacia su motivación y participación activa, en diferentes nivel de aceptación y aplicabilidad por parte de los distintos colectivos de alumnos.

1. INTRODUCCIÓN

Entorno General y aprendizaje cooperativo

El Espacio Europeo de Educación Superior EEES implica la transición de un modelo educativo centrado en la enseñanza, hacia un modelo centrado en el aprendizaje autónomo del alumno. En este nuevo enfoque, el protagonista es el propio estudiante, que abandona su tradicional posición pasiva para adoptar un papel activo en el proceso de aprendizaje [1]. El profesor, en última instancia, no podrá actuar sólo como simple transmisor de conocimientos; tendrá que impulsar el aprendizaje de las competencias y habilidades que tengan que adquirir los estudiantes.

Por ello, será necesario recurrir a estrategias metodológicas que propicien el cambio de roles. Ya no se puede utilizar una metodología “tradicional” basada en clases magistrales y problemas que el profesor resuelve en el aula. Incluso las prácticas de laboratorio deben cambiar su enfoque para conseguir nuevos objetivos, y lograr que los alumnos adquieran una serie de capacidades, que, por lo general, antes no se tenían en cuenta ni se evaluaban, como son la capacidad de trabajo en grupo, la capacidad de realizar exposiciones orales, etc.

En este entorno, parece cobrar cada vez más importancia el “Aprendizaje cooperativo”. El aprendizaje cooperativo es una metodología didáctica que parte de la organización de la clase en pequeños grupos mixtos y heterogéneos donde los alumnos

trabajan juntos y de forma coordinada para resolver tareas académicas y desarrollar su propio aprendizaje [2].

Sin embargo, que los estudiantes trabajen juntos, sin más, no necesariamente produce una situación de aprendizaje cooperativo. Los elementos básicos necesarios para que un trabajo en grupo sea auténticamente cooperativo son cinco [1]:

1. Interdependencia positiva: que se produce cuando los componentes del grupo son conscientes de que el éxito de cada uno de ellos depende del éxito de los demás. Nadie puede alcanzar sus objetivos si no lo alcanzan también el resto de componentes del grupo.

2. Interacción positiva cara a cara: cada estudiante del grupo necesita, para llevar a cabo con éxito su tarea individual, que los compañeros del grupo alcancen exitosamente, también, sus tareas individuales. Para ello, debe compartir recursos con ellos y darles todo el soporte y ayuda precisos (por ejemplo, explicaciones orales con relación a cómo resolver problemas, explicar un determinado concepto o conocimiento a los demás, asegurarse de que lo han entendido, discutir los conceptos relacionados con aquello en lo que se está trabajando y que conectan el trabajo presente con aquello que se aprendió en el pasado), a la vez que disfrutará y agradecerá la tarea alcanzada por los demás.

3. Responsabilidad individual. En cada sesión deben establecerse dos niveles diferentes de responsabilidad que serán evaluados por el profesor: el grupo debe ser responsable de alcanzar sus objetivos y cada componente del grupo debe ser responsable de contribuir, con su actitud y tarea, a la consecución del éxito del trabajo colectivo.

4. Enseñar a los estudiantes a desarrollar habilidades interpersonales y de grupo: los estudiantes deben adoptar un doble compromiso con la tarea (el aprendizaje del tema académico) y con el trabajo de equipo (funcionar efectivamente como un grupo).

Las habilidades sociales necesarias para hacer efectivo el trabajo cooperativo no aparecen por sí solas cuando se utilizan las sesiones cooperativas. Las habilidades sociales deben enseñarse a los estudiantes como una finalidad y como habilidades académicas en sí mismas. El liderazgo, la toma de decisiones, la construcción de la confianza, la comunicación y las habilidades en resolver conflictos, deben guiar tanto el trabajo del equipo, como sus relaciones, a efectos de alcanzar los contenidos de manera exitosa.

Asimismo, y puesto que la cooperación va asociada intrínsecamente a los conflictos, los procedimientos y habilidades para resolver y conducir estos conflictos de

manera constructiva serán especialmente importantes para el éxito a largo plazo de los grupos de aprendizaje y del éxito individual de cada uno de sus componentes

5. Autoanálisis o reflexión sobre el trabajo del grupo, que se produce cuando los componentes del grupo discuten cómo van alcanzando sus objetivos y qué efectividad tiene su relación de trabajo.

Los grupos necesitan poder describir qué acciones y tareas de sus miembros son útiles y cuales son inútiles a la hora que tomar decisiones acerca de qué conductas deben mantenerse, corregir o cambiar.

De forma muy sucinta cabría señalar que, mediante la aplicación del aprendizaje cooperativo, se pueden alcanzar los siguientes objetivos [3]:

- a) Incrementar el nivel de aprendizaje mediante la interacción.
- b) Facilitar diferentes estilos de aprendizaje.
- c) Conseguir mayor retención de la información.
- d) Fomentar la verbalización de pensamientos e ideas.
- e) Fomentar el desarrollo de habilidades, valores y actitudes.
- f) Dar retroalimentación a tiempo.
- g) Reducir los niveles de abandono.
- h) Bajar el nivel de ansiedad en los alumnos de nuevo ingreso.
- i) Enseñarles a pensar.

El Puzzle de Aronson

Entre las diversas manifestaciones o técnicas de aprendizaje cooperativo, creemos que el Jigsaw, “técnica de rompecabezas o mosaico” o “La Técnica Puzzle de Aronson (TPA)” [4] es una de las de las más representativas, y que mayor atención ha recibido últimamente de la investigación educativa [2].

Esta técnica consiste en subdividir a la clase en equipos de trabajo denominados “grupos puzle”. Cada alumno recibe un trozo de tema que tiene que leer, estudiar y preparar. A continuación, los alumnos de los diferentes grupos que tienen el mismo fragmento se reúnen en “grupos de expertos”, donde se discute y se profundiza en la información de cada parte. Por último, cada estudiante vuelve a su grupo puzle para exponer su fragmento –una vez completada con la información del grupo de expertos– y recibir la información del resto de sus compañeros y compañeras, de manera que la totalidad del trabajo estará condicionado por la mutua cooperación y responsabilidad entre los miembros del grupo puzle.

2. DESCRIPCIÓN DE LA INNOVACIÓN EDUCATIVA REALIZADA

Contextualización

Las asignaturas objeto de estudio se imparten ambas en títulos de grado en la Escuela Técnica Superior de Ingenieros Industriales de Valencia (tabla 1). Ambas comparten ciertos contenidos, si bien los mismos se imparten a nivel introductorio en la asignatura de primer curso, de carácter mucho más generalista. Se escogió un grupo de cada asignatura con similar número de alumnos matriculados (unos 70 aproximadamente). Si bien en el grupo de alumnos mayores la respuesta a la encuesta realizada por internet fue del 100%, en el caso de los alumnos de primero tan sólo 27 respondieron.

Curso	Título	Crédts. ECTS	Curso	Pobl. alumnos	Resp. encuestas	%
Empresa y Economía Industrial	Grado en Ingeniería en Tecnologías Industriales	6	1º	64	27	42%
Análisis de Costes y Selección de Inversiones Industriales	Grado en Ingeniería de Organización Industrial	4,5	3º	77	77	100%

Tabla 1.- Asignaturas objeto de estudio

Dentro de las competencias objetivo de la asignatura, a alcanzar señalamos aquellas que buscamos potenciar con la actividad (tabla 2):

Principales Competencias objetivo de la actividad
Estar capacitado para trabajar en equipo en un entorno multilingüe y multidisciplinar.
Comunicarse efectivamente con otras personas.
Resolver problemas con iniciativa propia y con espíritu emprendedor, toma de decisiones, creatividad, razonamiento crítico y comunicar y transmitir conocimientos, habilidades y destrezas en su campo.
Disponer de las bases necesarias y de la motivación para el aprendizaje autónomo con el convencimiento de que el aprendizaje es continuo a lo largo de la vida.

Tabla 2.- Competencias objetivo de la asignatura “Análisis de Costes e Inversiones Industriales”

Nuevo procedimiento de enseñanza aprendizaje. Práctica 1 “El puzle de Aronson”. Metodología.

La dinámica de la actividad de la asignatura fue la siguiente:

- Se dividió a los alumnos de la práctica en grupos de trabajo de cuatro personas, de forma que cada uno de ellos sería el “experto” de un tipo de coste (variable, fijo, directo e indirecto).
- Tras ello, se les dio a los grupos de alumnos un conjunto de costes extraídos de un caso de una empresa, que el grupo debía clasificar en Fijos, variables, directos e indirectos..
- Se realizó una primera clasificación por parte de cada grupo.
- Con esa clasificación, los “expertos” en cada tipo de coste se reunieron, y argumentaron y razonaron porqué se habían incluido en esa clasificación en el tipo de coste del que eran expertos.
- Tras la meditación por parte de los grupos expertos, los alumnos volvieron a reunirse en los grupos originales, y volvieron a clasificar los costes de nuevo, teniendo en cuenta las opiniones de todos los expertos.

3. ENCUESTA

Para obtener un feedback de la actividad realizada por parte del alumnado, se ha utilizado una encuesta, con la que se buscaba principalmente, mediante una escala Likert de 5 puntos, valorar el grado de participación activa, motivación y autoaprendizaje, siguiendo una metodología similar a (Palomares Casado et al., 2007)

[5] El cuestionario se describe en la tabla 3.

Número	Pregunta	Variable
1	Valora el grado de utilidad que consideras que tiene para tí esta actividad	Utilidad
2	Valora el grado de satisfacción personal al atender a esta actividad	Satisfacción
3	Valoración general de esta actividad (se valora del 0 al 10)	General
4	¿El DOE (organización de empresas) organiza más actividades de este tipo que otros departamentos?	Frecuencia-DOE
5	En general, considero que deberían organizarse más actividades de este tipo en el marco de las asignaturas de mi carrera	Frecuencia inversa grado
6	En general, considero las actividades de este tipo satisfactorias en el conjunto de mi carrera	Satisfacción grado
7	Considero que este tipo de actividad me hace participar de manera más activa en la asignatura	Participación
8	Considero que este tipo de actividad me hace estar más motivado por la asignatura	Motivación
9	Considero que este tipo de actividad me facilita el autoaprendizaje de la asignatura	Auto-aprendizaje

Tabla 3.- Cuestionario

4. RESULTADOS Y CONCLUSIONES

Los resultados se muestran en la tabla 4. Las puntuaciones en general son bastante positivas (por encima del término medio 3), lo que implica una buena opinión en general del curso. Las opiniones referentes a satisfacción, motivación, aprendizaje y participación son positivas. Siendo una actividad innovadora, los alumnos consideran que se deberían programar más actividades de este estilo en el conjunto de la carrera, reconociendo que el departamento de organización les implica en mayor grado que otros departamentos de carácter técnico.

Número	Variable	media costs 3º	media empresa 1º	diferencia de medias	Estadístico
1	Utilidad	3,62	4,15	0,524771525	0,006177
2	Satisfacción	3,66	3,68	0,017662338	0,925049
3	General	6,45	7,48	1,026936027	0,001060
4	Frecuencia- DOE	3,70	4,27	0,571862348	0,010344
5	Frecuencia inversa grado	3,76	4,12	0,352226721	0,081911
6	Satisfacción grado	3,69	4,04	0,348725349	0,046803
7	Participación	3,86	4,26	0,402116402	0,039288
8	Motivación	3,57	4,04	0,463703704	0,017056
9	Auto- aprendizaje	3,84	4,375	0,535	0,003660
*Todas las variables de 1 a 5 excepto la nº 3 de 0 a 10.) En negrita diferencias significativas					

Tabla 4.- Resultados

En todos los casos se observan puntuaciones mejores, muy positivas por parte de los alumnos de primero, donde parecen tener más éxito, que en el caso de los de tercero, donde las valoraciones son moderadamente positivas. Mediante una prueba T de Student se ha procedido a analizar si las diferencias son significativas. No se aprecian diferencias significativas en la satisfacción personal de la actividad ni en la opinión de que deberían realizarse más actividades similares. En cambio las medias difieren en todos los casos restantes.

Se podría concluir que el éxito de este tipo de actividades está muy relacionado con el público objetivo, y sus características (tipo de estudio o asignatura, edad, nivel de madurez, nivel del curso...). Se podría argumentar que los alumnos de reciente ingreso están más abiertos y acogen de mejor grado experiencias innovadoras que los que ya están finalizando los estudios, o cuentan con más experiencia en la universidad. En cualquier caso para ambos suponen una innovación positiva, y que habría que potenciar.

Por otro lado, y en relación con las limitaciones de este estudio, hay una serie de motivos que harían tomar estos resultados con cautela. En primer lugar, las diferencias de medias podrían deberse simplemente a la diferente conducción de la experiencia por parte del profesor, o a otra serie de variables fuera del control estricto del profesor (ambiente de clase, opinión del alumnado respecto a su carrera y el plan de estudios, características innatas de los grupos como nota de corte, por ejemplo, etc.

En segundo lugar, la experiencia en el caso de la asignatura de 3º se realizó en unas prácticas de asistencia obligatoria, mientras que en la de primero fue durante las lecciones magistrales habituales. Lo que de hecho se refleja en el diferente grado de respuesta al cuestionario. Esto podría haber supuesto un sesgo en el caso de la asignatura de primero, más favorable, al autoexcluirse los alumnos más descontentos en su realización, lo que explicaría que las diferencias entre ambos grupos no fueran tan elevadas en realidad.

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TUTORÍAS GRUPALES PLANIFICADAS FUERA DEL AULA EN EL APRENDIZAJE POR DESCUBRIMIENTO

L. FERNANDEZ-DURAN¹ Y A. LLORCA PONCE²

Resumen.

Con el nuevo Plan de Educación, las materias de últimos cursos pueden impartirse con elaboración de trabajos y proyectos donde el alumno debe aplicar los conocimientos adquiridos e ir elaborando el proyecto mediante aprendizaje por descubrimiento. En el caso de la asignatura Viabilidad de proyectos de 5º de Arquitectura, se le solicita al alumno para su evaluación la realización de una viabilidad de un proyecto que deben realizar en grupos de tres alumnos, a partir de la elección de un solar existente en su ciudad.

Las tutorías planificadas fuera del aula se convierten en una herramienta muy útil para el seguimiento de los trabajos grupales en trabajo colaborativo. Así hemos incorporado esta herramienta en la asignatura e investigado la variación en los resultados de aprendizaje ante la implantación de tutorías planificadas. Se han comparado los resultados obtenidos durante dos cursos consecutivos, antes y después de la puesta en práctica de las tutorías. Se ha valorado la calidad de los proyectos y el grado de seguimiento de la asignatura a partir del número de trabajos presentados. Por otro lado se ha realizado una pequeña encuesta a los alumnos que han acudido a las tutorías grupales planificadas para conocer su grado de satisfacción. Tras analizar los resultados de todas estas investigaciones reflejamos los resultados del estudio constatando que se han producido mejoras con la implantación de esta metodología.

Palabras clave: tutorías planificadas, resultados de aprendizaje, aprendizaje por descubrimiento, evaluación por proyectos.

1. INTRODUCCIÓN

El Consejo de Coordinación Universitaria del Ministerio de Educación y Cultura [1] propone un nuevo estilo de trabajo de los profesores universitarios donde se busque un mayor protagonismo del estudiante en su formación, organizando la enseñanza

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en función de las competencias a lograr y potenciando la adquisición de herramientas de aprendizaje autónomo y permanente. Las nuevas orientaciones metodológicas implican un nuevo enfoque didáctico, dónde se le otorga mayor importancia al aprendizaje que a la enseñanza, remarcando la necesidad de pasar del profesor que enseña al alumno que aprende. Se demanda, por tanto, una alta capacitación de los estudiantes para “aprender a aprender” y, un modelo de enseñanza más centrado en el mismo proceso de aprendizaje [2].

Autores como Zabalza [3], argumentan que las metodologías docentes centradas en el aprendizaje de los estudiantes son complejas y requieren de una exhaustiva planificación para capacitar a los alumnos en el aprendizaje autónomo y dotarles de herramientas para el estudio. El fin del profesor universitario pasa a ser: orientar, guiar y sostener la actividad constructiva de los estudiantes proporcionándoles las ayudas educativas necesarias. Así el docente ha dejado de ser fuente del conocimiento para desarrollar funciones de guía, orientador, asesor y facilitador de recursos y herramientas de aprendizaje [4].

Bruner [5] constructivista que sistematizó el aprendizaje por descubrimiento y construcción, señala que es fundamental llevar el aprendizaje más allá de la mera información, hacia objetivos de aprender a aprender y resolución de problemas. Para ello plantea seis sugerencias a aplicar para conseguir con éxito este aprendizaje:

- ✓ Dejar de usar la propia cabeza, los modelos que cada uno tiene en su cabeza.
- ✓ Ligar lo nuevo con lo ya dominado y construir puentes de mediación cognitiva
- ✓ Categorizar
- ✓ Comunicarse con claridad
- ✓ Formular hipótesis y tratar de probarlas, para hallar nuevo conocimiento o confirmar lo conocido

Bernardo Restrepo [6] cita como métodos pedagógicos que permiten desarrollar esta estrategia:

- ▶ El seminario investigativo.
- ▶ El ABP en sus distintas modalidades.
- ▶ El método de proyectos.
- ▶ El método tutorial.
- ▶ El estudio de casos.
- ▶ La enseñanza personalizada.
- ▶ Simulación y juegos.

Con todas estas sugerencias metodológicas, intentamos aplicar itinerarios de aprendizaje y crear las condiciones adecuadas para que éstos se desarrollen [7]. Así, planteamos la asignatura de Viabilidad de promociones inmobiliarias de 5º de Arquitectura bajo una metodología de aprendizaje por descubrimiento en la cual el alumno debe desarrollar un proyecto de viabilidad de una promoción tras la elección de un solar ubicado en su ciudad. Nuestro planteamiento metodológico para esta asignatura es el siguiente:

- *Trabajo en grupo.* Pretendemos alcanzar la competencia transversal de trabajo en equipo, para ello el proyecto de viabilidad se debe realizar en grupo de no más de 3 alumnos.
- *Método de proyectos.* Tratamos de aplicar pedagogías activas que se contraponen a la estrategia expositiva o magistral³ en la que el alumno es el protagonista del proceso de enseñanza-aprendizaje, busca la información, la selecciona, organiza e intenta resolver los problemas que le van apareciendo en este proceso. Así, evaluamos las competencias específicas de la materia mediante la elaboración de un proyecto de viabilidad de una promoción inmobiliaria a partir de un solar real que debe elegir cada grupo. Se realizan dos entregas, el estudio de mercado y la viabilidad económico-financiera.
- *Tutoría.* Acompañamos a los estudiantes en sus aprendizajes para propiciar su desarrollo integral a lo largo de su proceso formativo. Como docentes, orientamos, sugerimos fuentes de información y guiamos al alumno en el desarrollo del proyecto. Este seguimiento lo realizábamos en años anteriores en el aula y fuera del aula sólo bajo demanda.

2. LAS TUTORÍAS Y LAS FUNCIONES DEL TUTOR

Cómo nos dice Rodríguez Espinar [8] la tutoría es un elemento clave en cualquier modelo educativo que se centre en el aprendizaje del estudiante y un medio para estimular, guiar, apoyar y evaluar el aprendizaje y el desarrollo integral del estudiante. Su interés va en aumento por la transformación que se está dando en la universidad sobre la masificación, la heterogeneidad y complejidad en la organización y estructuras de funcionamiento, el fracaso universitario debido al nivel de absentismo en los estudios y la falta de motivación [9], las opciones en los itinerarios formativos y en los procesos de aprendizaje y las propias características de los jóvenes universitarios [7].

³ Hemos de aclarar que continuamos, en un pequeño porcentaje, apoyándonos en clases magistrales para la explicación de contenidos necesarios para la realización del proyecto.

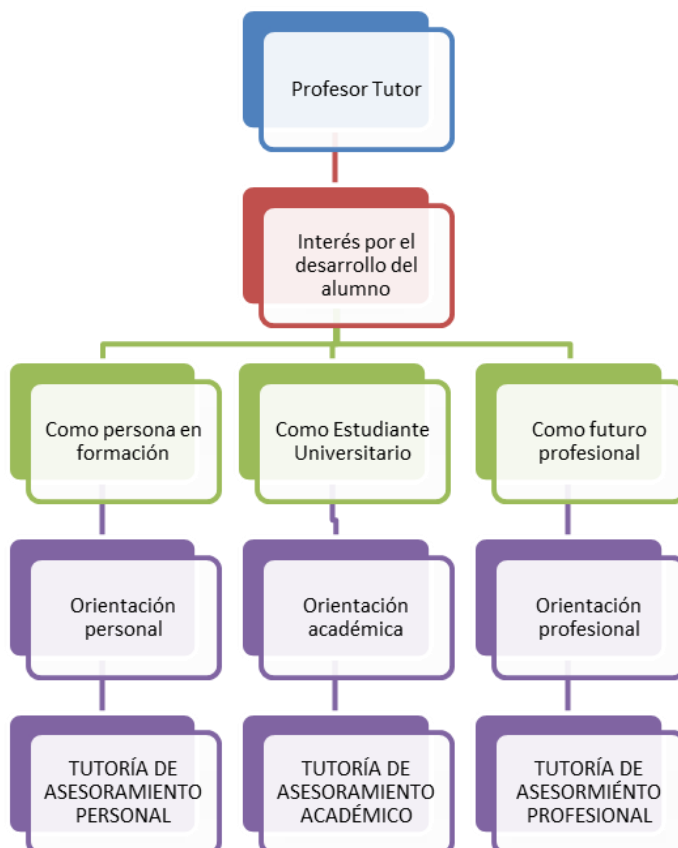
Muchas son las definiciones existentes de lo que es la tutoría, Alañón [10] nos dice que es aquella acción formativa y orientadora que el profesor ejerce con sus alumnos, a la vez y en paralelo con sus tareas instructivas; para Almajano [11] la tutoría persigue que el profesor escuche a sus alumnos y a partir de lo que oye pueda ayudarles a ejercer su libertad, sugiriéndole caminos y valorando para

cada uno de ellos las ventajas y las dificultades; Coriat y Sanz [12], en la línea de Rufino Cano[13]

nos dicen que mediante la tutoría el profesor tutor facilita al estudiante una ayuda, basada en una relación personalizada, para conseguir sus objetivos académicos, profesionales y personales a través del uso de la totalidad de recursos institucionales y comunitarios; y así podríamos estar ofreciendo definiciones de diversos autores. Nos quedamos con el esquema sacado de un texto de Rufino Cano [13] sobre el ser del profesional docente como profesor tutor sintetizado en la figura 1.

Al mirar las distintas definiciones nos hemos encontrado con multitud de tipologías de tutorías:

- ✓ Tutoría académica [4,14,15 y 16].- Centrada en el ámbito académico y el ámbito científico, asesorando sobre: estudios y asignaturas, bibliografía, fuentes de documentación, elaboración de trabajos de curso, realización de investigaciones, etc.
- ✓ Tutoría burocrática-funcional [4 y 16].- Aquella que se limita a funciones burocrático-administrativas: revisión de exámenes, certificados, cumplimentación de actas y documentos oficiales, quejas, reclamaciones, etc.
- ✓ Tutoría docente [4, 15, 16 y 17].- Completa y amplía la ofrecida en las clases convencionales a través de: enseñanza en pequeños grupos, realización de seminarios, profundización en algún tema, etc.



Fuente: Adaptación de Cano, R. (2009) *Tutoría universitaria y aprendizaje por competencias. ¿Cómo lograrlo?*, p. 189

Figura 1. El ser del profesor tutor

- ✓ Tutoría personalizada [4, 14, 15, 16 y 17].- Centrada en el ámbito personal o profesional, para atender las necesidades básicas y expectativas de los estudiantes y facilitar orientación sobre estudios y profesiones.
- ✓ Tutoría entre iguales [4, 15,18,y19].- Ayuda entre estudiantes dentro de una misma titulación.
- ✓ Tutoría de prácticum [3 y18].- El profesor tutor atiende a los alumnos en periodo de prácticas en empresas o instituciones.

- ✓ Tutoría de grupo [19].- Se trabaja de forma grupal con el fin de enseñar habilidades y estrategias, desarrollar planes de trabajo, fomentar la participación, etc. El principal objetivo es prevenir el fracaso escolar. Para ello se busca crear en el alumnado el deseo de aprender y la adquisición de un compromiso por lograrlo, dotándolo de habilidades y estrategias propias del trabajo universitario, así como de habilidades sociales y de comunicación.

Y una serie de tutorías más como tutoría virtual o tele-tutoría [4 y 15], tutoría interdisciplinar [18], tutoría de asignatura o materia [8 y 19], entre otras.

En nuestra investigación tratamos tutorías docentes y grupales. Las competencias tutoriales son distintas en función de que vayan dirigidas al grupo o al individuo, tal y como se puede ver en la Tabla 1. La tutoría en grupo necesita un mayor número de competencias que en el caso de realizar una tutoría individual [20].

Basándonos en esta literatura planteamos una nueva propuesta metodológica considerando reforzar el aprendizaje del alumno con tutorías planificadas grupales. A continuación contamos de forma detallada la experiencia.

Competencias para la acción tutorial en grupo
Potenciar competencias de relación y comunicación.
Enseñar a tomar decisiones en grupo.
Desarrollar la práctica argumentativa en sí mismo y en el alumnado.
Delegar la autogestión y autonomía en el grupo.
Utilizar estrategias de mediación en los conflictos.
Poseer recursos para la negociación.
Asumir la figura y rol de autoridad.
Considerar la justicia y equidad.
Competencias para la acción tutorial individual
Ajustar constantemente las necesidades psicoeducativas de cada alumno/a.
Lograr tiempos y espacios de diálogo e intercambio con cada alumno/a fuera del contexto de aula.
Escuchar activamente en las diferentes situaciones.

Fuente: Ballesteros, 2002, citado en Martínez y Raposo, 2011

Tabla 1: Competencias para la acción tutorial en grupo e individual

3. EXPERIENCIA DE LA APLICACIÓN METODOLÓGICA APLICADA

En la asignatura “Viabilidad económica de promociones inmobiliarias. Marketing inmobiliario” de 5º curso de la Licenciatura de Arquitectura impartida con el Plan educativo del 2002, realizamos un planteamiento metodológico basado en el aprendizaje por descubrimiento. Se trata de una asignatura optativa, en la cual se matriculan los alumnos que están interesados en la materia, lo cual permite realizar metodologías activas con mayor éxito.

La metodología aplicada en el curso 2011-2012 ya incluía trabajo en grupo. Raposo y Martínez (2011) nos dicen que se puede considerar el trabajo en grupo o en pequeños equipos, como una estrategia didáctica donde se distribuye la totalidad del alumnado en conjuntos que poseen un número limitado de personas definido según la finalidad de la tarea encomendada. Un grupo no es la

suma de las partes sino la integración de sus miembros que trabajan juntos y de forma coordinada, orientados por un objetivo común encaminado a resolver las actividades propuestas y a desarrollar su propio aprendizaje. Para un buen funcionamiento se precisa de cierto grado de compromiso y confianza en las posibilidades del otro. Cada equipo tiene entidad propia dada por el tema que aborda, por el docente o por sus propios componentes.

En el curso académico 2011-2012 se realizaban tutorías académicas y docentes, cuando el alumno lo solicitaba. Los problemas de esta metodología fueron los siguientes:

- El alumno no venía a tutoría
- No había acercamiento profesor-alumno
- Desconocíamos la evolución de los proyectos
- Muchos alumnos acababan el curso sin presentar el proyecto.
- No sabíamos que alumnos habían colaborado y cuáles no.
- Las dudas se presentaban la semana antes de presentar el proyecto.
- La calidad de los trabajos presentados no era demasiado buena.

Por todas estas razones, nos planteamos para el siguiente curso, instaurar como obligatorio la asistencia a tutorías planificadas fuera del aula, a la que debían asistir todos los miembros del grupo. Así para el curso 2012-2013 la asignatura estaba basada en la resolución de un proyecto de viabilidad económica de una promoción inmobiliaria que debía presentarse en dos entregas, la primera un estudio de mercado y la segunda la viabilidad económico-financiera de la promoción. Las condiciones puestas eran:

- ❖ Estos proyectos debían hacerse en grupo, de un máximo de 3 alumnos.
- ❖ Debían realizar 3 tutorías planificadas, la primera al inicio para ver si estaba bien planteado el proyecto y para confirmar la validez del solar propuesto para el proyecto. Las otras dos, al menos 2 semanas antes de cada entrega.
- ❖ A las tutorías planificadas debían acudir todos los miembros del grupo
- ❖ Debían apuntarse en las fichas de horario de tutorías planificadas expuestas en la entrada del departamento.
- ❖ Se haría un registro por parte del profesor, mediante una ficha informativa de la tutoría.

Los objetivos buscados con estas tutorías eran realizar un seguimiento del desarrollo de aprendizaje, conseguir una interacción entre alumno-profesor, comprobar que efectivamente se están desarrollando las competencias marcadas para nuestra materia, obtener más evidencias para evaluar al alumno, el enriquecimiento mutuo y el control del aprendizaje individual a través de un trabajo grupal, entre otros.

Se fijó un calendario de tutorías con objetivos marcados en cada una de ellas:

Tutoría inicial

1. Toma de contacto (formación de grupos y elección del solar)
2. Resolución de dudas de funcionamiento de la materia o del trabajo en grupo
3. Descubrir necesidades del alumno para el desarrollo de la asignatura
4. Motivación hacia el trabajo

Tutoría de seguimiento

1. Orientación de dudas en la materia o trabajo
2. Comprobación de aprendizaje en competencias

Tutoría final

1. Revisión del trabajo del alumno a lo largo del curso.
2. Solución de problemas surgidos en la materia o entre grupos
3. Últimas recomendaciones

Cada tutoría se ha registrado en una ficha en la que se ha anotado el nombre de los miembros del grupo, la fecha y la hora de la tutoría, la documentación aportada por cada grupo, la participación de cada alumno, las dudas planteadas y las recomendaciones dadas para la mejora del proyecto al grupo de alumnos.

4. EVALUACIÓN DE LA METODOLOGÍA

Para evaluar si las tutorías planificadas han resultado útiles en el proceso de enseñanza-aprendizaje de nuestra materia, hemos valorado tres aspectos:

1. **Número de alumnos presentados y no presentados**, comparando los resultados académicos del curso 2011-2012, en los que no se habían realizado tutorías planificadas con los resultados del curso 2012-2013 en los que ya se habían implantado estas tutorías fuera del aula. El resultado de esta comparación podemos verlo en la tabla 2. Podemos apreciar cómo el número de presentados sube en el año de las tutorías planificadas en 13 puntos porcentuales



Fuente: Elaboración propia

Figura 2. Porcentaje de Proyectos con nota superior a 8

Curso Académico	No presentados	% no presentados	Nº alumnos presentados	% presentados
2011-12	14	29%	34	71%
2012-13	9	16%	49	84%

Fuente: Elaboración propia

Tabla 2. Resultados comparativos sobre alumnos presentados

2. **Calidad de los proyectos.**- Hemos comparado proyectos que han superado la nota de 8 en el curso 2011-2012, con los que han superado esta nota en el curso 2012-2013.

Podemos ver en la figura 2, como en el curso en el que se han instaurado las tutorías planificadas, la calidad de los trabajos mejora, obteniendo una nota superior a 8 el 48% de los alumnos, mientras que en el año anterior, donde no se aplican estas tutorías, sólo superan el 8 el 35% de los proyectos.

- 3. Sondeo realizado a los alumnos y sus resultados.-** Se ha realizado un pequeño sondeo anónimo a los alumnos que han asistido a las tutorías planificadas para conocer la opinión y la satisfacción del alumno ante esta nueva metodología de trabajo.

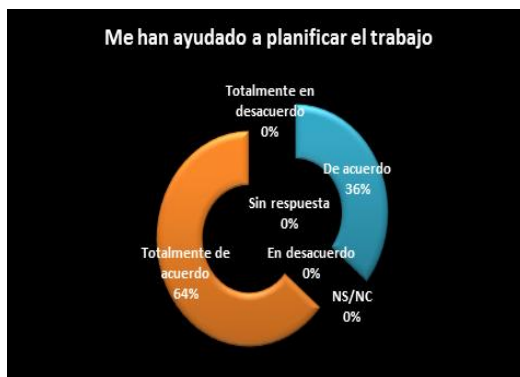
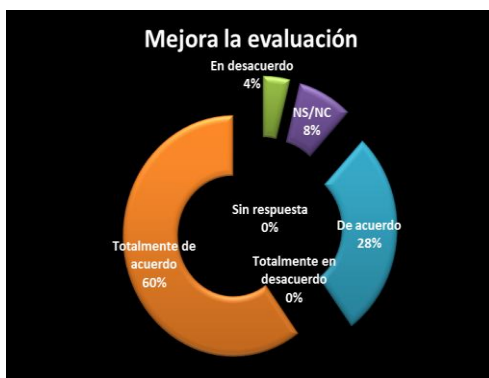
En este sondeo se preguntaba a los alumnos las siguientes cuestiones:

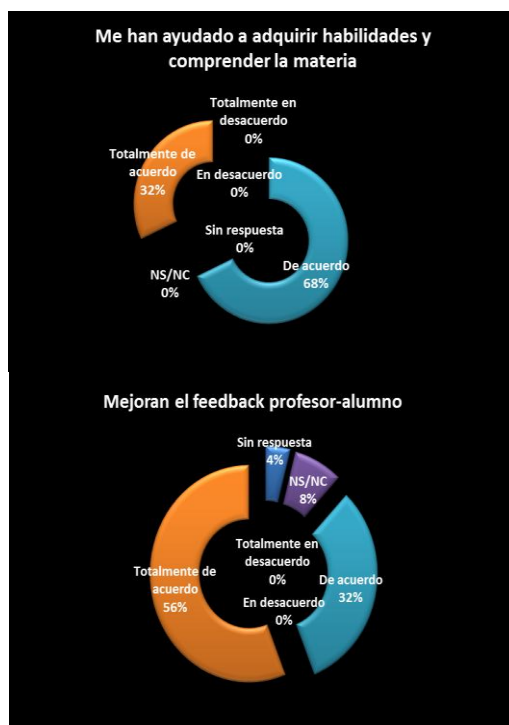
1. Las tutorías en grupo planificadas en el despacho del profesor para la materia "Viabilidad económica de promociones inmobiliarias. Marketing inmobiliario" ¿me han ayudado a planificar mi trabajo?
2. Estas tutorías me han ayudado a adquirir habilidades ajustadas a mis necesidades tanto en la comprensión de la materia como de las actividades grupales a desarrollar en ella.
3. Con ellas, ¿considero que ha mejorado el feed-back profesor-alumno?
4. ¿Considero, este tipo de tutorías, un instrumento útil para la optimización del aprendizaje de esta materia?
5. ¿Considero que contribuyen a mejorar la evaluación tanto del trabajo realizado como el desarrollado por los miembros del grupo?

Las respuestas a estas preguntas podían ser:

- Totalmente en desacuerdo
- En desacuerdo
- NS/NC
- De acuerdo
- Totalmente de acuerdo.

Los resultados de este sondeo han sido satisfactorios como recogen los gráficos que vemos a continuación:

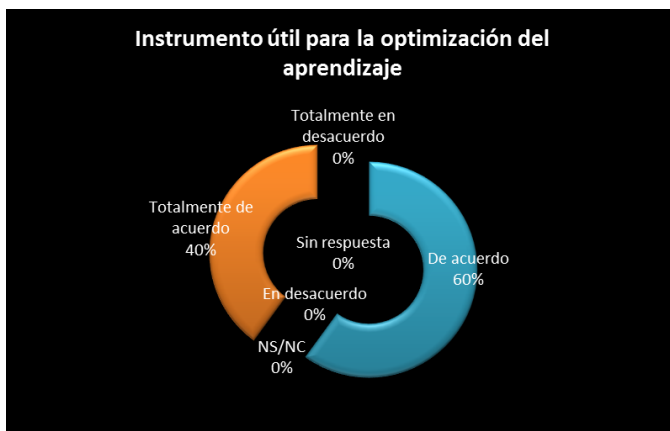




Fuente: Elaboración propia a partir de los resultados del sondeo

Figura 3. Resultados del sondeo

De todas las preguntas la más significativa es aquella en la cual el alumno valora la utilidad de las tutorías planificadas para su aprendizaje. La respuesta a esta pregunta fue más que satisfactoria, pues la totalidad de los alumnos mostraron estar de acuerdo o totalmente de acuerdo con la utilidad de esta herramienta metodológica, como se puede ver en la figura 4, que muestra los resultados del sondeo para esta cuestión.



Fuente: Elaboración propia a partir de los resultados del sondeo

Figura 3. Resultados del sondeo sobre la utilidad de las tutorías

5. CONCLUSIONES

En los últimos cursos de carrera universitaria en los que el alumno está más formado, es más efectivo el aprendizaje por descubrimiento, donde el trabajo autónomo del alumno, guiado por el profesor, mejora su aprendizaje.

Los distintos análisis realizados nos llevan a concluir que las tutorías guiadas han contribuido a mejorar los resultados de aprendizaje alcanzados por el alumno, como muestran los datos relativos al nivel de participación y a la calidad de los trabajos presentados.

La encuesta realizada a los alumnos refleja que las tutorías guiadas han sido de utilidad, los alumnos han considerado que la metodología aplicada aumenta, en gran medida, el feed-back profesor-alumno y mejora la planificación y evaluación de su trabajo.

Como destacan otros trabajos, las metodologías que potencian un aprendizaje autónomo requieren unas labores de tutorización sustancialmente mayores, por un lado, en cuanto a la cantidad de tiempo que requiere el alumno del asesoramiento del profesor y, por otro, el incremento de su complejidad. Supone pasar de una tutoría basada, en la resolución de cuestiones y problemas planteados por el alumno sobre el material desarrollado por el profesor, a una tutoría en la que, además de resolver dudas, deberá ayudar, orientar y estimular al alumno sobre un trabajo o proyecto que él desarrolla y que no está completamente definido por el profesor.

Pensamos que puede mejorarse estos resultados si complementamos estas tutorías con otras metodologías que refuerzan el aprendizaje autónomo y en grupo, como puede ser el uso del portafolio. En próximos cursos introduciremos esta herramienta en búsqueda de una mejora del rendimiento académico y personal de los alumnos de Arquitectura.

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EL PERFIL DE LOS ESTUDIANTES EN LAS PRÁCTICAS DOCENTES CON ENFOQUE DE EDUCACIÓN PARA EL DESARROLLO PARA LA CIUDADANÍA GLOBAL. UNA APROXIMACIÓN EXPLORATORIA A LA DOCENCIA EN LOS TÍTULOS DE GRADO

A. CANO RAMIREZ

Resumen.

Las prácticas docentes con enfoque de Educación para el Desarrollo para la Ciudadanía Global (en adelante EDCG), se desarrollan atendiendo a la confluencia de un conjunto de factores que se interrelacionan e interactúan, condicionando el acto pedagógico. El trabajo que se presenta forma parte de una investigación más amplia que tiene como finalidad explorar sobre las circunstancias en que tiene lugar la introducción de esta docencia en los títulos de grado de las universidades como desenlace del proceso de adaptación al Espacio Europeo de Educación Superior (EEES).

Entre las variables identificadas para la realización del estudio se encuentra la estructura universitaria, dentro de la que se identifica el perfil del estudiante que esta institución acoge como factor a considerar para abordar la EDCG.

En esta investigación de carácter cualitativa se ha definido, como resultado de la revisión bibliográfica, aquellos elementos del perfil del alumnado universitario, y se ha realizado un trabajo de campo teniendo como técnica de recogida de datos la entrevista semiestructurada.

Han sido los propios profesores de distintas universidades españolas que llevan a cabo esta metodología docente y expertos en EDCG, las fuentes de información, y se ha obtenido datos sobre la percepción que éstos tienen sobre la evolución y características actuales de sus estudiantes.

Palabras clave: Educación para el Desarrollo para la Ciudadanía Global, titulaciones de grado, perfil de los estudiantes universitarios

1. INTRODUCCIÓN

El perfil del alumnado universitario sostiene coherencia con el entorno social y cultural en el que está inserto y las universidades se nutren fundamentalmente de los jóvenes procedentes del contexto en el que aquella está inserta. Este hecho obliga a la universidad a no olvidar la situación sociocultural y económica, la familia y la comunidad a la que pertenece cada uno de sus estudiantes, la universidad no puede quedar ajena a los problemas que se plantean en la sociedad y, por tanto, a sus estudiantes (Escudero y Mesa, 2011: 139). En concreto, esta afirmación aterriza en las relaciones entre profesores y estudiantes, cuando Gimeno admite que, siendo un objetivo de la EDCG, para poder ayudar a que los estudiantes sean los que vayan construyendo su personalidad, es necesario que el docente los entienda (2003).

Sin embargo, el estudiante que se enfrenta a una pedagogía sostenida en la EDCG, requiere de éstos que adquieran compromisos con las actividades relacionadas con el aprendizaje, de manera que ello le ayuda a alcanzar los objetivos definidos para cada una (Biggs, 2008: 27). Para Knapper, el profesor tiene ante sí el reto de estimular que ese compromiso se haga realidad a la vez que conseguir un aprendizaje efectivo. El profesor también adquiere un compromiso, que acompañado por su entusiasmo, consigue fomentar el compromiso del estudiante (2009: 32).

Ante lo dicho, esto es, que la institución/el profesorado ha de comprometerse con sus estudiantes comprendiéndolos, y que los estudiantes han de asumir un compromiso con su aprendizaje, Knapper (2009: 35) apunta sobre la dificultad de los profesores para dar satisfacción a las necesidades individuales de los estudiantes que presentan una amplia variedad entre ellos y, al mismo tiempo, maximizar el aprendizaje para todos ellos. No obstante, esta dificultad, sí entiende que hacer explícitas las diferencias entre los estudiantes en su forma de aprender, les permite reflexionar sobre sus propios procesos de aprendizaje así como crear las condiciones para que éstos elijan las tareas de evaluación que les ayuda a demostrar el aprendizaje de maneras diferentes.

Está claro que los estudiantes universitarios han cambiado los mecanismos tradicionales de transmisión de la información y del conocimiento, la universidad no ostenta el monopolio, la autoridad y el poder de ello, de manera que el conocimiento puede ser más atractivo fuera que en las aulas y las instituciones educativas no son siempre lugares acogedores (Gimeno, 2005: 159), por lo que requiere de la adopción de mecanismos innovadores que se ajusten al nuevo perfil de estudiante.

Esto es así porque el acceso y manejo de las nuevas tecnologías ha desarrollado nuevas formas de comunicación hasta el momento nunca conocidas, lo que expone a la educación y a los docentes a un nuevo reto que permita comprender e integrar

de manera normalizada y optimizada este recurso en el que los jóvenes entablan una gran diversidad de formas de comunicación y, por tanto, con posibilidades de ser un instrumento para su proceso de aprendizaje.

2. METODOLOGÍA

El trabajo que se presenta se inserta en el actual proceso investigador de la tesis doctoral de la autora, constituyéndose en uno de los indicadores que está siendo objeto de análisis, dentro de un conjunto de factores del modelo de investigación propuesto. Se trata de un estudio multicaso, de corte cualitativo, de tipo exploratorio, aplicado y búsqueda de diagnóstico; el objeto de estudio es el nivel discursivo significativo, a través del paradigma interpretativo, en el ámbito psicosocial, y atendiendo a la teoría sistémica. La propuesta investigadora se fundamenta, por un lado, en la teoría de programa (Ligero, 2011) que nos permite realizar un trabajo deductivo a partir de una propuesta teórica, contrastando en la realidad, confirmando, revisando o desechando el marco conceptual de partida y, por otro lado, la teoría fundamentada, realizándose un ejercicio inductivo, del que se desprende gran parte de los resultados que se presentan a continuación.

El *objeto de estudio* del presente trabajo investigador exploratorio son las EDCG en las titulaciones de grado de las universidades españolas, esto es el “primer ciclo de los estudios universitarios que comprende enseñanzas básicas y de formación general, junto a otras orientadas a la preparación para el ejercicio de actividades de carácter profesional” (Real Decreto 55/2005, artículo 7: art. 7. Enseñanzas de Grado).

El *objetivo general* que nos proponemos en este caso concreto es desvelar cómo se percibe al estudiante universitario, siendo éste, junto al docente, el que protagoniza el acto pedagógico, y que, dentro del conjunto de factores en proceso de estudio, sostiene interacciones de carácter sistémico que ayudan a comprender cómo se desarrollan las prácticas docentes universitarias con enfoque EDCG. Dicho lo anterior, nuestro objetivo específico se centra en obtener el perfil del estudiante universitario.

Las *técnicas* escogidas, coincidiendo en que son las más usuales en el estudio multicaso, esto es “estudiar una situación o un fenómeno en un contexto *real*, de interpretar la complejidad, y de definir el estudio de caso por otras cosas que no sean los métodos” (Simons, 2011: 42), son la entrevista semiestructurada y el análisis documental.

Con relación al perfil de los estudiantes universitarios, hemos formulado la siguiente pregunta: ¿qué evolución o cambio ha observado en el perfil de los estudiantes universitarios a lo largo del tiempo que viene desempeñando su actividad profesional como docente en la universidad?.

El trabajo de campo lo hemos definido fundamentalmente atendiendo a la identificación y accesibilidad de expertos en la materia y de docentes universitarios que ponen en práctica la EDCG, procedentes de distintas universidades españolas y distribuidas por distintas áreas geográficas.

Hemos celebrado un total de trece entrevistas a docentes universitarios, pertenecientes a diez universidades españolas, distribuidas en cinco comunidades autónomas; cuatro entrevistas a expertos en EDCG, siendo tres de ellos docentes universitarios, procedentes de tres universidades de distintas comunidades autónomas, y una experta procedente de un instituto universitario especializado en la materia. Hemos podido obtener además, cuatro entrevistas escritas de representantes institucionales universitarios en el Grupo de Trabajo de Cooperación Universitaria al Desarrollo de la CICUE-CRUE¹.

Todas las entrevistas fueron ejecutadas a través de un encuentro personal y tuvieron lugar en los centros de trabajo de los entrevistados (un total de 11), en sus propios domicilios (2), haciendo uso de skype (1), y en otros espacios informales (3). Las entrevistas fueron grabadas, con previa autorización de los entrevistados, y transcritas para su análisis. Las cuatro de los miembros del Grupo de Trabajo de la CUD (CICUE), fueron escritas y enviadas mediante correo electrónico.

Se presentan en este trabajo algunos datos descriptivos obtenidos hasta el momento, siendo conscientes de que nos encontramos aún inmersos en el proceso de análisis global de los resultados.

3. RESULTADOS

A continuación se presenta la visión que sobre el estudiantado detectan los entrevistados. Se les preguntó sobre si habían observado algún cambio a lo largo de los años del perfil de éstos, y algunos entrevistados manifiestan que sí se ha producido un cambio, aunque alguno refiere a que no sabría qué decir al respecto.

Ha cambiado, pero es que la sociedad ha cambiado y hay aspectos preocupantes, el deseo de aprender ha disminuido (E8).

No sé valorarte si en estos últimos años se ha producido este cambio (E11).

¹ Las organizaciones a las que pertenecen el conjunto de entrevistados: Universidad de Valencia, Universidad Politécnica de Valencia, Universidad Ramón Llull, Universidad del País Vasco, Universidad de Deusto, Universidad de Valladolid, Universidad de Oviedo, Universidad Politécnica de Madrid, Universidad Autónoma de Madrid, Universidad Fundación-ETE, Universidad de Sevilla, Universidad Jaime I de Castellón, Universidad de Extremadura y el Instituto de Estudios sobre Desarrollo y Cooperación Internacional (HEGOA).

Se detecta que las expectativas de los estudiantes, ante los contenidos a recibir en la asignatura, condicionan del clima en el aula.

Están mezclados, los electrónicos con los eléctricos, con los químicos y con los mecánicos, sus expectativas en la asignatura son muy diferentes, unos saben que la van a continuar, y en cierto modo es lo que han elegido. Y otros saben que no la van a ver más de automatización. Hay que buscar algo, conjugar que los electrónicos tengan un cierto contenido que luego van a completar, pero que los otros tengan un pequeño barniz sobre todo (E4).

Se pone de manifiesto que los estudiantes llegan a la universidad condicionados, por un lado, con un bagaje previo y propio.

A la universidad se llega con valores adquiridos (E8).

Es una generación que ya no tiene referentes de otras épocas, pero que aportan otras cosas. Gente que ya vive en las redes sociales, que ha crecido en determinado contexto y que ya se plantea el futuro en clave de cómo salir de la crisis, o cómo construir algo diferente. Y eso es muy sintomático. Yo no lo había visto antes (E13).

Y, por otro lado, con escasa motivación para estudiar, con formas de aprendizaje que no se corresponden con la EDCG y dependiente.

Vienen muy desmotivados, no traen muchas veces un método de estudio, sí que quieren hacer la carrera pero no les gusta estudiar, ni les gusta aprender, no están muy desmotivados. Están acostumbrados a estudiar siempre pasar examen, siempre bajo coacción, o por la nota (E6).

Ellos están acostumbrados a coger apuntes, y uno de los problemas de trabajar con ellos de otra manera, es que a veces tienen la sensación de que no les quedan cosas claras, digamos y aquilatadas, no? y fijadas en un sitio (E9).

Sí. Tengo la impresión de que el alumnado cada vez es menos autónomo (que cada vez requieren más que el profesorado gestione sus tiempos y sus tareas diarias) (E20C).

Señalan que los estudiantes carecen de habilidades comunicativas para interactuar de manera eficaz en el aula.

Muy acostumbrados a hablar, a no escucharse, a no callarse, a alborotar, a que el profesor les mande callar, por inmadurez. Se nota en su comportamiento que vienen acostumbrados a hablar mucho, a poco orden, poca disciplina entendida como unas normas para trabajar (E6).

No están acostumbrados, hay que enseñarles a participar en clase, (que les cuesta mucho trabajo, sobre todo en los debates, al principio es un gallinero,

tenemos que aprender a que participen en clase, tenemos que aprender, no estamos educados a eso... (E9).

Se detecta un perfil de estudiante que no goza de conexión con la realidad, que considera que no existen problemas y que todo está solucionado.

El problema de la gente joven es el que creen que, como todos estos temas se han hablado ya, está todo superado y no son conscientes de la desigualdad y de las estructuras tan machistas que existen (E8).

Se puede detectar una diferencia entre los estudiantes que ingresan en la universidad y aquellos que ya van culminando los estudios, observándose una inmadurez que progresa positivamente hasta la elaboración de su propio discurso.

Es posible que estén ahora más inmaduros, que haya más alumnos que entran en la universidad todavía adolescentes, pero tal y como está la sociedad, la entrada a la responsabilidad, a la madurez y demás, se retrasa cada vez más. (Refiriéndose a los estudiantes de primer curso) vienen todavía muchos con la cabeza llena de pájaros, algunos con los dos pies en la adolescencia (E6).

Refiriéndose a los alumnos de cuarto curso: que está a punto de salir; el alumno que tiene todo su imaginario ya muy construido, ya muy currado; que tiene incluso miedo de salir, se ha acostumbrado a estudiar, ha estado muy cómodo aquí desde los discursos y desde la crítica, se notaba muchísimo, la madurez de las definiciones del que casi va a salir al que entra (E1).

Con relación a la capacidad de interrogar y cuestionar las cosas, los entrevistados plantean que es una carencia de los estudiantes, aunque hay matices con relación a la titulación de la que se trate.

El colectivo de educación social es muy ilusionante, pero también es un colectivo muy difícil porque es muy exigente, es muy polemizador, casi todos trabajan (trabajan en el mundo laboral), son más luchadores, no lo tienen tan fácil (E1).

El pedagogo es muy trabajador, pero no cuestiona nada; el educador lo cuestiona todo, lo critica todo y cuando ya se ha calmado, entonces trabaja (E1).

En el máster de cooperación al desarrollo, donde el perfil de alumnos es muy diferente, porque es mucho más interdisciplinar (E11).

Se perfila un estudiante conformista asociado a la alta autoestima, consumista perteneciente a clase media (en este caso se trata de estudiantes de universidad privada), individualista y egoísta fruto de las exigencias de la universidad y de la sociedad que fomenta la competitividad y la meritocracia

La universidad te tiene que traspasar y tiene que transformarte. Entonces, ha cambiado porque la sociedad ha cambiado, ha cambiado porque hay un conformismo. Hace unos años la gente lo tenía mal y ahora se lo merecen todo, la gente joven, sí, se justifica más, tiene la autoestima mucho más alta (E8).

Es gente que viene a consumir, (en la privada es que lo tienen todo cubierto), entonces, son gente de clase media, que no tienen ningún problema económico (E13).

Durante estos años el perfil del alumno/a ha evolucionado quizás hacia un modelo más individualista y egoísta, fruto de las exigencias universitarias y las demandas de la sociedad al premiar la competitividad y la meritocracia, y no tanto los valores, el respeto, la tolerancia o la empatía con las personas más necesitadas (E18C).

Se producen manifestaciones contrapuestas con relación al perfil de los estudiantes con relación a su compromiso social:

- Por un lado, se tiene que los estudiantes carecen de compromiso social.

Cada vez tengo menos gente en clase que se haya implicado en alguna iniciativa social, hay menos implicación social (E2).

Nuestros estudiantes que tienen una carrera súper de informática, muy tecnológica, no sé si viven en la nube. Hay otras escuelas como más activa, que montan más follón, en lo nuestro, pues es un público que va a lo suyo, no se moviliza mucho, ni es muy beligerante. No percibo así un cambio de actitud o más movilizante, se quejan de las tasas y tal, pero tampoco mucho (E5).

- A la vez que se producen afirmaciones que dicen lo contrario, que el perfil actual de los estudiantes universitarios si es conocedor y comprometido con la realidad, se percibe un movimiento estudiantil, activista, político, en el que se confía.

Será algo coyuntural, ha coincidido un grupo de gente activa dentro de los consejos de estudiantes, (...) en cuanto al alumnado, ahora mismo yo creo que estoy viviendo un resurgimiento bastante potente, ojalá no me equivoque, de activismo en el alumnado, pero durante mucho tiempo también ha estado bastante dormido, no? En ese sentido, no? (E4).

Sí ha cambiado porque es gente que empieza a pensar en clave política y en un contexto de crisis. Todo lo que le rodea es crisis, los que hoy tienen 17, 18 años en 1º son gente que ya ha crecido escuchando que todo está en crisis: la política, la economía, el futuro, sus títulos, la transición español (E13).

Confío mucho en el movimiento estudiantil más que en el movimiento docente. Pero, veo en el movimiento estudiantil mucho deseo de que la universidad sea

de otra manera, de que el saber se pueda constituir también, se pueda distribuir también de otra manera, mucho más equitativa y justa. Confío en la posibilidad de un joven siempre. Quizás porque un joven tienen una fuerza, y unas ganas de rebeldía, que a veces, a los mayores parece que se nos olvida. En estos últimos años, está mostrando tener capacidad, ha reviscolao, decimos en catalán, pues se ha revitalizado (E17E).

Hay honrosas excepciones que confirman la regla, afortunadamente (E19C).

Si. Es más conocedor de esta realidad (E21C).

4. CONCLUSIONES

En conjunto, por un lado, no se genera una percepción consensuada sobre si se ha producido o no cambios en el perfil de los estudiantes universitarios y, por otro lado, los entrevistados no se expresan en términos de cambios, aunque sí proceden a explicitar cómo observan al actual estudiantado.

Las manifestaciones que adquieren un mayor protagonismo expresadas por los entrevistados, en lo referente a los contenidos conceptuales y habilidades, tienen un enfoque de registro de carencias y déficits. Sin embargo, cuando se apunta hacia los contenidos actitudinales, se diversifican los posicionamientos, destacándose carencias a la vez que poniendo en valor atributos que son coherentes con la EDCG.

Así se tiene que, el profesor universitario, cuya práctica docente está enfocada desde la EDCG, que ha de adaptarse a sus estudiantes atendiendo al contexto social y cultural al que pertenecen, con el que ha de comprometerse y promover el compromiso de aquellos en su propio aprendizaje, desarrolla su acto docente con un perfil de estudiantes que se caracteriza por los siguientes aspectos:

- Con relación a los contenidos conceptuales, la vida en el aula se encuentra determinada por las expectativas de los estudiantes, su bagaje previo y propio.

Además con escasa motivación para estudiar, con formas de aprendizaje que no se corresponden con la EDCG y dependientes.

- Con relación a los contenidos de habilidades, estos carecen de habilidades comunicativas, no gozan de conexión con la realidad, éstos consideran que no existen problemas y que todo está solucionado. No obstante, se detecta un proceso madurativo en el transcurso de los años académicos.
- Con relación a los contenidos actitudinales, se observa diferencias en la capacidad de interrogar y cuestionar las cosas según la titulación a la que pertenecen, se trata de un estudiante conformista, con alta autoestima, consumista, individualista, egoísta y competitivo, todo ello relacionado con las exigencias del entorno.

Como conclusión final, señalar que se producen manifestaciones contrapuestas con relación al perfil de los estudiantes con relación a su compromiso social. Se indica que están carentes de compromiso social, a la vez que se pone de manifiesto la valoración sobre un resurgimiento o revitalización de un movimiento estudiantil, político, activista y rebelde, en el contexto coyuntural de crisis que, siendo conocedor de la realidad, es por lo que ofrece confianza.

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TUTORÍAS EN ASIGNATURAS A EXTINGUIR

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Resumen.

Con la incorporación al Espacio Europeo de Educación Superior (EEES) ha exigido la implantación de cambios en los planes de estudios, para la adaptación de las titulaciones que se estaban impartiendo. Para ello han aparecido nuevas titulaciones en Grado y han ido desapareciendo las Licenciaturas e Ingenierías Superiores y Técnicas. Conforme han ido desapareciendo los cursos impartidos en los Planes Antiguos, los alumnos que los cursaban tenían dos opciones: continuar con las asignaturas que les quedaban sin docencia o cambiarse al plan nuevo. En el presente artículo se revisa el impacto que han tenido las asignaturas a extinguir o sin docencia, tanto en el alumnado como en el profesorado así como las estrategias a seguir.

Palabras Clave: Tutorías, Asignaturas a extinguir, Espacio Europeo de Educación Superior.

1. INTRODUCCIÓN

Como tutorías se entiende la atención personalizada a los estudiantes [1]. La formación de los estudiantes universitarios encuentra en la tutoría uno de sus principales pilares. Los alumnos son reacios al uso de las tutorías, aunque esto empieza a cambiar sobre todo en las asignaturas a extinguir o sin docencia, ya que como los alumnos ya no tienen la posibilidad de asistir a clase, intentan solventar esto con la asistencia a tutorías.

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Atendiendo a la modalidad que se preste la tutoría, se distingue entre tutorías presenciales y tutorías no presenciales. Las tutorías presenciales constituyen la modalidad clásica en la que un alumno o grupo de alumnos resuelve las dudas junto al profesor, generalmente en su despacho. Por otro lado, se tienen las tutorías no presenciales, en las que alumno y profesor no se encuentran físicamente en el mismo lugar. En esta modalidad son de gran ayuda las Tecnologías de la Información y la Comunicación (TIC). Dentro de este segundo grupo, se pueden distinguir entre las tutorías síncronas o asíncronas en función de si la comunicación se realiza en tiempo real o no necesariamente en tiempo real, respectivamente [2].

Es necesario partir de la consideración de la tutoría, no como una obligación o carga para el alumno, sino como un derecho, un eslabón más de la cadena de aprendizaje que ha de comprender las tres facetas cuya presencia es necesaria en toda acción tutorial (información, asesoramiento y formación); el reconocimiento normativo de este derecho se puede encontrar de forma genérica en [3] por el que se aprueba el Estatuto del Estudiante Universitario, en el que se prevé como derecho común a todo estudiantes el “asesoramiento y asistencia por parte de profesores, tutores y servicios de atención al estudiante, de conformidad con lo dispuesto en este Estatuto”. Este instrumento formativo ha de ir destinado a fomentar una íntegra educación académica y personalizada del alumno y a mejorar sus posibilidades profesionales.

En este sentido, [4] señala que “las universidades impulsarán, de acuerdo con lo establecido en la normativa autonómica y de las propias universidades, sistemas tutoriales que integren de manera coordinada las acciones de información, orientación y apoyo formativo a los estudiantes, desarrollados por el profesorado y el personal especializado”.

La situación y opiniones acerca de las tutorías han presentado habitualmente ciertas contradicciones: de un lado, se ha afirmado su importancia y se pone un énfasis especial en prever un número elevado de ellas, y en controlar su efectivo cumplimiento por parte del profesorado. Sin embargo, de otro lado, su papel dentro de la formación del estudiante queda desvanecido, sin que se prevean contenidos específicos para las mismas, puesto que se parte de la convicción de que la tutoría es –sólo y exclusivamente- la puesta a disposición pasiva del profesor durante determinado tiempo para la resolución individualizada de las dudas del estudiante. Por esta y otras razones que tienen que ver con la idoneidad de horarios y, en general, de accesibilidad del profesor, en la práctica, estas tutorías se han infrautilizado; y ello, sin perjuicio de reseñar la indudable importancia de esta función, acrecentada por el efecto que la audiencia y resolución de dudas en el aula surten en el alumno.

Entendemos que tres son los momentos de la tutoría: tutoría genérica, tutoría monográfica sobre el contenido de la asignatura y tutoría en la revisión del resultado/calificación de los exámenes. Todas ellas suponen la ocasión prácticamente única para establecer algún tipo de contacto personal con el estudiante, y por ello su

utilización efectiva debe ser priorizada. Es posible aspirar al menos a una asistencia a tutoría por cada alumno de la asignatura; esta asistencia puede ser la ocasión para conocer la actitud del estudiante ante la materia que se imparte, y establecer así unas más idóneas metas docentes.

2. ASIGNATURAS EN EXTINCIÓN

Con la implantación en la Universidad Politécnica de Valencia de los nuevos Títulos de Grado y en concreto en la Escuela Técnica Superior de Ingenieros Industriales (Grado en Ingeniería en Tecnologías Industriales, Grado en Ingeniería de Organización Industrial, Grado en Ingeniería de la Energía, Grado en Ingeniería Química y Grado en Ingeniería Biomédica) y de la Facultad de Administración de Empresas (Grado en Administración de Empresas), al inicio del curso académico 2010-2011, que supuso la extinción de los anteriores títulos de Ingeniero Industrial, Ingeniero de Materiales, Ingeniero de Organización Industrial, Ingeniero Químico e Ingeniero en Automática y Electrónica Industrial y Licenciado en Administración y Dirección de Empresas, un considerable número de alumnos se encuentran en la confusa situación de tener pendientes de superación determinadas asignaturas carentes, desde dicho curso y de forma progresiva, de sesiones docentes presenciales, con la complicación e incertidumbre que tal circunstancia conlleva. En efecto, según se prevé estos alumnos tienen derecho a examen en tres convocatorias durante los 2 años siguientes a la extinción de la docencia de dicha asignatura, es decir, un total de 6 posibles convocatorias.

Esto está teniendo lugar de acuerdo con el siguiente cuadro:

Curso Académico	Plan a Extinguir Licenciatura	Plan Nueva Implantación Grado
2010-2011	1 ^{er} Curso	1 ^{er} Curso
2011-2012	2 ^o Curso	2 ^o Curso
2012-2013	3 ^{er} Curso	3 ^{er} Curso
2013-2014	4 ^o Curso	4 ^o Curso
2014-2015	5 ^o Curso	---

Tab. 1 Tabla de aparición y desaparición de Estudios. Fuente: Elaboración Propia

De este modo, en dichos cursos académicos están coexistiendo en la Universidades planes antiguos con planes nuevos, extinguiéndose los de plan antiguo e incorporándose los cursos de los nuevos planes paralela y progresivamente.

Las diferentes escuelas han intentado hacer labores de difusión e información para orientar a los alumnos perjudicados por la implantación de un nuevo plan de estu-

dios, en todos aquellos aspectos que el inexistente contacto con el profesor sitúa en un estado de permanente preocupación; es tal la situación, que si no son ayudados en la preparación de dichas asignaturas, los alumnos pueden verse obligados a cambiar de titulación, o bien a iniciar el complejo procedimiento de adaptación a las respectivas titulaciones de grado.

Objetivos Específicos a Tener en Cuenta

Teniendo en cuenta las necesidades desatendidas por parte de la comunidad universitaria ante los cambios que sobrevienen desde el ámbito comunitario de enseñanza superior, conforme a los criterios perseguidos por la Declaración de Bolonia, los objetivos a seguir serán:

- Crear un espacio de encuentro con los alumnos en el que se transmitan los problemas y dificultades que encuentran éstos en su formación universitaria, un espacio que busque la estimulación de habilidades y actitudes positivas.
- Fomentar la realización por parte del profesorado implicado de seminarios y tutorías sobre las asignaturas sin docencia.
- Proporcionar a los alumnos el material que precisen para el estudio de las diferentes asignaturas sin docencia.
- Guiar al estudiante en la organización y planificación de la materia.
- Asesorar en estrategias de trabajo autónomo.
- Resolución y puesta en común de dudas compartidas por los estudiantes.
- Dar a conocer al alumno las categorías generales y específicas de su situación personal ante la disciplina de que se trate. Se busca proporcionar al alumno información sobre las posibilidades de las que dispone para superar la asignatura sin docencia.
- Favorecer la consecución de las metas académicas de los estudiantes matriculados en asignaturas sin docencia en la Ingeniería Industrial y en la Licenciatura de Administración y Dirección de Empresas.

3. DIRECTRICES GENERALES DESDE LA UNIVERSIDAD

Desde la Universidad no se han dado directrices al respecto, de hecho, a los profesores Responsables de dichas asignaturas no les cuenta ni tan siquiera en su POD (Plan de Ordenación Docente), ni tampoco las horas que supongan poner, realizar y corregir dichos exámenes, ya que las tutorías se suponen que están recogidas en sus horas de tutorías en general. Hay asignaturas en extinción con muy pocos alumnos, pero también las hay con muchos (uno de los autores es responsable de una asignatura sin docencia con 108 alumnos matriculados).

La única directriz es que los alumnos tienen derecho a una serie de convocatorias de exámenes, a tutorías y revisión para los mismos. Si que es obligatorio colgar una guía docente en la que se indique el temario de la asignatura, así como el temario de la asignatura y la forma de evaluación, para ello es muy útil la plataforma PoliformaT utilizada en la Universidad Politécnica.

La Universidad Politécnica de Valencia, no realiza evaluaciones de los profesores responsables de estas asignaturas, no se les pide nada y no se les exige nada, con lo que la dispersión de actitudes puede ser muy variada.

4. ACTUACIÓN DE LOS PROFESORES

Los profesores son los que han asumido toda la carga de trabajo y de acompañamiento que representan dichas asignaturas. Las actuaciones realizadas por los autores del presente artículo han sido:

- Subir el temario y el Plan Docente a la red.
- Tutorías personalizadas.
- Subir a la red indicaciones de cómo preparar la asignatura.
- Impartición de clases de tutoría colectiva, en la que se realizan problemas y se resuelven dudas.
- Corrección de exámenes en tutorías colectivas, y también publicando las soluciones de los mismos en la red, para que los alumnos puedan comprender en que han fallado para no repetir los mismos errores en próximas ocasiones.
- Seguimiento personalizado en algunos casos.

Las dos primeras actuaciones enumeradas son las únicas que son obligatorias para el profesorado, las demás son actividades voluntarias. Como toda actividad voluntaria por parte de los profesores, algunos la realizan y otros no, con lo que existe una gran dispersión entre las acciones realizadas por unos profesores y por otros. Existiendo casos en que los profesores realizan muchas actuaciones para que los alumnos no abandonen las asignaturas y otros casos en los que esto no ocurre.

5. CONCLUSIONES

Los autores del presente artículo consideran que la Universidad como conjunto debería establecer unas pautas mínimas a seguir en las que se recojan las actuaciones mínimas a realizar por los profesores en las asignaturas en extinción. Se debería reconocer un mínimo de horas lectivas en función de la cantidad de alumnos matriculados en las mismas y de sus resultados, o de las acciones realizadas.

Los profesores responsables de estas asignaturas en extinción deberían ser evaluados por los alumnos matriculados en las mismas como sucede con el resto de asig-

naturas, para ver la labor realizada por los mismos. El no realizar una evaluación de estas acciones formativas puede llegar a indicar lo que les preocupa a las universidades las actuaciones de los profesores frente a los alumnos en las mismas.

Debería existir un indicador de abandono de dichas asignaturas, y de presentación a los exámenes.

Agradecimientos

La investigación realizada en este trabajo ha sido financiada por la Universitat Politècnica de València a través del proyecto Project PIME A07/13 concedido en la convocatoria 2013-2014 y por el EICE INDIN.

Algunos de los autores pertenecen al Grupo de Investigación e Innovación Educativa en Metodologías activas para el desarrollo y evaluación de competencias genéricas interpersonales (MACGI).

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LA RÚBRICA COMO INSTRUMENTO PARA LA EVALUACIÓN DE COMPETENCIAS GENERICAS: ANÁLISIS DE UNA EXPERIENCIA EN INGENIERÍA DE LA ENERGÍA

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Resumen.

Los nuevos títulos de grado en la Universidad española, generados a raíz de su incorporación al Espacio Europeo de Educación Superior (EEES) inciden en la importancia de desarrollar y evaluar competencias genéricas o transversales, situando a la rúbrica como unos de los instrumentos idóneos para realizar una evaluación sumativa y, especialmente, formativa de los estudiantes. La presente comunicación expone la experiencia de evaluación mediante rúbricas de las competentes genéricas: comunicación oral y comunicación escrita, realizada con 74 alumnos del 2º curso del Grado en Ingeniería de la Energía, de la Escuela Técnica Superior de Ingenieros Industriales de la Universitat Politècnica de València. A partir de los resultados obtenidos, podemos concluir que el alumnado ha percibido y valorado muy positivamente su la utilización.

Palabras Clave: competencias genéricas, rúbricas de evaluación y percepción de los estudiantes.

1. INTRODUCCIÓN

Desde el proceso de adaptación al Espacio Europeo de Educación Superior (EEES) adquiere gran importancia el trabajo por competencias, especialmente las genéricas o transversales como son el trabajo en equipo, la comunicación oral y escrita, entre otras [1]. Este tipo de competencias son transferibles a una gran variedad de funciones y tareas, siendo deseables para garantizar la empleabilidad del recién egresado, con independencia de la titulación de origen.

Desde el punto de vista de la empleabilidad de los estudiantes y profesionales en el ámbito de la ingeniería, son los modelos de competencia con un enfoque holístico

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los que mayor interés tienen, integrando tanto aspectos técnicos como habilidades personales e interpersonales que permitan tener un buen desempeño laboral [2]. Para ello el estudiante deberá adquirir progresivamente un conjunto de competencias que lo harán un profesional competente.

Este cambio de paradigma educativo, supone un replanteamiento del proceso de evaluación para alinearlo con el logro de competencias [3]. En este contexto, las rúbricas han ido adquiriendo un papel relevante, y algunos autores [4] han destacado su valor en el aprendizaje basado en competencias, ya que las rúbricas de evaluación van a permitir clarificar el alcance del proceso formativo de los estudiantes.

Para evaluar competencias existen diferentes instrumentos que posibilitan llevar a cabo una evaluación auténtica, uno de ellos son las rúbricas, que por su versatilidad y potencialidad didáctica han recibido una mayor atención tanto teórica como práctica, en la última década.

2. LA RÚBRICA COMO RECURSO PARA LA EVALUACIÓN

Las rúbricas, conocidas también como matrices de valoración, son en palabras de [4] "guías de puntuación usadas en la evaluación del desempeño de los estudiantes que describen las características específicas de un producto, proyecto o tarea en varios niveles de rendimiento" [5] especifican su forma y procedimiento indicando que una rúbrica "se presenta como una pauta o tabla de doble entrada que permite unir y relacionar criterios de evaluación, niveles de logro y descriptores. La columna indica dimensiones de la calidad y enumera una serie de ítems o áreas que se deben evaluar. La fila indica los niveles de dominio. En la intersección se incluye una descripción textual de las cualidades de los resultados y productos en esa dimensión y a ese nivel". Su estructura es sencilla y permite al profesor evaluar diferentes indicadores de la competencia y su nivel concreto de desarrollo, tomando en consideración las evidencias para la evaluación de que dispone. Pueden ser cuantitativas, cualitativas o mixtas.

Puede hablarse de dos tipos de rúbrica: la holística y la analítica [6]. En la primera el profesor evalúa la totalidad del proceso o producto como un todo, sin juzgar los componentes por separado, para determinar el nivel de competencias alcanzado por el estudiante. Mientras que en la segunda el profesor evalúa inicialmente, por separado, las diferentes partes del producto o desempeño, para obtener finalmente la calificación total. En la rúbrica analítica se promueve una evaluación más formativa, aunque el proceso de calificación es más lento.

La rúbrica se ha revelado como un instrumento que permite una evaluación integral y formativa [7]) y como instrumento de orientación [8-9]. Para lograr que sean realmente formativa, el estudiante debe implicarse en todo el proceso de aprendizaje,

autoevaluándose, evaluando a sus compañeros e incluso llegando a participar en su diseño.

Ventajas y desventajas

La utilización de rúbricas aporta una gran variedad de ventajas, tanto para el profesor como para el estudiante [4, 10, 11, 12 y14], entre ellas se encuentran:

- Son fáciles de utilizar y de explicar.
- Obligan al profesor a clarificar sus criterios de evaluación y niveles de logro que el estudiante debe alcanzar.
- Le proporcionan al profesor indicadores para evaluar y documentar el progreso de los estudiantes, mostrándole donde están sus puntos débiles, para poder corregirlos.
- Facilitan la calificación del desempeño de los estudiantes en materias o temas que son complejos, imprecisos y subjetivos.
- Muestran claramente al estudiante qué se espera de él y como será evaluado, ayudándole así a comprender los objetivos, valorar sus progresos y logros, para regular sus esfuerzos y para modificar estrategias.
- Los estudiantes suelen percibir positivamente su utilización reduciendo su nivel de ansiedad.
- Proporciona al estudiante un feedback continuo sobre sus fortalezas y debilidades, ayudándole a autorregular su aprendizaje.
- Permite que el alumno evalúe y haga una revisión final de sus trabajos, antes de entregarlos al profesor.
- Propician el aprendizaje crítico y reflexivo.
- Cuando son utilizadas por los estudiantes, fomentan el desarrollo de competencias metacognitivas como la autorregulación de su aprendizaje.
- Sirven de soporte para la autoevaluación, coevaluación y heteroevaluación de las elaboraciones de los estudiantes.
- Pueden utilizarse tanto para evaluar procesos como resultados.
- Ayudan al profesor a reducir el tiempo invertido en la evaluación de los productos y competencias de sus estudiantes.

Pero las rúbricas también presentan una serie de desventajas:

- Si el profesor no las elabora adecuadamente, la evaluación puede ser engañosa.

- No elimina otros tipos de evaluación.
- Los estudiantes pueden percibirlos como un instrumento para satisfacer las demandas del profesor más que una representación de los criterios de calidad en la realización de sus trabajos y actividades.

De cualquier forma, son muchas más sus ventajas que sus desventajas.

3. METODOLOGÍA

A continuación se describe la metodología seguida en esta investigación.

Contexto

La investigación se realizó con 74 alumnos inscritos en la asignatura "Fundamentos de Organización de Empresas", de 4,5 créditos que se imparte durante el primer cuatrimestre del 2º curso del Grado en Ingeniería de la Energía, de la Escuela Técnica Superior de Ingenieros Industriales de la Universitat Politècnica de València, durante el curso 2013-14.

Objetivos

Los objetivos de investigación educativa son los siguientes:

- Conocer la percepción que los estudiantes tienen sobre la utilidad y satisfacción sobre la utilización de rúbricas.
- Identificar las ventajas y dificultades encontradas por los estudiantes en su proceso de aplicación.
- Recopilar sugerencias para la mejora en el uso de la rúbrica como recurso para la evaluación formativa.

Procedimiento y actividades

Para la elaboración de las rúbricas analíticas utilizadas se han seguido los siguientes pasos:

1. Determinar el logro del aprendizaje que se desea evaluar. Por ejemplo: el estudiante expone el tema escogido por su grupo demostrando claridad y dominio del tema.
2. Diseño de la tarea a través de la cual se evaluará dicho logro de aprendizaje. Por ejemplo: la actividad propuesta para evaluar el logro del aprendizaje es la exposición oral del tema durante 15 minutos.

3. Señalar los criterios o dimensiones que se evaluarán.
4. Establecer el peso de cada criterio que se evaluará, según su importancia y que esta se vea reflejada en el puntaje total.
5. Definir el número y categorías de los niveles de desempeño. Se decidió establecer cuatro niveles de tipo mixto (cuantitativo y cualitativo).
6. Establecer los descriptores de la ejecución de la tarea para cada uno de los niveles de desempeño, para ubicar en qué etapa del proceso de aprendizaje se encuentra el alumno.
7. Consensuar con los alumnos los criterios, el lenguaje utilizado en los descriptores y el peso asignado a cada criterio.

El primer día de clase se explico a los estudiantes que era una rúbrica, sus normas de utilización y finalidad. Se informó a los estudiantes que a lo largo del cuatrimestre en horario no presencial debían, en grupos de cinco estudiantes, realizar dos trabajos académicos relacionados con el temario de la asignatura, con una extensión de 15 a 20 folios, y, posteriormente, realizar una exposición oral del mismo. Los estudiantes se agruparon libremente y se juntó a los que no tenían equipo o grupo.

Para seleccionar el tema y la recibir las orientaciones para su elaboración y búsqueda de información, todos los integrantes de cada grupo acudieron a una tutoría y, posteriormente, como mínimo a una de seguimiento. En la primera tutoría se proporcionó a cada grupo un documento base con las normas a seguir, como son: fecha y hora de entrega, portada, formato, extensión mínima y máxima, y apartados (introducción, apartados, conclusiones o resumen y fuentes consultadas), así como un documento base de cómo realizar una exposición oral. Se introdujo dentro de la intranet de la asignatura (PoliformaT) las dos rúbricas, después de consensuarlas. Una vez finalizado el trabajo académico, debían presentarlo en el plazo temporal establecido junto a la rúbrica de autoevaluación del equipo. Para aplicar la coevaluación para los trabajos académicos, se introdujeron los trabajos en la intranet de la asignatura y se asignó cada trabajo a otros dos equipos para que los evalúen. Dichos equipos enviaron por correo electrónico la plantilla de coevaluación al profesor y, este junto a la suya, las remitió al representante del equipo autor del trabajo.

Posteriormente, en horario de prácticas, realizaron una exposición oral del trabajo académico realizado, la presentación fue realizada por parte de un alumno seleccionado por los profesores. Se invitó al resto de la clase a asistir a dicha exposición. Al finalizar la misma se realizó una autoevaluación, una coevaluación y una heteroevaluación. Se realizaron observaciones verbales sobre la exposición indicando los puntos fuertes y aquellos que precisaban mejora. A todos los equipos se les envió a los pocos días las plantillas de coevaluación y heteroevaluación rellenas. La autoevaluación se entregó el mismo día al profesor.

4. INSTRUMENTOS

Los instrumentos utilizados han sido dos rúbricas para evaluar las competencias exposición oral y escrita. A continuación, en la tabla 1, se expone una de las rúbricas utilizadas: rúbrica para evaluar un trabajo académico.

RUBRICA PARA EVALUAR UN TRABAJO ACADÉMICO				
CRITERIOS	DESCRIPTORES			
	Excelente (10-9)	Bueno (8-7)	Suficiente (6-5)	Deficiente(<5)
Formato 10%	Se siguen todos los descriptores establecidos.	Se siguen casi todos los descriptores establecidos.	Solo se siguen algunos descriptores.	No se sigue, casi ningún descriptor.
Contenido 40%	Cubre el tema con profundidad Su desarrollo es completo. Contenido excelentemente estructurado.	Incluye suficiente información sobre el tema, pero falta algún apartado o no están bien enfocados. Buena estructura.	Faltan algunos apartados o no están bien enfocados. Estructura con errores en la jerarquía.	Muchas partes no han sido tratadas o están mal interpretadas. No tiene estructura, sin jerarquía.
Redacción 10%	Redacción coherente y ordenada, texto cohesionado. Sin ningún error (gramatical, ortográfico, etc.). Excelente uso del vocabulario específico.	Casi no hay errores gramaticales, ortográficos o de puntuación (de 1 a 3 errores). Buen uso del vocabulario específico de la materia.	Con unos pocos errores gramaticales, ortográficos o puntuación (de 3 a 6). Vacilaciones en el uso del vocabulario y abreviaturas específicas de la materia.	Muchos errores gramaticales y otros (más de 7). No se utiliza, en absoluto, el vocabulario y abreviaturas específicas de la materia.
Conclusiones 10%	Conclusión muy bien planteada y estruc-	Conclusión bien planteada y estructu-	Conclusión planteada y estructurada,	Prácticamente no existen conclusiones.

	turada, vinculada con la práctica empresarial. Extensión adecuada.	rada, poco vinculada con la empresa. Extensión adecuada.	sin relación con la práctica empresarial. Extensión reducida.	
Citas, referencias y bibliografía 10%	Realiza citas y referencias de manera correcta. Bibliografía adecuada y actualizada.	Las citas y referencias presentan 1 ó 2 errores. Bibliografía adecuada.	Las citas y referencias con más de 3 errores. Poca actualización o fuentes inadecuadas.	No cita fuentes, (plagio). Bibliografía inadecuada o sólo páginas de internet.
Extensión del escrito 10%	Sigue la extensión recomendada (15-20 páginas).	Se excede un poco o es ligeramente inferior (1 ó 2 folios).	Se excede o es ligeramente inferior (3 ó 4 folios).	No tiene la extensión recomendada (>4 folios).
Tiempo de Entrega 10%	Se entregó con anterioridad al día y hora fijada.	Se entregó en el día fijado y, a la hora establecida.	Se entregó en el día pero no a la hora fijada.	Se entregó con más de 1 día de retraso.
NOTA FINAL				

Tabla 1 Rúbrica de evaluación de un trabajo académico. Fuente elaboración propia.

Los criterios utilizados en la rúbrica de exposición oral son los siguientes: dominio del tema; comunicación verbal (claridad, tono de voz, vocabulario y uso de muletillas); comunicación no verbal (postura, contacto visual,...); aspectos formales (estructura, índice, conclusiones); respuestas a las preguntas planteadas; utilización de PowerPoint (número de presentaciones, cantidad de texto, tamaño letra, utilización del color e imágenes y se gira para leer la presentación) y control del tiempo.

Para responder a nuestro objetivo de conocer la percepción de los estudiantes respecto al grado de utilidad y satisfacción sobre la implementación de la rúbrica se diseñó un breve cuestionario, con una escala tipo Liker (escala 1 a 5, siendo 1 totalmente en desacuerdo y 5 totalmente de acuerdo). El cuestionario finaliza con preguntas abiertas para conocer los aspectos más positivos y más negativos encontrados por el estudiante al utilizar las rúbricas.

<i>De las siguientes afirmaciones, indica tu opinión marcando con una X</i>					
A. LA RÚBRICA ME HA RESULTADO ÚTIL PARA....	1	2	3	4	5
1) Desarrollar expectativas ajustadas sobre qué se me demanda					
2) Guiar el desarrollo del trabajo académico y su presentación					
3) Conocer cómo seremos evaluados					
4) Revisar lo que sé iba haciendo para ajustarlo a los criterios establecidos					
5) Evaluar el trabajo académico y la presentación de mi equipo (autoevaluación)					
6) Evaluar el trabajo académico y la presentación de otros equipos (coevaluación)					
7) Proporcionar feedback					
8) Constatar el nivel de competencia adquirida					
B. NIVEL DE SATISFACCIÓN					
9) Mi experiencia con la rúbrica ha sido satisfactoria					
10) ¿Desearías continuar seguir utilizando rúbricas en más asignaturas del Grado?					
11) ¿Cuáles es el aspecto más positivo que encuentras a la utilización de rúbricas?					
12) ¿Y es el aspecto más negativo?					
13) Otras sugerencias que desees realizar					

Tabla 2 Cuestionario para conocer el nivel de utilidad y satisfacción sobre la utilización de rúbricas. Fuente: Elaboración Propia basado en [16]

5. RESULTADOS

Los calificaciones obtenidas por los alumnos indican que hubo una mejora significativa entre el primer y segundo trabajo académico, en todos los grupos, sucediendo lo mismo con la exposición oral.

El cuestionario fue contestado por los 74 alumnos matriculados. Los datos estadísticos del cuestionario se muestran en la tabla 3,

Pregun- ta	Media	Desvi. típica	Pre- gunta	Media	Desv. típica
1	3,29	0,83	6	2,97	0,95
2	3,36	0,74	7	3,48	0,87
3	3,87	0,61	8	3,23	0,86
4	3,58	0,95	9	3,72	0,79
5	3,64	0,81	10	2,75	0,98

Tabla 3. Datos estadísticos del cuestionario

Como se puede observar los ítems más valorados son: Conocer cómo seremos evaluados; Evaluar el trabajo académico y la presentación de mi equipo (autoevaluación); Mi experiencia con la rúbrica ha sido satisfactoria. Por el contrario, los menos valorados por orden son: ¿Desearías continuar seguir utilizando rúbricas en más asignaturas del Grado?; Evaluar el trabajo académico y la presentación de otros equipos (coevaluación); Constatar el nivel de competencia adquirida.

Respecto a las dos preguntas abiertas en las que se les pedía señalar el aspecto más positivo y el más negativo las respuestas que se repiten con mayor frecuencia son las siguientes:

- En general, señalan como los aspectos más positivos que el uso de las rúbricas, según sus propias palabras: *"Al conocer la valoración antes de realizar el trabajo o actividad te ayuda a hacerlo bien desde el principio"*, *"Nos ayuda a planificar mejor el trabajo"*, *"Nos ha venido muy bien para ser consciente de los puntos débiles del grupo e intentar mejorarlos"*, *"Garantiza la corrección objetiva"*.
- El aspecto negativo más mencionado es: "Dificultades dentro del equipo para ponerse de acuerdo", "Tener que evaluar a los compañeros", "La falta de tiempo para rellenar tantas rúbricas".

Aunque las sugerencias han sido muy escasas, la más predominante ha sido que la rúbrica ocupe una sola página, con un tamaño legible.

6. CONCLUSIONES Y PROPUESTAS DE MEJORA

Consideramos que estamos ante un recurso que favorece una verdadera evaluación objetiva y formativa de las competencias transversales.

Con la utilización de la rúbrica desde el comienzo del proceso, el alumnado conoce los criterios con los que va a ser evaluado junto con las exigencias asociadas a una competencia específica, lo que le puede permitir regular y orientar su aprendizaje [15]. Realizar trabajos en grupo y exposiciones orales son estrategias metodológicas habituales en las aulas universitarias y necesarias en el ejercicio profesional del ingeniero.

La rúbrica del trabajo académico ha propiciado una mayor homogeneidad en la estructura y formato de los trabajos entregados y la exposición de los mismos.

Por otra parte, la valoración de los estudiantes mostrada a través del cuestionario realizado ha sido elevada, no habiendo ninguna puntuación media por debajo de 3. Los estudiantes han mostrado una buena aceptación de las rúbricas, la mayoría de ellos verbalmente nos informaron que nos las habían utilizado nunca, expresando su satisfacción al disponer de las mismas al inicio del cuatrimestre, al servirles principalmente para conocer cómo serán evaluados y permitirles la autoevaluación de la competencia comunicación escrita y oral.

Nuestro trabajo nos aporta también la idea de que las rúbricas más eficaces son aquellas que se producen de forma conjunta entre los diferentes agentes del proceso de enseñanza-aprendizaje (profesor-alumnos), para que desde el inicio los estudiantes conozcan cuales son los parámetros que se van a aplicar en la evaluación, comprendan el objetivo de la tarea o desempeño y puedan centrar sus esfuerzos en el logro de los mismos.

En nuestro estudio, en la mayor parte de los casos, los alumnos han sobrevalorado su trabajo. Ello puede ser debido a que se trata de estudiantes de segundo curso y no saben detectar sus puntos débiles. La evaluación realizada por los compañeros (co-evaluación) tiene un alto grado de similitud con la calificación de los profesores.

Como propuesta de mejora planteamos las siguientes: la necesidad de que una misma rúbrica sea utilizada en las asignaturas en que los alumnos realicen trabajos académicos y, posteriormente, los expongan oralmente en el aula; analizar la validez y fiabilidad de las rúbricas utilizadas.

Agradecimientos

Estos trabajos de investigación han sido apoyados por los PIMES 2013-2014 de la Universitat Politècnica de Valencia.

Algunos de los autores pertenecen al Grupo de Investigación e Innovación Educativa en Metodologías activas para el desarrollo y evaluación de competencias genéricas interpersonales (MACGI).

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ADAPTACIÓN DEL ESTILO DOCENTE EN UNA ASIGNATURA CON UN REDUCIDO NÚMERO DE ESTUDIANTES

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Resumen.

El trabajo con grupos reducidos genera condiciones didácticas diferentes a se crean en un grupo grande, planteando múltiples ventajas, pero también las que problemas y limitaciones que es importante considerar y prever.

Entre las ventajas de trabajar con grupos reducidos destaca el hecho de que nos permite introducir más actividades de aprendizaje, aumenta la interacción profesor-alumno y la participación de los alumnos. Pero junto a estas ventajas hay que evaluar los posibles problemas que pueden aparecer, como falta de motivación y heterogeneidad de los alumnos o la exigencia de una mayor dedicación del docente, que pueden limitar la consecución de los objetivos de aprendizaje planteados.

En este artículo se describe el proceso de análisis llevado a cabo para establecer el estilo docente en la asignatura de Dirección Estratégica en la empresa constructora. Se trata de una asignatura de intensificación del módulo de Empresas constructoras, que se imparte en el 5^a curso de la licenciatura de Administración y Dirección de Empresas en la UPV, en el segundo cuatrimestre, y en la que el número de alumnos matriculados para el curso 2013-14 es de 8.

Del proceso general de análisis, se presentan en el presente artículo, por considerarlas de mayor interés, la adaptación aplicada en:

- La presentación de la asignatura
- El sistema de evaluación.

1. EL TRABAJO CON GRUPOS REDUCIDOS

La planificación y el diseño de actividades que sean coherentes con los resultados esperados, y que faciliten, guíen y motiven a los estudiantes en su proceso de aprendizaje, es una de las tareas a las que debe enfrentarse un profesor en el terreno metodológico, y para abordar esta tarea deben tenerse en cuenta múltiples variables, como la naturaleza de la asignatura, los recursos disponibles, los niveles de los objetivos cognitivos previstos, las características genéricas de cada metodología

(capacidad de propiciar un aprendizaje autónomo y continuo, el grado de control ejercido por los estudiantes sobre su aprendizaje, el número de alumnos a los que puede abarcar, el número de horas de preparación que exige, etc.), y la adecuación entre el método de enseñanza y la personalidad del docente [1].

Aunque todas estas variables pueden condicionar la eficacia del aprendizaje, hay algunas sobre las que los profesores podemos actuar, pero hay otras, como el número de alumnos o sus conocimientos previos, en las que no tenemos capacidad de maniobra, por lo que la decisión metodológica se convierte en un difícil equilibrio entre algunas variables que sí pueden cambiarse y otras que no es posible cambiar [2].

La puesta en marcha de la experiencia que se presenta en este artículo se ha centrado en una de las variables sobre las que no tenemos capacidad de maniobra, el número de alumnos, y más en concreto en el análisis de las condiciones didácticas que se dan en un grupo reducido, para lo cual se abordaron las siguientes etapas:

- Identificación de las metodologías docentes que se pueden aplicar en grupos reducidos.
- Análisis de las ventajas e inconvenientes que se presentan al trabajar con grupos reducidos.
- Selección de las metodologías a aplicar y diseño de las actividades de aprendizaje.

En el artículo se presentan los resultados de los 2 primeros apartados y, en lo que se refiere a las actividades de aprendizaje a implantar, se describen, por considerarlas de mayor interés y aplicabilidad a otros contextos, el diseño de la primera sesión de clase en la que se realizó la presentación de la asignatura, y la descripción de la sistemática de evaluación.

En los siguientes apartados se describe en primer lugar el contexto de la experiencia, para pasar después a describir los resultados del análisis realizado y la descripción detallada de la experiencia puesta en marcha, incluyendo una valoración del resultado que permita plantear su posible aplicación en otros contextos.

2. CONTEXTUALIZACIÓN DE LA EXPERIENCIA

La asignatura

La asignatura en la que se ha desarrollado la experiencia es una asignatura de 5º curso de la licenciatura en Administración y Dirección de Empresa, que se imparte en el segundo cuatrimestre, y forma parte del bloque de intensificación de empresas constructoras. Se trata de una asignatura con un enfoque eminentemente práctico

que permite al alumno adquirir competencias y habilidades vinculadas al entorno laboral, tal y como aparece en la guía docente:

“Se ponen en práctica todos los conceptos que el alumno ha recibido acerca de la dirección estratégica y política de empresas en general, aplicados a las empresas constructoras.

Estos conocimientos y la toma de decisiones estratégicas en diversas áreas de la empresa se pondrán en práctica mediante la creación de una empresa de la construcción y la elaboración de un plan de empresa completo.”

Es importante destacar que en el primer cuatrimestre del curso, los alumnos tienen como asignatura troncal “Dirección Estratégica y Política de Empresa”, y es en esta asignatura en la que los alumnos reciben los conceptos teóricos que sirven de fundamento para esta asignatura.

La asignatura se imparte con periodicidad semanal, y cada sesión tiene una duración de 3 horas y 15 minutos.

El tamaño del grupo

El número total de alumnos matriculados nos conduce a catalogarlo como “grupo reducido pequeño” [1], ya que al inicio del cuatrimestre se habían matriculado 8 alumnos, aunque en las primeras semanas se matricularon 3 alumnos más.

3. METODOLOGIAS DIDACTICAS APLICABLES A GRUPOS REDUCIDOS.

Partiendo de la premisa de que no existe “el mejor método”, y que la elección del método no debería basarse en lo cómodo o atractivo que le resulte al profesor, en general las investigaciones sobre métodos de enseñanza plantean las siguientes conclusiones [3]:

- Todos los métodos de enseñanza son equivalentes cuando se trata de hacer alcanzar objetivos simples como la adquisición y la comprensión de conocimientos.
- Los métodos de enseñanza mayoritariamente centrados en el estudiante propician particularmente alcanzar objetivos relacionados con la memorización a largo plazo, el desarrollo del pensamiento, el desarrollo de la motivación y el transfer de aprendizajes.
- Los resultados superiores obtenidos con ciertos métodos de enseñanza son aparentemente menos atribuibles a estos métodos por sí mismos que a la cantidad y calidad de trabajo intelectual personal que aquellos permiten generar.

Teniendo esto en cuenta, realizamos un análisis de diferentes metodologías docentes desde el enfoque del tamaño del grupo de alumnos que pueden abarcar, y de este análisis se desprende que, en principio, cualquier metodología podría aplicarse en un grupo reducido de alumnos, mientras que algunos de ellos no son aplicables a grupos grandes, ya que cuanto mayor es el número de estudiantes, existen menos posibilidades de interacción, de control, de supervisión individual o de realimentación entre el profesor y los alumnos y entre estos últimos entre ellos mismos. Esto se puede ver en la siguiente tabla, en la que se transcribe el listado de metodologías identificadas por Fernández March [3], y su aplicabilidad en función del nº de estudiantes.

METODOS DE ENSEÑANZA						
LECCION MAGISTRAL		TRABAJO EN EQUIPO			TRABAJO AUTONOMO	
Formales	Informales	Casos	Problemas	Proyectos	Contrato de aprendizaje	
Nº de estudiantes que se puede abarcar	GRANDE	GRANDE	MEDIANO	MEDIANO	MEDIANO	PEQUEÑO

Tabla 1. Extracto de los métodos de enseñanza [3]

Según estos datos, nos planteamos centrarnos en las metodologías docentes más activas y participativas: trabajo en equipo y trabajo autónomo, que inicialmente deberían aumentar la atención e implicación del alumnado en los procesos globales de su formación [1].

Como siguiente paso, y teniendo en cuenta los criterios marcados en la guía docente, se analizaron las siguientes variables, con el objetivo de identificar la/s metodología/s a aplicar [3]:

- Las características de la asignatura: eminentemente práctica (los alumnos ya disponen de conocimientos teóricos al respecto, dado que en el cuatrimestre anterior han cursado una asignatura al efecto).
- Niveles cognitivos perseguidos: Superiores (aplicación de los conocimientos, análisis, síntesis y evaluación).
- Necesidad de propiciar un aprendizaje autónomo: Elevada
- Nivel de control que deberían ejercer los alumnos sobre su aprendizaje: elevado.

Este análisis nos condujo a plantear, como metodología central de la asignatura, el “Aprendizaje orientado a proyectos”: Estrategia en la que el producto del proceso de aprendizaje es un proyecto o programa de intervención profesional, en torno al cual se articulan todas las actividades formativas.

En la tabla siguiente se presentan las características básicas de esta metodología [3]

VENTAJAS	<ul style="list-style-type: none">- Permite la adquisición de una metodología de trabajo profesional.- Es interesante. Se convierte en un incentivo.- Se aprende a partir de la experiencia.- Desarrolla el autoaprendizaje y el pensamiento creativo.
DONDE APLICARLO	<ul style="list-style-type: none">- Recomendable en materias terminales. En cursos donde ya se integran contenidos de diferentes áreas de conocimiento y se pueden realizar trabajos muti e interdisciplinares
ASPECTOS A CONSIDERAR	<ul style="list-style-type: none">- Es importante definir claramente las habilidades, actitudes y valores que se estimularán en el proyecto.- Establecer el sistema de seguimiento y asesoría a lo largo de todo el proyecto.
PAPEL PROFESOR-ALUMNO	<ul style="list-style-type: none">- Profesor: actúa como experto, tutor, recurso y evaluador.- Estudiante: Protagonista, Diseñador, Gestor de aprendizaje, recursos y tiempo, Auto-evaluador.

Tabla 2. Características básicas del “Aprendizaje centrado en proyectos” [3]

Una vez establecida la metodología central, es importante señalar que en el diseño global de las actividades a llevar a cabo en la asignatura, se contempló el uso de otras metodologías complementarias, tomando como referencia que la buena metodología didáctica, sea cual sea la forma final que adopte, siempre contiene tres elementos que resultan básicos: la lección magistral; el trabajo en grupo y el trabajo autónomo por parte del estudiante [2].

4. VENTAJAS E INCONVENIENTES DE TENER UN NÚMERO REDUCIDO DE ESTUDIANTES

En principio el trabajo con grupos reducidos es una consecuencia básica de la aplicación del EEES, que potencia tanto la evaluación continuada como los grupos con menos estudiantes, pero en el caso que nos ocupa, con tan pocos estudiantes en el aula, nos planteamos identificar las ventajas e inconvenientes con los que nos pod-

íamos encontrar, con el objetivo de potenciar las ventajas, y reducir al máximo los posibles inconvenientes.

En este sentido, y teniendo en cuenta que también es importante fomentar el trabajo individual de los alumnos hacia una autonomía formativa, las principales ventajas de tener un número reducido de estudiantes están relacionadas con la mayor interacción que se produce entre alumnos y profesor, y el hecho de propiciar un seguimiento más directo por parte del profesor del proceso de aprendizaje del alumno, pero estas ventajas se pueden convertir en problemas si el profesor no consigue “conectar” con los alumnos.

En la tabla siguiente se muestran las ventajas e inconvenientes de las tres modalidades de trabajo individual y en grupos reducidos [3]:

	VENTAJAS	INCONVENIENTES
Trabajo Individual	<ul style="list-style-type: none"> - Cada uno se clarifica delante de sí mismo. - Se trabaja al propio ritmo de aprendizaje. - Genera hábitos de reflexión personal 	<ul style="list-style-type: none"> - Poco creativo. - Falta de intercambio. - Riesgo de interpretaciones subjetivas del conocimiento poco contrastadas
Trabajo con grupos reducidos pequeños (2-15)	<ul style="list-style-type: none"> - Estimula la competitividad y motiva el trabajo. - Aumenta la creatividad. - Permite analizar puntos de vista diferentes. - Desarrolla la capacidad de cooperación y favorece el intercambio de experiencias. 	<ul style="list-style-type: none"> - Desequilibrio en la participación. - Dosis excesivas de confrontación y conflicto entre los miembros que bloquean el trabajo y la reflexión. - Baja productividad en grupos sin hábito de trabajo en equipo.
Trabajo con grupos reducidos (15-40)	<ul style="list-style-type: none"> - Las anteriores y: - Más riqueza de contenido. - Integración de corrientes de opinión de los subgrupos. - Puesta en común de los resultados de la reflexión individual o de los subgrupos. 	<ul style="list-style-type: none"> - Las anteriores y: - Incremento de la inhibición de algunos miembros a participar. - Requiere un animador hábil

Tabla 3. Ventajas e inconvenientes del trabajo con grupos reducidos [3]

Una vez analizadas las ventajas, nos planteamos analizar los posibles inconvenientes, entre los que destacan:

- Falta de motivación de los alumnos. Si en un grupo reducido de alumnos alguno está desmotivado, puede transmitir esta apatía al resto, dificultando el desarrollo de las sesiones.
- Actitudes pasivas por parte de los alumnos
- Clima inadecuado.
- Falta de liderazgo del profesor.
- Necesidad de mayor dedicación por parte del profesor

Teniendo en cuenta las ventajas e inconvenientes, se plantearon las diferentes sesiones de clase de tal forma que se potenciaran las ventajas y se minimizaran o redujeran los posibles inconvenientes, por lo que resultó clave en primer lugar la necesidad de realizar diferentes actividades en las sesiones, que resultaran interesantes y motivadores, y por otro lado la necesidad de que los alumnos se sintieran protagonistas, y participaran de forma activa en las sesiones.

5. DESCRIPCIÓN DE LA EXPERIENCIA “PRESENTACIÓN DE LA ASIGNATURA”

Si en cualquier contexto la primera impresión es importante, entendíamos que esta primera impresión era más trascendente en este caso, ya que en la primera clase se conforma la actitud del estudiante sobre nosotros como docentes y sobre la asignatura y debíamos hacer todo lo posible para captar la atención de los alumnos y motivarles para asegurar que la mayor cantidad de alumnos posibles iba a seguir la asignatura y asistir a las clases, y evitar encontrarnos con un aula “prácticamente vacía”.

Antes de describir con detalle la experiencia, se describen a continuación los criterios y los objetivos planteados en el diseño de la primera sesión para preparar bien la puesta en escena y el contenido.

Objetivos

- Captar el interés de los estudiantes por la asignatura, y motivarles a implicarse en su aprendizaje.
- Transmitir los objetivos de la asignatura y aclarar expectativas
- Evaluar conocimientos previos de los alumnos
- Identificar los métodos docentes que se van a emplear
- Explicar el sistema de evaluación

Premisas

- La primera clase debe ser un reflejo de la metodología que se va aplicar en la asignatura
- Transmitir desde la primera sesión la escucha activa, como metodología básica en todo el planteamiento de la docencia
- Involucrar a los alumnos en el desarrollo de la presentación
- Utilizar todo el tiempo de la sesión de clase (3 horas y 15 minutos)
- Utilizar la guía docente como documento de referencia

La primera clase debe ser un reflejo de la metodología que se va a aplicar en la asignatura. Es muy importante transmitir bien a los alumnos los métodos didácticos que se van a emplear, y no hay mejor forma de transmitir que con el ejemplo, por lo que la primera sesión debía ser un ejemplo de los métodos que se van a utilizar incidiendo especialmente en los aspectos metodológicos nuevos: pocas explicaciones teóricas, trabajo en equipo, protagonismo de los alumnos, escucha activa, evaluación continuada... etc.

La Escucha activa es un elemento indispensable para asegurar una comunicación eficaz, y en un grupo reducido de alumnos entendemos que es fundamental para mantener la motivación de los alumnos. Se refiere a la habilidad de escuchar no sólo lo que la persona está expresando directamente, sino también los sentimientos, ideas o pensamientos que subyacen a lo que se está diciendo. La escucha activa debe darse en una triple dirección: de los alumnos al docente, de éste al alumnado y entre ellos mismos, y su importancia en la docencia es innegable ya que sin ella no pueden llegar a darse, de manera adecuada, los procesos de enseñanza-aprendizaje [4].

Involucrar a los alumnos en la presentación de la asignatura. Una de las formas de que los alumnos se involucren en las clases es hacerlos cómplices de lo que ocurre en ellas, y en la primera sesión nos planteamos que participaran de forma activa, y comenzaran a plantear dudas y comentarios, de forma que se sintieran protagonistas, y de alguna forma se “eliminará la tarima”, que a veces dificulta el proceso de enseñanza-aprendizaje.

Utilizar todo el tiempo de la primera sesión de clase. Muchas veces pensamos que porque es la primera clase no podemos usar el tiempo asignado a la clase, sin embargo, esto se puede ser percibido por los alumnos como falta de profesionalidad del docente, o falta de preparación, por lo que se diseñó esta primera sesión con el objetivo de utilizar todo el tiempo disponible.

Revisar la guía docente. Entendiendo la guía docente, como un documento que compromete al profesor frente a los alumnos, a modo de “contrato”, se trata de un

documento que debe ser revisado con detalle en la primera sesión de la asignatura, y que debe servir de guión para abordar todos los aspectos relevantes de la asignatura.

6. DISEÑO DE LA SESIÓN DE PRESENTACIÓN DE LA ASIGNATURA

Teniendo en cuenta los objetivos y las premisas para la presentación de la asignatura, se plantearon las siguientes actividades.

- Profesora - Breve presentación de la profesora de la asignatura (10 minutos)
- Formación de grupos (en función de los alumnos que asistieran, se planteó la formación de 2 ó 3 grupos)
- Alumnos - Realización del cuestionario 1 (10 minutos). Presentación de resultados (20 minutos)
- Profesora - Presentación de la asignatura I, y entrega de la guía docente (30 minutos)
- Alumnos - Realización del cuestionario 2 (10 minutos). Presentación de resultados (20 minutos)
- Profesora - Presentación de la asignatura II (30 minutos)
- Turno de preguntas y comentarios al programa y al sistema de evaluación (1 hora).

1.- Presentación de la profesora.

Con esta presentación se pretendía aportar detalles de su currículum, con el objetivo de relacionarlo con el contexto de la asignatura. En esta breve presentación se aportarían también los datos generales de contacto.

2.- Formación de grupos

Con el objetivo de poner en práctica uno de los métodos docentes a utilizar: el trabajo en grupo, se planteó la conveniencia de que desde el inicio de la sesión los alumnos tuvieran la posibilidad de comentar y comparar ideas e interpretaciones entre ellos, para lo que se tenían que organizar en grupos para trabajar los cuestionarios que se les iban a pasar a continuación.

3.- Cuestionario 1:

Al distribuir el cuestionario era importante transmitir cuál era el objetivo del mismo, que no era otro que intentar conciliar, en la medida de lo posible, sus intereses y aspiraciones con los de la profesora, y que se podían resumir en que conocieran la materia (DEEC) y aprendieran a aplicarla al nivel de un futuro Licenciado en ADE.

Para ello era importante que contestaran a las cuestiones con la mayor sinceridad posible.

Las cuestiones planteadas eran las siguientes:

- ¿Tenéis alguna relación con el sector de la construcción?
- ¿Por qué habéis elegido la intensificación en empresas constructoras?
- Por qué os habéis matriculado en esta asignatura?
- ¿De qué creéis que va la asignatura?
- ¿Qué queremos conseguir a la finalización del curso?
- Identificar las metodologías docentes que habéis utilizado, y un ejemplo de asignatura

Al repartir el cuestionario se le pediría que anotaran los datos identificando a los miembros de cada grupo, dado que esta información se colgarían en la intranet de la asignatura.

Tras el trabajo en grupo, se planteó dedicar un tiempo (20 minutos) a comentar los resultados de cada grupo.

Con esta actividad, además de obtener información acerca de los alumnos y sus aspiraciones, se pretendía que también desde el inicio de la asignatura los alumnos se conocieran entre sí, dado que había alumnos de otras escuelas de la UPV (no todos venían de FADE).

4.- Presentación (I) de la asignatura y revisión de la guía docente

La presentación se organizó en dos bloques, y en este primer bloque se utilizó la guía docente de la asignatura como documento de base, para que también los alumnos pudieran acceder a ella en cualquier momento como documento de consulta.

En esta presentación se planteó abordar los siguientes aspectos de la asignatura:

- Contenido y estructura de las diferentes unidades didácticas
- Sistemática de evaluación y criterios
- Programación
- Desarrollo de la asignatura y metodología a utilizar (primera aproximación).

El orden de los diferentes temas a tratar se planteó intentando dar respuesta a las siguientes cuestiones:

- Qué se va a ver en la asignatura
- Cómo se va a evaluar el aprendizaje

- Qué actividades se van a realizar y cuando
- Como se va a desarrollar la asignatura

5.- Cuestionario 2- Alumnos

Tras la presentación inicial de la asignatura, se planteó que los alumnos volvieran a resolver en grupo las siguientes cuestiones:

- ¿Cuáles son los objetivos a alcanzar? (Intentar conciliar vuestros intereses y los de la profesora)
- ¿Qué metodología vamos a utilizar? (Consultar la guía docente de la asignatura)
- ¿Cómo se van a valorar los resultados y el proceso de aprendizaje?. ¿qué opináis al respecto?.

6.- Presentación II

En esta segunda parte de la presentación se planteó realizar un análisis detallado de la metodología docente a utilizar, tanto el eje central de la misma (aprendizaje basado en proyectos), como el resto: clase magistral y trabajo en grupo, pocas explicaciones teóricas, escucha activa, trabajo en equipo, evaluación continuada.

7.- Preguntas y comentarios

Finalmente, en la última etapa de la sesión, se dejaría espacio para resolver las dudas de los alumnos y plantear cuestiones al respecto.

Además, se prepararon varios videos de corta duración relacionados con la asignatura, en la que expertos en la materia (dirección estratégica), reforzaran los objetivos previstos y su aplicabilidad real en las empresas del sector.

7. MÉTODO DE EVALUACIÓN PLANTEADO

La evaluación del aprendizaje y la calificación administrativa son actividades que debieran coincidir, aunque no siempre lo hacen. De ahí la clásica afirmación según la cual no es lo mismo aprobar que aprender y que los alumnos lo que buscan por encima de todo es aprobar.

Pero el hecho de disponer de un grupo tan reducido de estudiantes resulta un marco muy propicio para concebir y ejecutar la evaluación en un sentido más integral, de forma que realmente aprueben quienes aprendan, esto es, que evaluación del aprendizaje y calificación administrativa sean realidades coincidentes, y además si pretendemos formar a los estudiantes para que piensen, decidan y actúen en el mundo real, la tarea de evaluación que les propongamos debe requerir en algún momento una demostración de estas capacidades [5].

Para ello se planteó un sistema de evaluación mixto y transparente, con 4 elementos, y con diferentes niveles de evaluación: heteroevaluación (el profesor evalúa al estudiante), coevaluación (evaluación entre pares) y la autoevaluación.

TIPO	DESCRIPCION	PESO	CRITERIO
Proyecto	Supone el análisis y la resolución de una situación planteada que presenta problemas de solución múltiple, a través de la reflexión y el diálogo para un aprendizaje grupal, integrado y significativo	50%	25% : Nivel de participación y trabajo en grupo. La nota se dará agregada, y el % de cada miembro lo decidirá el grupo. 25% : Nota del trabajo, cumplimiento de los criterios de calidad y contenido establecidos.
Prueba objetiva (tipo test)	Examen escrito estructurado con diversas preguntas o ítems en los que el alumno no elabora la respuesta, sólo ha de señalarla o completarla con elementos muy precisos	20%	20 preguntas tipo test, con tres respuestas posibles de las cuales sólo una es verdadera. Cada pregunta errónea restará el 33 % de una respuesta correcta.
Preguntas del minuto	Son preguntas abiertas que se realizan al finalizar una clase (dos o tres)	20 %	Se evaluará: - Asimilación de los conceptos teóricos de la asignatura. - El resultado de la presentación de las prácticas de aula
Co-evaluación	Co-evaluación	10%	- Evaluación de los compañeros y del profesor (presentación del caso y de las prácticas de aula)

8. VALORACIÓN DE LA EXPERIENCIA Y SU POSIBLE APLICACIÓN A OTROS CONTEXTOS

En cuanto a la valoración de resultados, y dado que la experiencia que se presenta se ha realizado en el cuatrimestre en curso (2º 2013/2014), no se ha podido valorar el resultado de la experiencia propuesta en la evaluación de la asignatura, aunque del feed-back recibido por los alumnos en la presentación de la asignatura plantea buenas perspectivas.

Centrándonos en el desarrollo en sí de la primera sesión de clase, el disponer de un guión tan estructurado facilitó la consecución de los objetivos planteados, y realmente los alumnos participaron de forma activa y se involucraron en la presentación de la asignatura. Sin embargo, y aunque se abordaron todos los puntos planteados, y con el nivel de profundidad necesario, no se consiguió utilizar todo el tiempo de la sesión, y la clase finalizó media hora antes de lo previsto, aunque teniendo en cuen-

ta que el tiempo previsto era largo (3 horas y 15 minutos) esto no fue percibido como un problema por los alumnos.

En cuanto a la posible aplicación a otros contextos, entendemos que la experiencia puede ser extrapolable a cualquier tipo de asignatura que tenga características similares a la nuestra, es decir, eminentemente práctica, y en la que los alumnos ya tengan conocimientos teóricos previos, dado que de lo contrario la respuesta a los cuestionarios planteados no generaría debate en los grupos, y esta actividad no aportaría contenido a la presentación.

Como conclusión hay que señalar que el resultado ha sido muy positivo, y de hecho se ha conseguido que los alumnos asistan a las clases y participen de forma activa en todas las sesiones.

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LA WIKI EN EL APRENDIZAJE DE LOS ESTUDIANTES UNIVERSITARIOS DE INGENIERÍAS

S. BLANC¹ and P. YUSTE

Abstract

This paper presents an innovation research on promoting self-learning and collaborative writing in engineering university courses. The work is focused on the development of a course Wiki as the leitmotiv of the students' activity. Students produce self-contained and reusable Wiki pages within the course framework attending to a suitable work planning. Additionally to help the student on the achievement of curricula, the Wiki is also available to the whole group in the form of self-study material adapted to the students group. Wikis provide teachers with potentially significant opportunities for creating socially engaged tasks that require active student participation and collaboration. Wikis allow students to carry out a collaborative writing stimulating reflection, knowledge sharing, and critical thinking. However, despite the potential capabilities of wikis, there is a need for a systematic process to the construction of this virtual writing space and the use of this tool for upper expectations in a deep real learning approach. The paper also reports on the evaluation of the approach by means of quantitative data collection.

Keywords: Active learning; Student-centered; Wiki; High Education Engineering courses

1. INTRODUCCIÓN

Aunque se ha conseguido avanzar mucho en el enfoque de metodologías activas en pro de la participación del alumno en su propio aprendizaje, aún existen campos abiertos a la investigación educativa y la innovación como es el caso del trabajo no

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presencial, reconocido como necesario y evaluable en el actual sistema de créditos ECTS.

Existen técnicas que se han aplicado satisfactoriamente dentro del aula con el fin de motivar a los alumnos y trabajar en competencias propias del título y competencias transversales. Sin embargo, la práctica realizada fuera del aula no puede ser una mera extensión de la práctica dentro del aula o laboratorio puesto que fuera se pierde el componente motor de estas actividades que es el discurso docente y la guía oral obtenida en la presencialidad.

Por eso, es importante investigar en actividades fuera del aula, que conduzcan hacia un aprendizaje significativo, autónomo y centrado en diversidad de competencias. Un ejemplo es el aprendizaje por investigación, que se puede realizar de forma guiada y adaptada basándose en *systematic review*. Sin embargo, encontrar y reconocer fuentes de información válida y fiable no es suficiente si no se saben aplicar los conocimientos a la práctica de la ingeniería. En este sentido, el trabajo en equipo tutorizado es un componente práctico en la planificación curricular donde cada equipo trabaja un aspecto de la materia de forma teórico-práctica. Por una parte, las ventajas del trabajo en equipo han sido defendidas en numerosas ocasiones. El objetivo es que el trabajo de investigación y aplicación se realice como parte de las horas de dedicación semanal del alumno no presenciales. Por tanto, la tutorización de los equipos es un componente esencial en el aprendizaje del alumno y también reduce la carga docente si se compara con la tutorización individual.

Sin embargo, que cada equipo trabaje toda la materia de la asignatura con suficiente profundidad no es realista si tenemos en cuenta la duración cuatrimestral de los cursos. Por ese motivo, este trabajo incide en el aspecto colaborativo de la producción digital en abierto basada en la creación de Wikis, aprovechando el potencial de la plataforma de la Universitat Politècnica de València (PoliformaT).

El trabajo versa sobre experiencias aplicadas a cursos de ingeniería sobre materias relacionadas con tecnología. Este trabajo aporta un análisis sobre los resultados obtenidos durante un año de experiencia, así como una evaluación de la dinámica empleada.

El resto del artículo se organiza en la sección de contexto y metodología; se expondrán los resultados de la experiencia del curso 2013-2014 con datos cuantitativos y finalmente las conclusiones.

2. CONTEXTO

En los actuales grados y masters de las universidades españolas, la mayoría de los cursos donde se trabajan competencias específicas de ingeniería tienen un componente conceptual y una aplicación práctica. Un ejemplo son las asignaturas relacionadas con el área de tecnología informática en cursos de ingeniería industrial, tele-

comunicaciones e informática. Estos cursos se contextualizan a lo largo de la formación del alumno tanto en cursos de iniciación como en cursos avanzados.

Un reto frecuente en el diseño curricular de cursos avanzados es su dependencia con cursos y materias previas, especialmente en la componente conceptual. Sin embargo, en una escala del 1 al 5, es frecuente que el nivel medio de los alumnos al iniciar el curso referente a las competencias específicas esperadas esté más cercano al 2-3 que al 5, lo que dificulta el avance al inicio del curso, sobre todo en lo referente a las actividades de laboratorio.

Durante el curso 2013-2014 se ha desarrollado una iniciativa para abordar este problemática en dos cursos de tecnología informática de la ETS de Ingeniería del Diseño e Ingeniería Industrial. Esta materia se imparte tanto en Grado en Ingeniería Electrónica Industrial y Automática como a alumnos de la titulación de Ingeniero Industrial en sistemas electrónicos y automáticos.

Estos cursos trabajan competencias específicas en materia de programación de micro-controladores y microprocesadores y en el diseño de sistemas embebidos, profundizando en materias previas donde el alumno ya ha tenido contacto con leguajes de programación para dispositivos programables. Sin embargo, la capacidad y nivel de destreza al inicio del curso no es homogénea.

Las actividades del laboratorio suelen proporcionar un entorno cómodo para el alumno, donde poder avanzar a su ritmo pero de forma guiada. Es, por tanto, un espacio para trabajar la falta de homogeneidad con la realimentación formativa individual necesaria.

A diferencia de la concepción de “actividad de laboratorio” previa a la adaptación a Bolonia, en el actual sistema ECTS [1] esta actividad abarca tanto la presencialidad como horas de trabajo individual fuera del aula. Es precisamente este aprendizaje individual no presencial el que puede evitar que el avance del curso al inicio del semestre sea lento para aquellos alumnos que no tienen el nivel de destreza esperado, y que a su vez, evite que el alumno aventajado se desmotive.

El uso de recursos y herramientas digitales, frecuentemente accesibles y disponibles en la elaboración de los cursos universitarios, permiten al docente crear entornos de aprendizaje donde el alumno se siente cómodo y seguro sobre su progreso.

Estos recursos digitales permiten la mejora del *readiness level* del alumno en competencias transversales relacionadas con la búsqueda, síntesis y comunicación de la información, mientras que las actividades de aprendizaje que utilizan estos recursos pueden profundizar en la verificación, aplicación y validación del aprendizaje.

Uno de los recursos más conocidos es la Wiki. Esta herramienta se encuentra disponible en espacios públicos, como Wikispaces, o privados, como es el caso de PoliformaT: una plataforma digital basada en el proyecto Sakai [2] que incluye

recursos como repositorios, contenidos, foros, herramientas de asistencia al aprendizaje, herramientas de evaluación, etc. (SAMigo [3]).

Crear una Wiki es una actividad colaborativa de actual expansión en el ámbito docente [4][5]. Además, el alumno muestra su trabajo pero también ve el trabajo de los demás mientras lo desarrolla, lo que desde la perspectiva del alumno le genera cierta seguridad [6]. La orientación que recibe el alumno también puede ser colaborativa, a través del foro, o individual, a través de canales privados. Pero a su vez, la vinculación de la Wiki a herramientas analíticas también permite al docente obtener datos sobre accesos, introducción de contenidos y modificaciones de páginas, para una posterior evaluación de la implicación y esfuerzo del alumno.

Sin embargo, el desarrollo de una Wiki es sólo una parte de las actividades de aprendizaje y como tal debe estar integrada en una planificación de trabajo. Ya otros autores así lo han experimentado, como [7].

3. METODOLOGÍA

En la implantación de los nuevos planes de estudio en grados de ingeniería en el marco de Europa, se ha producido la introducción de un enfoque de formación basado en competencias que potencia el uso de metodologías activas que promueven la participación del alumno en su propio aprendizaje [8] mediante actividades contextualizadas en el currículum de la asignatura.

Sin embargo, para que la actividad del alumno sea realmente efectiva, deberá ir acompañada de un seguimiento docente que permita reconducir el aprendizaje. Es necesario, por tanto, diseñar mecanismos que garanticen una realimentación formativa efectiva.

Existe, entre los docentes una preocupación fundamentada sobre cómo abordar esta realimentación. Hasta ahora, la clave ha sido el uso intensivo de actividades participativas, con algunos ejemplos como [9][10][11][12][13].

Si tenemos en cuenta una ratio profesor-alumnos elevada, la posibilidad de atención al alumno dentro del aula a la hora de realizar estas actividades disminuye y cada actividad planificada supone una sobrecarga docente considerable [8]. Es necesario, por tanto, buscar soluciones alternativas manejables independientemente de la ratio.

Una posible solución es la planificación de actividades fuera del aula. Como ventaja, el alumno dispone de más tiempo para desarrollar la actividad, siempre que la planificación tenga en cuenta el resto de asignaturas cursadas. Además, el producto resultante de esta actividad suele ser escrito, lo que propicia la realimentación también por escrito, más eficaz que la oral puesto que el alumno puede volver sobre ella tantas veces como sea necesario [14][15].

Además, en la estructura de créditos ECTS [1], para cursos presenciales, el trabajo del alumno realizada fuera del aula tiene la misma relevancia que el realizado presencialmente y una asignación de horas/crédito que deben incluirse en la planificación del curso.

Sin embargo, ese trabajo debe estar orientado, o tutorizado, para que sea realmente efectivo. Pero tutorizar un grupo grande de alumnos debe realizarse mediante actividades formativas abordables, donde el esfuerzo del alumno y del profesor reviertan de forma inmediata en el beneficio del grupo. Es más, para dar una atención individual, el concepto de grupo grande no es necesariamente superior al tamaño medio de grupo considerado en muchas universidades. En realidad, un grupo de 10 personas puede ser considerado como grande en función de la atención que se espera volcar sobre esos alumnos.

Si buscamos que el esfuerzo tanto de alumnos como profesor revierta de forma inmediata en beneficio del grupo, casi con seguridad necesitaremos utilizar herramientas digitales. Existen muchas posibilidades, y entre ellas, podemos considerar el uso de una Wiki.

La Wiki es una herramienta suficientemente extendida y común como para asumir que el alumno puede trabajar con ella ya con cierto nivel de preparación desde el primer día del curso. Por tanto, el tiempo que se invierte en “aprender” a utilizar el recurso no es significativo. Además, la estructura de paginado de la Wiki ha de desarrollarla el propio docente, lo que permite una segmentación clara de la materia que se va a trabajar.

Lo que sí es significativo es el aprendizaje que se deriva de crear una Wiki. En la Fig. 1 vemos las etapas básicas que se trabajan durante la producción de una Wiki: búsqueda, síntesis y comunicación de la información. En un segundo nivel coexisten tres etapas más del aprendizaje profundo, que son: verificación, aplicación y validación del aprendizaje. Las tres etapas básicas son competencias transversales que se pueden trabajar con técnicas denominadas como “*systematic research*”. Sin embargo, para que esas etapas sustenten un aprendizaje real en el alumno, es necesario que el propio alumno adquiera la capacidad de verificar dicha información. Por ese motivo, la etapa de verificación está dentro de las actividades propuestas en la Tabla 1 antes incluso que la comunicación.

Realizar una Wiki entre varios alumnos es una técnica de escritura colaborativa. Algunos autores defienden que además de practicar la colaboración y la reflexión, la escritura colaborativa también fomenta el pensamiento crítico [16], fundamental en nuestros futuros ingenieros, siempre y cuando esta escritura sea estructurada y objetivada [17].

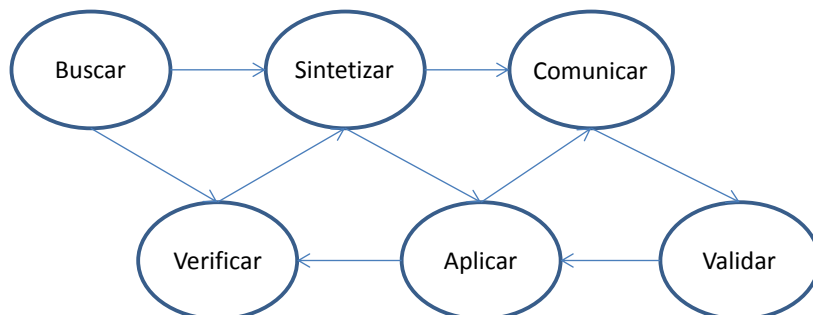


Fig. 1 Etapas del tratamiento de la información en las actividades del curso

Utilizando el texto de Said Hadjerrouit, los cuatro pasos se deben cumplir si queremos que se produzca un aprendizaje profundo en el alumno a través de actividades de escritura colaborativa son:

1. *“It begins with the review of the current state of research with the aim of understanding the problems associated with wiki-based collaborative writing.*
2. *It continues with the design of a collaborative writing approach to wiki that will be used to foster collaboration, participation and group interaction. The approach supports the designers’ work, forming the foundation for implementation and evaluation.*
3. *The implementation step is concerned with the use of the approach in an educational set-ting using multiple methods for collecting empirical data.*
4. *The last step is concerned with the evaluation of the approach through the systematic analysis of the data collected by means of various methods. “*

Para trabajar en el cuarto paso es necesario un planteamiento general de actividades, donde desarrollar una Wiki sea el comienzo. El plan de actividades propuesto para el curso es el que se muestra en la Tabla 1. Cada actividad cruza con una de las etapas del tratamiento de la información de la Fig. 1.

La forma de trabajar la información es utilizándola para realizar un pequeño proyecto de prácticas. En el caso de las asignaturas de tecnología, relacionadas con la programación de micro-controladores, el proyecto consiste en desarrollar una aplicación donde se configuren varios periféricos necesarios en la implementación del código.

Por tanto, la información de la Wiki está estructurada en una página por periférico, con ejemplos sobre su configuración y uso en rutinas simples. Una vez concluidas

las páginas de la Wiki, cada grupo implementará una aplicación en la que se trabaje el periférico desarrollado en la Wiki más otros que no se hayan trabajado hasta el momento.

Uno de los resultados esperados con respecto a la Wiki durante la implementación de los trabajos es la mejora de la Wiki. Esta mejora también es colaborativa ya que puede ser por entradas producidas por los propios autores de la página o por otros alumnos que incluyan ese periférico en su aplicación.

Por ese motivo se propone también el uso de un foro donde compartir sugerencias o preguntas que contesten los propios alumnos aunque moderado por el profesor.

Finalmente, todo este trabajo está contemplado en la evaluación, tanto el desarrollo de la Wiki como las mejoras realizadas durante todo el curso y la participación en el foro, ya que es una evidencia de la implicación del alumno en el curso.

ACTIVIDAD	ETAPA
a) A cada grupo se le asigna una página de la Wiki a desarrollar	<i>Buscar</i>
b) El profesor orienta al grupo en los recursos bibliográficos	
c) El grupo confecciona los contenidos de la página	<i>Sintetizar</i>
d) El profesor revisa los contenidos de la página	
e) Cada página debe contener ejemplos genéricos de uso	<i>Verificar</i>
f) Los ejemplos deben de haber sido probados en el laboratorio	
g) El grupo diseña la página de la Wiki con contenidos, enlaces externos e incorporando los ejemplos de uso	<i>Comunicar</i>
h) A cada grupo se le asigna un trabajo de laboratorio donde se apliquen los contenidos de al menos dos páginas de la Wiki	<i>Aplicar</i>

elaborada	
i) El profesor sigue y tutoriza el trabajo del grupo	
j) El desarrollo del trabajo produce una realimentación de las páginas de la Wiki	<i>Validar</i>
k) A través del foro se intercambian comentarios sobre los ejemplos de la Wiki	
l) El profesor evalúa los trabajos	
m) Termina el proceso de creación de la Wiki	

Tabla. 1 Etapas del tratamiento de la información en las actividades del curso

4. RESULTADOS PRELIMINARES

El plan de actividades se enmarca en la dedicación a prácticas de laboratorio. Con 1.5 créditos ECTS, la dedicación estimada del alumno debería de ser de 37 horas y media (1.5 x 25), de las cuales, hasta 15 pueden ser presenciales en el laboratorio.

En la experiencia del primer cuatrimestre de 2013-2014 se completaron las actividades de la a) a la m). Las acciones sobre las que se han reportado resultados son: leer páginas Wiki y revisar páginas Wiki.

La revisión de las páginas es lo que determina el desarrollo de sus contenidos por parte del alumno. El registro de accesos está limitado al tiempo consumido por el alumno en la actividad g) de la Tabla 1. En media, los alumnos han invertido en el desarrollo de las páginas una media de 4.3 horas por página. En este caso además, cada grupo de dos alumnos desarrollaba una sola página, lo que supone menos de un 11% del tiempo no presencial de dedicación esperada por alumno.

Otro dato relevante es la utilización de la Wiki por todo el alumnado. Una vez concluida la actividad g) de la Tabla 1, una analítica que nos permite conocer la utilidad de estas páginas producidas es el número de accesos de lectura por alumno. Así obtenemos que durante la fase de desarrollo (previa a la finalización de la tarea g), el número medio de accesos de lectura por alumno fue de 29 accesos, mientras que el número de accesos medio durante las actividades h) a m) fue de 48 accesos por alumno entre las 8 páginas desarrolladas.

Además, se registraron 91 accesos de 6 alumnos (de un grupo de 25) para revisión de las páginas durante las actividades h) a m). Este dato es importante, aunque revela una actividad más baja de la esperada. El motivo puede estar en la evaluación. Si el alumno entiende la actividad h) como una entrega, es difícil que invierta tiempo después en mejorarla. Por ese motivo, en el segundo semestre se incluye dentro de la rúbrica de la evaluación la mejora de la Wiki durante la realización de la aplicación.

En la experiencia del segundo cuatrimestre del 2013-2014 (sin concluir), se han completado las actividades de la a) a la g). Las acciones sobre las que se han reportado resultados es la de revisar página de la Wiki, con una media de 42 accesos por grupo para revisar su propia página. El número de días máximo que un grupo ha accedido a su página ha sido de 9, mientras que la media es de 5 días por página (o grupo). Por cada uno de esos días accedidos, la media de tiempo dedicado es de una hora, mientras que el máximo observado es de dos horas y media. Similar a la experiencia del primer cuatrimestre.

Sin embargo, estos resultados aún son pocos con respecto al potencial de la experiencia. Datos como la participación en los foros sólo lo obtendremos si enfocamos esta actividad como evaluable, ya que si no, la autonomía que tienen los alumnos de tercero y cuarto de grado no siempre la enfocan a mejorar el material común, sino el personal de cada alumno.

La Fig. 2 y Fig. 3 muestran dos ejemplos de páginas desarrolladas por los alumnos. Estas páginas incorporan texto, imágenes pero también enlaces recomendados. Una de las dificultades a la hora de orientar a los alumnos que han realizado estas páginas es en evitar el cortar y pegar de fuentes fiables como son los manuales del fabricante. Por eso, la actividad d) tiene gran peso no sólo en la realimentación que el profesor da al alumno, sino en conseguir una estructuración en las páginas homogénea que se proporcione la información necesaria para su uso durante la implementación posterior de la aplicación (actividad j).

5. CONCLUSIONES

En este artículo se presenta un trabajo de innovación docente cuyo objetivo es la mejora del trabajo autónomo del alumno en asignaturas impartidas en el ámbito universitario.

El trabajo versa sobre la producción de Wikis que realizan los propios alumnos asistentes a los cursos de ingeniería como parte de su trabajo y aprendizaje de las competencias curriculares. Estas Wikis son desarrollos auto-contenidos y reutilizables por otros alumnos gracias a su formato digital. La actividad de producción tiene un enfoque de aprendizaje centrado en el alumno donde el profesor guía en la distribución del esfuerzo y consecución de metas.

Sobre el perfil de los alumnos, la experiencia se ha desarrollado en cursos de cuarto de grado y quinto de la titulación de ingeniero industrial. Son alumnos que cierta autonomía y que sin embargo, no presentan el mismo nivel de conocimientos previos al inicio del cuatrimestre. Conocimientos que, por otra parte, se espera que tengan y que son esenciales para que la marcha del curso tenga el ritmo esperado.

En este trabajo se analiza la incipiente puesta en práctica del proyecto. Una de las observaciones más destacadas es la sociabilidad de esta metodología. Los alumnos se sienten más seguros en su progreso si pueden establecer una conexión entre su aprendizaje y el del grupo mientras se abordan competencias transversales relacionadas tanto con el trabajo colaborativo como con el tratamiento de la información.

La herramienta utilizada para esta experiencia ha sido la Wiki de la plataforma PoliformaT, desarrollada bajo el proyecto Sakai. Es una herramienta sencilla que no obliga al alumno a realizar ningún aprendizaje previo. Sin embargo, actualmente la Wiki no se puede conservar para varias ediciones del curso y tampoco existe una forma automática de exportación a espacios públicos como Wikispaces [18], lo que se puede considerar como una limitación importante que tal vez se pueda resolver en futuras versiones.

Tec In: Wiki

Inicio de la Wiki Ver Editar Información Historial Notificaciones

Interrupciones Externas

Introducción

Para obtener una información más extensa consultar: [Interru_Externa.pdf](#)

Las interrupciones son eventos asíncronos que requieren la atención de la CPU. El calificativo de asíncrono indica que pueden producirse para notificar un cambio en el estado del dispositivo.

El C-8051 incluye un sistema extendido de interrupciones con un total de 14 fuentes de interrupciones y dos niveles de prioridad, aunque er asociado flags localizados en el SFR que saltan al nivel lógico 1 al activarse alguna de estas.

Rutinas de Interrupción

Si las interrupciones están activas por el sistema, al activarse el flag de alguna de ellas se genera una petición de interrupción con lo que le memoria para ejecutar el servicio de rutina de interrupción (ISR). Este ISR debe finalizar con una RETI de tal manera que la CPU continúe c

```
INC R6
MOV A,R7
CPL A
ORL A,R6
JNZ C:0803
```

µC 8051

```
PUSH ACC
PUSH PSW
MOV A,0x08
SETB C
SUBB A,0x00
MOV 0x80,A
POP PSW
POP ACC
RETI
```

IRQ

Código de atención a la Interrupción

Fig. 2 Ejemplo de página de la Wiki desarrollada por dos alumnos

Codigos de ejemplo

Código ejemplo de inicialización:

```
void SMBus_Init(void)
{
    SMBOCF = 0x5D; // Use Timer1 overflows as SMBus clock
    // source;
    // Disable slave mode;
    // Enable setup & hold time
    // extensions;
    // Enable SMBus Free timeout detect;
    // Enable SCL low timeout detect;
    SMBOCF |= 0x80; // Enable SMBus;
}
[Código de ejemplo completo (C8051F350)]<a href="http://community.silabs.com/mqrf63796/attachments/mqrf63796/1/39562/1/CODE.txt">http://community.silabs.com/mqrf63796/attachments/mqrf63796/1/39562/1/CODE.txt</a>
[códigos ejemplo para C8051F00x and C8051F01x]<a href="https://www.silabs.com/Support%20Documents/TechnicalDocs/an113.pdf">https://www.silabs.com/Support%20Documents/TechnicalDocs/an113.pdf</a> [página 14 en adelante]
```

Fig. 3 Otro segmento de página de la Wiki desarrollada por dos alumnos

AGRADECIMIENTOS

Este trabajo ha sido parcialmente subvencionado por la E.T.S del Diseño de la Universitat Politècnica de València y por la AVAP (Agència Valenciana de d'Avaluació i Prospectiva)

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APRENDIZAJE BASADO EN PROBLEMAS EN GESTIÓN EMPRESARIAL

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VICENTA FUSTER

Resumen

El método del caso es la manera más popular y práctica para aprender la gestión empresarial. Algunas de las características de la materia se ajustan perfectamente a este método, ya que muestra ejemplos reales a los estudiantes y ayuda a entender cómo se puede aplicar la teoría estudiada. Sin embargo, los estudios de casos tienden a centrarse en los problemas específicos de la gestión, aunque tratados de manera intensiva. La cantidad de información que se presenta es reducida y el problema objeto de estudio acotado. Esto es perfectamente válido para algunas técnicas de gestión que se pueden enseñar con los problemas cerrados estructurados, en los que se conocen y se cuantifican todas las variables, y los problemas pueden ser modelados en fórmulas y reglas. Estas técnicas corresponden con las decisiones tácticas y operativas, donde se considera sólo una actividad específica de la empresa.

Pero la mayoría de los problemas de gestión, en especial los relacionados con la toma de decisiones estratégicas, son complejos, con una gran variedad de variables involucradas, algunas de ellas cuantitativa, además de cualitativas, y la relación entre las variables no siempre se conoce y sabe modelar. Además, debido a la turbulencia del entorno y el cambio continuo en la tecnología, los mercados y los competidores, algunas variables que son esenciales en el problema pueden no ser medibles en el futuro próximo, y otras variables importantes pueden ser descuidadas o subestimadas. Esto ha producido que el campo de la gestión estratégica no se centre en las técnicas, sino en los marcos

conceptuales, clasificaciones, puntos de vista y enfoques al problema. En virtud de estas características, el método del caso por sí mismo pierde su poder de aprendizaje

Este trabajo presenta la estructura de un proyecto piloto que se desea realizar en el grado de ingeniería técnica superior de ingenieros industriales que involucra a la asignatura fundamentos de organización de empresas en segundo curso, en la Universitat Politècnica de València, en la que un conjunto de casos cortos, cuando se utilice el método del caso para reforzar cada tema de la teoría, se combina con un caso largo y abierto, donde se presenta una gran cantidad de información, y los estudiantes pueden analizar cada pregunta específica del caso teniendo en cuenta la visión global de la organización, su estructura, sus capacidades, los clientes, los competidores y la situación financiera. Por último, se debe presentar un informe final sobre una organización, seleccionada por un grupo de 4 estudiantes que realizan el informe en común. En este informe final sobre una empresa específica, con la guía del profesor, el método utilizado es el aprendizaje basado en problemas. Los principales criterios para la elección de la empresa es el acceso a la información. Todos los aspectos de la teoría estudiada durante el curso se analizan en la empresa seleccionada, pero un problema de gestión determinante específico a que la empresa se enfrenta es estudiado en profundidad, con la guía del profesor, y desarrollado. Ventajas, desventajas y problemas que se pueden encontrar en este proyecto piloto se comentan.

Palabras clave: Aprendizaje basado en problemas, gestión de negocios, método del caso

1. INTRODUCCIÓN

El trabajo aquí presentado analiza el uso del aprendizaje basado en problemas (ABP) en la enseñanza de la gestión de negocios. El trabajo se estructura como las fases del proyecto del plan piloto que se desea establecer, plan que tiene como objetivo la mejora de la enseñanza de la materia de gestión empresarial, asignatura que lleva por título fundamentos de organización de empresas de segundo curso del

grado de ingeniería técnica superior de ingenieros industriales en la Universitat Politècnica de València. En primer lugar se realiza un análisis de los métodos más comunes y corrientes utilizados en la enseñanza de gestión de negocios, especialmente el método de casos [1]. Sus ventajas y posibles deficiencias se examinan. A continuación se comentan las ventajas y los inconvenientes de la introducción de PBL en la enseñanza de la asignatura. En tercer lugar, se comenta lo aconsejable de extender el uso de PBL y cómo el ABP ha de adaptarse a las peculiaridades de la asignatura en cuestión. En cuarto lugar, se citan los detalles de la operativización del método y de los principales problemas a los que se enfrenta. Por último, se presentan las conclusiones.

La enseñanza de la administración de empresas y el método del caso

La administración de empresas es un campo difícil para la investigación estructurada y mejoras de conocimiento sistemático. Por lo tanto, un campo difícil de aprender y enseñar. Algunos de las características que confieren esta dificultad son las siguientes:

- Problemas no estructurados y complejos.
- La diversidad del objeto bajo estudio (organizaciones).
- Gran influencia del entorno (mercados, competidores, economía, leyes, tecnología, etc.).
- La importancia de los factores sociales.
- Entorno turbulento y siempre cambiante.
- Gran cantidad de variables involucradas.
- Relaciones ambiguas entre las variables.
- Variables involucradas difíciles de medir.

La complejidad del problema bajo estudio, expresada en la gran cantidad de variables que podrían desempeñar un papel determinante en los fracasos o el éxito

de las organizaciones, ha llevado a limitar las variables a tener en cuenta para su estudio parcial, confiando así el análisis a ámbitos abarcables. Por supuesto, hay áreas en la gestión que estudian algunos problemas específicos, tales como el marketing, las operaciones, la innovación, la gestión de calidad, recursos humanos, gestión de la tecnología, los sistemas de información, etc., y donde el aprendizaje se puede estructurar con mayor facilidad. Pero para un estudio más general de la empresa, la división poco razonable del problema es algo inevitable. Esto explica la división del campo administración de empresas en una gran variedad de escuelas en las que las organizaciones se estudian bajo un punto de vista específico (teoría de recursos, enfoque de costos de transacción, la teoría del comportamiento, etc.)

Además, una notable característica común de las diferentes teorías de la empresa es que toman la forma de marcos conceptuales, vistas y enfoques, en los que se subraya la importancia de un conjunto limitado de variables relacionadas, ignorando otros factores principales para hacer la investigación y el análisis posible. Sin embargo, a pesar de la limitación de las variables del objeto bajo estudio, es difícil ir más allá de un marco conceptual y construir modelos matemáticos que permiten explicar, al menos parcialmente, el desempeño de las organizaciones. Esto se debe, en parte, a la dificultad en la medición de las variables que intervienen en la gestión, algunas de ellas completamente subjetivas y cualitativas.

Bajo estas condiciones es comprensible que el método del caso sea la herramienta predominante utilizada en el aprendizaje de la administración de empresas. Un caso de negocios por lo general adopta el formato de un relato de una organización en cuestión en el mundo real, donde se ofrece una combinación de información cualitativa y seleccionada, y los datos pertinentes. La longitud y la complejidad del caso depende del propósito del profesor, ya que pueden variar de lecturas muy cortas, que ejemplifica un punto específico de la teoría con un caso del mundo real, a un caso largo y muy elaborado, con abundancia de datos e información, donde el alumno debe analizar y responder a algunas preguntas relacionadas con la teoría

estudiada. Pero en cualquier caso, el problema está cerrado, no se necesita más información que la proporcionada, y por lo general se espera una solución estándar. Este método es consistente con cómo son abordados por los investigadores los problemas no estructurados y complejos de gestión empresarial: Análisis en profundidad de las relaciones de un conjunto relacionado de variables, de forma aislada. Aunque en el mundo real, un problema de gestión, especialmente los de estrategia, rara vez puede ser abordado con el análisis de un simple conjunto de factores si se requieren soluciones empresariales robustas, este método permite la construcción del conocimiento y la comprensión en profundidad de las organizaciones. De la misma manera, el estudio de los diferentes paradigmas, teorías y enfoques debe guiar el aprendizaje de la gestión empresarial.

Las características del método del caso encaja perfectamente con este aprendizaje:

- Ejemplos del mundo real.
- Ajustado a la teoría.
- Clarificación de la teoría.
- La habituación a trabajar con datos cualitativos y cuantitativos.
- Evaluación de las diferentes opciones.
- Fácil de implementar.
- Problemas delimitados.
- Discusión y trabajo en equipo.
- La habituación al discurso público.

Esto ha hecho que el método del caso la metodología utilizada con mayor frecuencia en el aprendizaje de la administración de empresas, a gran distancia de otros métodos.

Sin embargo, el método del caso tiene algunos inconvenientes generales. Entre los posibles problemas asociados con el método del caso están:

- Necesidad de estudiantes motivados.
- Conocimiento de dinámica de grupo.
- Consume tiempo.
- Es difícil de evaluar.

Pero en la administración de empresas, el método del caso tiene algunos problemas específicos. La realidad que se presenta en los casos está cerrada. El problema está limitado a la información presentada. Pero en el mundo real, las decisiones estratégicas tienen raramente este formato. Los investigadores en el campo saben que el objetivo y las limitaciones de cada teoría, y la naturaleza contingente de la realidad que se esfuerzan por explicar. Así, los profesionales y los gestores deben combinar los puntos de vista y enfoques adecuados estudiados como una ayuda, en lugar de un axioma, de manera ecléctica, para cada problema de forma individual, ya que cada problema en la gestión estratégica es única. Si se desea dar una experiencia más cercana a la realidad y a los problemas organizativos reales, el ABP es a priori una mejor metodología que el método del caso.

2. VENTAJAS E INCONVENIENTES DE LA UTILIZACIÓN DE ABP EN LA ADMINISTRACIÓN DE EMPRESAS

Como en el caso de derecho o la medicina, en los diversos campos de la ingeniería, en la administración de empresas existe la necesidad de confrontar a los estudiantes con la complejidad de los problemas reales, en los que se debe utilizar la combinación de todos los conocimientos adquiridos durante todo el grado. Esto se resuelve tradicionalmente en carreras de ingeniería con el proyecto final de carrera, o en la medicina con el largo proceso de médico residente o médico interno residente. En la gestión empresarial, el intento de las prácticas finales en las empresas después de concluir el grado usualmente se convierte en una inserción en

el mercado laboral en lugar de una experiencia de aprendizaje, ya que las tareas asignadas a los estudiantes el conocimiento simple y poco exigentes. El ABP en este caso, puede desempeñar un papel importante.

El aprendizaje basado en problemas fue concebido como problemas simplificados que son complicados a lo largo del curso con el fin de acercarse a los problemas de la vida real [2]. Esto se puede decir también sobre el método del caso, pero el ABP va un paso más allá. Tal vez la frase que capta mejor la filosofía que subyace en el ABP es "un proceso de investigación y análisis en el que los alumnos adquieran los conocimientos necesarios para resolver un problema complejo. La complejidad del problema en la gestión empresarial debe deberse principalmente por ser un problema abierto, donde una multitud de información cualitativa y cuantitativa y los datos están disponibles, e inicialmente, no está claro cuáles son más relevantes, si se necesita más información, donde se puede encontrar, cómo procesar datos para obtener información clara, etc. En estos problemas, los estudiantes deben aplicar los diferentes enfoques y puntos de vista estudiados, adaptándolos al problema concreto objeto de estudio y sus contingencias, la creación de una solución ecléctica. Esto le permitirá contextualizar las teorías al mundo real y cómo pueden ser aplicadas, y sus límites y valores [3].

Además, el ABP es un método activo, interactivo y de colaboración [4], competencias que deben ser exigibles a los administradores.

Inconvenientes de PBL

Se dice que el ABP permite "adquirir nuevos conocimientos y aprender mediante la resolución de problemas". Entonces, la bondad del método ABP está ligada a la calidad del problema. El problema definirá los conocimientos que hay que aprender. Si queremos que el método funcione correctamente, el problema tiene que ser un reto para los estudiantes, lo que implica una gran dificultad para los profesores en el desarrollo o la búsqueda de ellos. Pero incluso si el ABP está muy bien implementado, los estudiantes están motivados y guiados correctamente, el

problema es un reto gratificante para los estudiantes, etc, incluso en estas circunstancias, el ABP tiene un gran problema: el gran tiempo consumido . Si bien implementado, el ABP consume mucho tiempo, tanto del profesor como de los alumnos. El proceso de investigación, el análisis, la discusión, la búsqueda de nuevos datos relevantes, etc., se puede asociar a aprender haciendo. En el aprender haciendo se contextualiza los conocimientos adquiridos y sus aplicaciones entiende mejor, pero el proceso de aprendizaje es lento. Además, no hay ninguna garantía de que se aprende todo el conocimiento que se considera pertinente en una materia por parte del profesor [5].

Estos inconvenientes pueden ser resumidos como sigue:

- Consume tiempo.
- Necesidad de motivación alta de los estudiantes.
- Dificultad para encontrar una variedad de problemas adecuados por parte del profesor.
- Los niveles básicos de conocimiento deseable aprendido en todos los aspectos objeto de investigación no se garantiza.

3. EL MÉTODO PROPUESTO

Debido a las características del aprendizaje de la administración de empresas más arriba comentado y los objetivos del plan, el curso debe tener el formato de un cuerpo principal de clases teóricas apoyadas por el caso del método. Esto es necesario para evitar una de las principales críticas del ABP, es decir, los estudiantes necesitan una sólida formación teórica para hacer frente a los problemas propuestos, si estos problemas están destinados a ser un reto y digno con fines de aprendizaje. En el modelo propuesto, la metodología clásica para la enseñanza de la administración de empresas se complementa simultáneamente por el método de ABP de dos maneras. En primer lugar, además de los casos reducidos de apoyo para cada tema de teoría, se presenta un caso macro con abundante información y datos, que se proporciona al comienzo del curso. A lo largo de cada tema, se piden algunas preguntas específicas del macro-caso. Este caso macro, aunque cerrado, funciona como una transición entre los casos cortos específicos del método de casos y el

problema del ABP. En segundo lugar, un problema real abierto en una empresa existente es asignado por el profesor para ser resuelto por un equipo de estudiantes. En esta resolución se debe seguir estrictamente la metodología ABP.

Cabe señalar que el ABP sólo se utiliza como un soporte de la clase tradicional, y entonces la longitud y la complejidad del problema debe ser limitado. Aunque el problema debe ser obligatorio para todos los estudiantes, el peso de la evaluación del problema en la nota final debe ser de acuerdo a la importancia que se da respecto al método tradicional.

4. OPERATIVIZACIÓN DEL MÉTODO

La elección del problema

La bondad del método ABP está ligada a la calidad del problema. En el caso de la administración de empresas, los problemas deben ser reales si la consistencia del método con la materia se quiere preservar. Aquí el método plantea un desafío para el profesor con respecto a la elección de los problemas. En cuanto a las características del campo de la gestión empresarial, el principal criterio para elegir el problema era el acceso de los estudiantes a la información. Así, en lugar de elegir un " buen problema ", la decisión se deriva de la elección de una "buena empresa ", donde alguna fuerte conexión de amistad o de parentesco entre algunos estudiantes del equipo y algún gerente de la firma permita la recolección de información directa. Si esto no es posible, el profesor puede asignar una empresa de colaboración con la Universidad o, como último recurso, asigne una gran empresa donde la información indirecta relacionada con productos, mercados y competidores son bien conocidos, y donde una gran cantidad de información y datos está disponible en la prensa e internet.

Luego, a medida que se desarrolle la teoría, la empresa se analiza en cada aspecto específico tratado en el tema, con reuniones periódicas (cada dos semanas) con el profesor. Cuando un problema de gestión interesante se encuentra y discute con el profesor, el profesor le asigna el problema al equipo, y un análisis más detallado de las posibles soluciones se debe presentar y exponer por el equipo al final del tema.

Desarrollo del problema

El desarrollo del problema se guía con una frecuencia semanal por parte del profesor, que sugiere fuentes de información, bibliografía para ser consultada y nuevas variables a considerar. Es deseable que el problema elegido sea un verdadero dilema o reto para la empresa por lo que el análisis y la solución que se ofrece es digno de atención por parte de los gerentes.

Evaluación

Dado que los problemas planteados por la ABP deben ser un reto y ser abiertos, el resultado del análisis no está garantizado. Por lo tanto, se aumenta la subjetividad de la evaluación. En nuestra operativización del método, este problema se minimiza por el bajo peso del método ABP (20% de la nota final) y la importancia dada a su exposición al final del semestre.

5. CONCLUSIONES

El contacto con una empresa real, donde el alumno pueda analizar la organización desde los diferentes puntos de vista que ofrece la teoría de la empresa es esencial en el aprendizaje de la gestión empresarial. En el caso de los estudiantes de ingeniería, el ABP puede ser una herramienta eficaz, ya que la abstracción de la teoría explicada no siempre es bien entendida por los estudiantes y los casos que se comentan en clase los obligan a adoptar una actitud demasiado pasiva.

La elección de las empresas en el método ABP puede actuar como un poderoso elemento de motivación.

La cantidad de trabajo y el tiempo asignado a la ABP se considera suficiente.

Las reuniones periódicas y la elección del problema como resultado de un análisis previo de los estudiantes aligera considerablemente la cantidad de trabajo del profesor. Esta es una cuestión esencial, ya que uno de los problemas del método ABP es el número limitado de alumnos por profesor, ya que no es un trabajo individual para cada grupo. Para una clase numerosa (60 estudiantes por semestre), el trabajo del profesor en el método ABP debe ser exclusivamente la supervisión, y evitar cualquier otro tipo de trabajo activo de las reuniones periódicas. El modelo propuesto hace soportable el peso de trabajo para el profesor.

Una de las dificultades más importantes que se puede encontrar es la evaluación de los estudiantes. Debido a la subjetividad del valor de los resultados extraídos, combinado con la difícil y la complejidad de los problemas, la tendencia de "dejarlos pasar" se ha detectado en metodologías apoyadas por trabajos. Además, todos los miembros del equipo comparten la misma marca, no importa la diferencia de la actitud y de la actividad que se encuentra en las reuniones y la exposición final.

Agradecimientos

La investigación realizada en este trabajo ha sido financiada por la Universitat Politècnica de València a través del proyecto PIME A07/13 concedido en la convocatoria 2013-2014 y por el EICE INDIN.

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PAUTAS PARA EL EMPLEO DE REDES SOCIALES EN LA DOCENCIA DE MATERIAS DE ORGANIZACIÓN DE EMPRESAS: UNA PROPUESTA

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Resumen.

En el presente trabajo, presentamos una propuesta para apoyar la docencia ordinaria en redes sociales. Durante un curso académico, en una asignatura impartida por profesores del departamento de Organización de Empresas de la Universidad Politécnica de Valencia en la Escuela Superior de Informática Aplicada, empleando Twitter para ello.

Se parte del análisis de los actores (profesores y alumnos) y se indican criterios para la selección de la red oportuna y una relación de ventajas e inconvenientes de la experiencia. La comunicación, como necesario puente entre los actores, es vista bajo el prisma del cambio que debe experimentar.

Finalmente se presentan las pautas de actuación que la práctica ha determinado como oportunas y unas sucintas conclusiones que resumen con brevedad la experiencia y cierran la exposición.

Palabras clave: Red Social, Docencia, Comunicación, Pautas

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1. UNA APROXIMACIÓN AL PROBLEMA

La sociedad en general y los jóvenes en particular han experimentado una serie de cambios conductuales gracias a la evolución de las Tecnologías de la Información y las Comunicaciones (TIC en adelante) y la extensión de su uso. En el otro plato de la balanza nos encontramos con una universidad que en algún caso sigue comportándose como en sus orígenes, donde lo importante era que, al no disponer de textos o ser éstos carísimos, los alumnos tomaran casi al dictado las lecciones de sus docentes.

A pesar de la juventud de la red, desde los años 90 las tecnologías informáticas han tenido un lugar preeminente a la hora de crear, distribuir y gestionar la información para las actividades humanas, sean éstas sociales, culturales, políticas y, claro, económicas. Un impacto comparable con la aparición de la imprenta moderna. En medio de esos cambios, llega la guinda de las redes sociales, profusamente usadas por nuestros alumnos y casi vírgenes en el ámbito de la docencia.

El docente debe convertirse en una suerte de Community Manager, una figura que suele ser expuesta en distintas clases. El presente trabajo trata de ser una traslación de esa teoría, que se cuenta a los alumnos, a una experiencia práctica con los mismos alumnos, que, a su vez, nos permita dar un paso atrás y pulir de nuevo la teoría para adecuarla al nuevo fin.

2. CAMBIOS EN LA COMUNICACIÓN

La comunicación trasciende a la tradicional, de uno a muchos (que sigue siendo posible, y necesaria, de forma presencial o compartiendo recursos como ficheros informáticos, intercambiando correos electrónicos...) a muchos a muchos, donde nuestro alumno, individuo social, se comunica con sus pares, ejerciendo incluso tutorías entre sí con redes sociales.

Llegado éste punto, hay que dejar claro que el uso de las redes sociales no es universal entre los alumnos⁴, aunque su conocimiento pueda darse por supuesto en alumnos de grado de informática, y mucho menos pensar que todos quieran aceptar los mensajes en un medio que generalmente usan para actividades lúdicas, del docente. Implica pues voluntariedad, no se puede confiar en ellas para envío de mensajes globales, pues no podemos tener la certeza de que llegarán a todos, pero no es desdeñable su impacto.

⁴ Encuesta propia, cursos 2012-2013; 2013-2014

¿Hablamos de revolución o de evolución? Puede que un poco de ambas. Hemos hablado de la televisión y en algún momento la hemos comparado con las redes sociales. Evidentemente, tiene muchas diferencias de forma y fondo, la principal que mientras con la televisión la comunicación es de forma uno a muchos, en lo que comúnmente se denomina broadcasting, con las redes sociales se va al narrowcasting: donde cada consumidor puede ser respondido y atendido personalmente, no como un número siquiera, sino como uno más. Pero también supone un cambio de paradigma en la relación de poder y flujo de la información en la sociedad de hoy. Además, hay que tener en cuenta que la idea del profesor como único publicador de contenido desaparece, al poblarse la red de alumnos que a su vez son generadores de contenido útiles para la materia.

3. EL DOCENTE ANTE EL RETO DE LAS REDES SOCIALES

Éste rápido cambio que describíamos puede provocar una indigestión en aquellos de nosotros que, siguiendo a Prensky (Prensky, 2001) [1], somos inmigrantes de la tecnología. Mientras para los más jóvenes, inmersos en las TIC desde su nacimiento, resultan algo natural y hasta necesario en su día a día, algunos de los docentes podemos encontrar que las nuevas formas de comunicación, como las redes sociales, son capas añadidas a nuestra comunicación tradicional.

Sin tener que llegar que aludir a la ley de Metcalf para determinar el valor de la red, y poder averiguar hasta donde llegaría el grafo social de nuestra asignatura, la práctica desmonta cualquier duda⁵.

Básicamente, como avanzábamos, el profesor debe reinventar la figura del Community Manager, pero enfocado a la docencia. Debe pues:

- Crear espacios para que los estudiantes hablen y se comuniquen. Combinar tareas individuales (blogs, ...) con otras colectivas (wikis, ...)
- Provocar que circule la información (se puede usar el muro para publicar el esquema de la clase del día, pero la docencia no se limita a los días de clase). Estimular: facilitar noticias, videos, preguntas... informar de acontecimientos relevantes para la asignatura.

⁵ En el caso que aludimos, durante el primer año, un 80% de los matriculados siguió al docente en la red social seleccionada. De ellos, la práctica mayoría, permanecen en contacto en el segundo año con el docente por éste medio. En el segundo año, a los dos meses de iniciada la docencia, el número de seguidores rebasaba el 30%.

- Explicar la posición “institucional” (del centro, de la universidad). Nos convertimos en la primera frontera de atención al alumno. Buscar líderes (alumnos y ex alumnos) que dinamicen con a los alumnos.
- Escuchar, monitorizar la red. Evitar espirales de violencia. Implica muchas veces guardar silencio frente al que no respeta y, si se puede, acabar con cualquier reacción negativa mediante conversación y anticipación. Hacemos pues una tutorización con feed-back continuo
- Fomentar tareas que requieran actividad intelectual alumno: leer, escribir, reflexionar,...

4. ELECCIÓN DE LA PLATAFORMA

¿Cómo seleccionar la plataforma a usar? Deberíamos leer ésta pregunta de forma que la interrogación incluyera la siguiente: ¿cómo ésta ayudará a alcanzar los objetivos que perseguimos? (Peck, 2011) [2]

Al margen de que nada obliga a escoger una y sólo una de ellas, lo cierto es que para un docente el esfuerzo de vigilancia y asistencia que debe a toda red social donde esté implicado limita la posibilidad de estar en un gran número de ellas. El planteamiento debe ser pues restrictivo. Y para restringir, se impone un criterio: que encontremos a nuestros alumnos dentro.

Resulta excesivo para el espacio disponible una clasificación exhaustiva de las redes sociales, pero conviene sobrevolar las que pueden ser más relevantes. Lo hacemos en la tabla 1.

Nombre	Breve descripción	MM Usuarios
Hi5	Se usa por el público joven para conocer nuevas personas.	80
LinkedIn	Especializada en el mundo empresarial	225
Facebook	Red Social generalista, con el mayor número de usuarios	1000
Twitter	Red de microblogging (mensajes cortos)	200
Tumblr	Espacio con fotos, video, texto, enlaces...	300
Google+	La red social de Google.	343
Tuenti	A priori dirigida a universitarios, pero que poblada por adolescentes.	14
Habbo	Red social dirigida a jóvenes	200

Tab 1 Redes sociales más populares. Fuente: (Peck, 2011) [2] (Lovett, 2011) [3] y elaboración propia

Si eliminamos aquellas usadas por perfiles distintos de edad (profesionales en ejercicio o adolescentes), o las que tienen poca implantación en España, las posibilidades se restringen mucho: de hecho, nos quedaríamos con Facebook y Twitter como candidatas.

Una vez escogida la plataforma, debemos estudiar las ventajas de sus características. Así, con Facebook podemos usar sus listas (Peck, 2011) [2], que nos permiten que ciertos contenidos los vean solo quienes nos interese que los vea. Esto abre la posibilidad a usar la práctica denominada cloaking (Orense, 2010) [4], que significa mostrar distintas páginas a distintos visitantes, según su origen. Con Twitter (Peck, 2011) [2] tenemos numerosas herramientas para escuchar o seguir los comentarios, no sólo sobre la asignatura o materias relacionadas, sino aquellos de interés para nuestros alumnos... o lo que entre ellos se cruza o se dice de otras personas e instituciones. Y es que escuchar es la mejor manera de prevenir. Ésta y otra ventaja, la de que no sea una red simétrica, es la que determinó su elección. Los alumnos pueden seguirnos y nosotros no tenemos porqué seguirlos a ellos, de igual modo que seguimos a gurús de la materia para transmitir sus mensajes más interesantes a los discentes, y ellos no nos siguen a nosotros en general.

5. VENTAJAS E INCONVENIENTES DERIVADOS DE LA EXPERIENCIA

Nos enfrentamos con muchos problemas, unos, preexistentes pero magnificados con las redes sociales, como la rumorología social (Rodríguez, 2012) [5] o el uso de

falsedades para hacer daño; y otros intrínsecos al ser humano, como la limitación de nuestras mentes y nuestra memoria selectiva, que provoca muchas veces que no logremos escarmentar con errores ajenos (Trout, 1996) [6]. La clave es recordar que no se trata más que de una interacción entre personas. A mayor sea la interacción de una red social, más atractiva se convierte para sus usuarios. Una relación de los pros y los contras, adaptada de (Mifsud, 2010) [7] puede ser la siguiente:

Ventajas:

- Identificación. La red la asumen como una prolongación de su mundo.
- Integración: de alumnos con discapacidad (movilidad reducida, etc.)
- Interacción: horizontal (alumno/alumno), y vertical (profesor/alumno).
- Aun sin ser administrador, el alumno puede proponer temas y aportar material para ser consumido o discutido por sus iguales.
- Facilitan la autonomía del estudiante y también los grupos de trabajo
- Los contenidos se convierten en pro activos.
- Implica un acercamiento del aprendizaje informal con el formal
- Se poseen diferentes herramientas de comunicación sincrónica y asincrónica
- Podemos usar una mezcla de técnicas ya clásicas y otras novedosas, propias de las redes sociales, como la microsegmentación

Inconvenientes:

- Provoca una sensación de falsa realidad (vive en el mundo virtual)
- Cambio de roles. El aspecto lúdico puede primar en su mente.
- No son plataformas docentes: complementan, no sustituyen
- Supone trabajo extra para el docente y actividades opcionales para el alumno
- Son recordatorio, más que apoyo (no todos los alumnos están en ellas)
- No disponen de herramientas de control de acceso (o evaluación)
- Barrera que supone la cultura de la universidad (de pensamiento único a estructura en red colaborativa)

6. EL ALUMNO FRENTE A LA EXPERIENCIA

Antes de ver cómo acercarse a ellos hay que estudiar sus características, algunas peculiares y directamente derivadas de su edad juvenil, y otras comunes entre la mayoría de los internautas, como el (Deza, 2008) [8] querer ser al tiempo único y formar parte de la tribu. Si una característica se señala frecuentemente en la juventud es el poco miedo que demuestran. (Trout, 1996) [6], y otra, común a todas las edades, pero más acentuada en la suya, el seguimiento al líder, a quien marca tendencia. En las redes sociales, la clasificación que suele usarse para definir la influencia de los usuarios sobre otros usuarios es la de Klout (Peck, 2011) [2] que, olvidando la cumbre de la pirámide, donde aparecen líderes de pensamiento, nos ofrece unas cuantas figuras de interés que podemos ver reflejadas: los transmisores que difunden contenidos que se extienden como un reguero de pólvora, alimentadores que producen un flujo constante de información acerca de un tema, con lo que engancha a determinado público similar a él, los que ayudan en la red a todos, los que socializan y sirven como catalizador en todo grupo social, los activistas... núcleos de personas que, de una forma u otra, generan seguimiento, gente a la que se copia pues se la cree superior en gusto, conocimiento o experiencia. Es el seguimiento de la masa, donde para analizar qué es lo correcto, averiguamos antes lo que hacen los demás.

Conviene, ya que nos centramos en ese segmento de edad, dar un vistazo a sus características generales. De un estudio de CISCO (CISCO, 2012) [9], sabemos que:

- Uno de cada cinco revisan sus teléfonos al menos cada 10 minutos.
- Más del 40% sufriría “abstinencia” si no pudieran revisar sus actualizaciones.
- El 40% pasa más tiempo con amigos online que con amigos en persona.

7. PAUTAS DE ACTUACIÓN, A MODO DE CONCLUSIÓN

Las conversaciones deben cuidar aspectos muy particulares, de acuerdo al público al que se dirigen, como (Peck, 2011) [2] la originalidad e inspiración de las mismas o la frecuencia con la que se producen, y su necesaria actualidad. Se intenta infundir sensación de comunidad, creando la sensación a los usuarios de que forman parte de un grupo que escucha y responde. Esto es fundamental, pues las personas tienden a no volver cuando no se sienten escuchadas por nadie.

En cuanto a los comentarios, se ha de cuidar lo que se dice en todo momento, y no solo porque todo se puede vincular a la universidad. Así mismo deben controlarse las advertencias que nos vengán desde ellos, tratando de prever las situaciones des-

agradables más abundantes: los comentarios inadecuados (Peck, 2011) [2]. La experiencia nos dice que lo mejor suele ser borrar, pues responder intentando contemporizar suele ser contraproducente, si hay mala fe en origen. Si se trata de algo leve, se puede ignorar o responder, pero de forma clara y concisa, no en postura defensiva. Llegados a éste punto, hay que dejar bien sentado que una cosa es un comentario crítico, y otra uno inapropiado. Si es una crítica, más si está justificada, hay que afrontarla.

Algunas de las pautas seguidas (inspiradas en (Polo, 2012) [10]):

- Creación de plan de publicación, para mensajes de contenido, retuiteos... (frecuencia y horarios de aparición)
- Selección de etiquetas o #hashtags (que nos permiten organizar contenidos)
- Cuidado del estilo: concisión y claridad (¡sólo disponemos de 140 caracteres!)
- Gamificación: ofrecemos pequeñas gratificaciones (de 0,01 a 0,05 puntos) por participar en distintas actividades.

Sobre los contenidos de los mensajes, además del estilo, debemos considerar:

- Tienen una vigencia muy limitada. Deben ser fáciles de compartir y ser constantes en su aparición. Muchos alumnos se limitarán a la primera pantalla, no harán “scroll”. Esto fuerza los retuiteos.
- Se busca dialogar, no dar discursos. Las aportaciones han de ser concisas.
- Respuestas y aclaraciones. Buscamos una estandarización sin dejar de personalizar. En ocasiones la respuesta ha de ser privada (uso de mensajería o correo)
- Tiempos de respuesta breves
- Ante un error: Si lo vemos en el acto, lo corregimos. Si no, mejor actualizar, no borrar.

Los principios a seguir por todo docente interesado en la experiencia se resumen fácilmente. Tan solo son dos: vertebrar (dar simpatía, respeto, contenidos de calidad, en el día a día) y dinamizar (provocar acciones con vida propia, que salgan de los propios alumnos)

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GESTÃO DEMOCRÁTICA DA ESCOLA PÚBLICA: NOVAS DEMANDAS PARA EDUCAÇÃO BRASILEIRA

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RESUMO

Novos desafios e mudanças constantes sempre fizeram parte do cenário educacional da escola pública brasileira. Dentre inúmeras demandas, uma que tem suscitado muitas discussões é a redemocratização da gestão escolar que esta ocorrendo em diversos casos na atualidade. O presente artigo tem como objetivo analisar os desafios impostos aos novos gestores das escolas públicas brasileiras e as possibilidades ofertadas através da flexibilização e das mudanças ocorridas na Constituição Federal de 1988 e na Lei de Diretrizes e Bases de 1996 para atender as novas demandas e exigências do sistema de ensino público relacionadas à gestão no ambiente escolar. Através de uma pesquisa que tem suas bases na revisão bibliográfica, busca-se apontar os princípios e bases da gestão democrática na educação, o redimensionamento do papel dos gestores e os instrumentos essenciais para que se configure a gestão do tipo democrático. Destaca-se que a reflexão final das discussões acerca da gestão democrática nas escolas públicas brasileiras passam de um entendimento muito mais amplo, no qual cabe ressaltar que apenas mudar denominações ou siglas nada significa, é preciso sobretudo que a nova forma de representação denote originalidade e efetiva atuação.

Palavras-chave: Gestão Democrática. Educação. Escola pública. Ensino

1. INTRODUÇÃO

A partir da Constituição Federal de 1988, a política de gestão democrática do ensino se firmou como um dos princípios do ensino público em termos legais. O processo de redemocratização da gestão democrática se deu com a flexibilidade da Lei de Diretrizes e Bases, mas especificamente através dos Artigos 12 e 15 que ampliou o espaço de decisão da escola e possibilitou aos gestores a execução de sua proposta pedagógica, administração de seu pessoal e de seus recursos.

É preciso, portanto, reconhecer que a escola passa por uma transição de modelo administrativo, ou seja, atualmente nas unidades de ensino, procura-se praticar e incentivar novas formas de administração, baseadas em grupos e equipes de trabalho (conselhos escolares), ou seja, um tipo de gestão que aproxima a escola do modelo de organização aberta, dotada de flexibilidade e conseqüentemente atribui responsabilidade a todos que nela atuam.

Rompe-se, assim, com o modelo burocrático de gestão pública, centralizador e autoritário que havia se cristalizado no Brasil. Algumas das razões que explicam o movimento e ampla adesão em direção à democratização e descentralização da gestão educacional são: crescimento do número de escolas, dificuldade de se manter o controle sobre elas e a necessidade de redução do controle burocrático e centralizador dos órgãos centrais. Sendo assim, é preciso destacar que os novos modelos de gestão da escola implicam principalmente no redimensionamento das propostas para a escolha do diretor, ou seja, na articulação e consolidação de novos mecanismos de participação.

A compreensão de que a construção de uma gestão democrática escolar é processual e eminentemente pedagógica, abre precedentes para que estudos e discussões sejam incentivados e provocados, de forma que os atores sociais passem do discurso à prática, com o objetivo de executarem novas ações coletivas. Desse modo, a consolidação de mecanismos como os conselhos escolares e grêmios

estudantis, passa a caracterizar o novo modelo de gestão a ser seguido pela escola pública.

O interesse por esta temática surge, então, da necessidade de compreender o processo de democratização da gestão no contexto das escolas públicas e buscar compreender os problemas gerados pela flexibilização desse processo tão novo, complexo, dinâmico e de extrema relevância para estruturação e reestruturação do sistema administrativo educacional. Abre-se assim, um novo campo de investigação e de pesquisa com a pretensão de estudar as recentes demandas geradas no processo de democratização da escola pública.

Nesse sentido, Luz (2006, p.13) argumenta, a gestão como ação de liderar, coordenar, administrar, organizar, dirigir, ter o controle do funcionamento, dos meios e dos fins de uma atividade ou empreendimento, deve estar presente na pauta das discussões, em diferentes âmbitos, públicos e privados, dentre os quais o educacional.

Vale saliente no horizonte educacional, a gestão escolar democrática tornou-se um tema de grande relevância para o sistema atual de ensino, pois possibilita a construção de um ambiente de trabalho que se norteia pela descentralização do poder com ampla participação de todos os segmentos da escola e da comunidade onde a mesma se encontra inserida. Evidencia-se, desta maneira, a importância de se estudar o tema, pois, além de ter seus preceitos na Constituição Federal, passou a constar na Lei de Diretrizes e Bases 9394/96 que regulamenta a reforma educacional brasileira.

Portanto, é pretensão deste estudo, contribuir para compreensão dessas novas demandas, através de uma análise do processo de estruturação da gestão democrática e participativa. Assim, a realização deste trabalho justifica-se por abordar uma questão que se tornou imprescindível no contexto do sistema educacional, pois se tornou alvo de debates e discussões bastante pertinentes para construção de novos paradigmas relativos à gestão da escola pública.

Visando atender a essas novas prerrogativas, o estudo objetiva analisar as novas demandas para a efetivação de uma gestão democrática que leve em consideração a efetiva participação de todos os constituintes da comunidade escolar e, conseqüentemente, aumente a sua autonomia, através da criação de órgãos colegiados, mostrando que um gestor não é mais aquele que somente dá ordens, e sim uma pessoa aberta ao diálogo, capaz de descentralizar a administração e, principalmente, garantir a ampla atuação de todos os envolvidos no processo educacional.

Outros importantes enfoques a serem observados são: a compreensão dos conceitos de gestão pública participativa, análise das diretrizes legais desse processo, observação dos mecanismos de ação coletiva e apontar os principais desafios a ser enfrentado por os novos gestores da escola pública.

2. OBJETIVOS

Geral:

Analisar as novas demandas para a efetivação de uma gestão democrática e participativa, que leve em consideração a participação da comunidade escolar e, conseqüentemente, aumente a sua autonomia, através da criação de órgãos colegiados e da descentralização e flexibilização da administração escolar.

Específicos:

- Compreender os conceitos de gestão democrática participativa;
- Analisar as diretrizes legais desse tipo de administração;
- Observar os mecanismos de ação coletiva;

- Apontar os principais desafios a ser enfrentado pelos novos gestores da escola pública.

3. METODOLOGIA

A metodologia adota para este estudo foi pesquisa bibliográfica e documental numa abordagem qualitativa. A base legal baseou-se em documentos do Ministério da Educação, Lei de Diretrizes e Bases 9394/96, Constituição Federal da República e artigos publicados por diversos autores. Entende-se que a pesquisa bibliográfica é o melhor caminho a ser seguido neste tipo de pesquisa, pois oportuniza a leitura, análise e interpretação de vários estudos realizados por diferentes autores, permitindo assim um aprofundamento sobre a abordagem aqui tratada. Outro aspecto a ser destacado é que através da pesquisa bibliográfica se conhecem os fundamentos teóricos, relativos a estudos feitos anteriormente por outros autores, obtendo-se, portanto informações seguras, através de artigos científicos e outras publicações que servem de sustentação e aporte para novas pesquisas e descobertas relativas ao estudo.

Assim, por estudar a efetivação da democracia e da participação coletiva na escola pública pode seguir diversos itinerários, a pesquisa procura analisar o estudo de concepções relativas à gestão democrática e participativa na perspectiva de diferentes autores; analisar as diretrizes legais que norteiam a gestão democrática; observar os mecanismos de ação coletiva que são essenciais para colocar em prática a gestão democrática e participativa no contexto escolar e a interpretar as tendências atuais e das novas demandas da gestão democrática.

A observação deste último ponto é essencialmente importante, pois boa parte do debate acadêmico sobre a gestão tem como ponto de partida os desafios que se impõem aos novos gestores e as demandas fundamentais para que esse processo se efetive dentro das escolas.

4. FUNDAMENTAÇÃO TEÓRICA

Concepções de gestão democrática e participativa

A gestão escolar democrática tornou-se uma realidade na escola pública brasileira a partir da década de 80 do século XX, atendendo a um movimento histórico que encabeçou a redemocratização da sociedade e conseqüentemente da educação. Logo, pensar a gestão democrática na educação exige uma análise do contexto histórico e político do Estado Brasileiro, no sentido de compreender as possibilidades e limites do trabalho educativo. Em atenção a esse fato, Souza (2010), usa o tom dos discursos sobre gestão democrática do ensino, destacando termos da legislação a partir da Constituição Federal de 1988,

O princípio constitucional da gestão democrática na escola pública, combinado com as determinações da Lei de Diretrizes e Bases da Educação, Lei nº 9.394/96, sobre a necessidade de que os sistemas de ensino devem dotar as escolas de autonomia pedagógica, administrativa e de gestão financeira, tem resultado em múltiplos cenários de discussão sobre o papel do dirigente escolar. Assim, seja numa perspectiva de construção coletiva da democracia na escola, seja na perspectiva da responsabilização dos agentes escolares pelos resultados educacionais, explicita-se a preocupação com a formação e com as condições de trabalho dos dirigentes escolares. (SOUZA, 2010, p.174).

O diálogo estabelecido com Gracindo (2009) se dá através dos seus estudos sobre o papel do gestor escolar e as demandas da gestão democrática, que trata a mesma como:

Um instrumento que permite a participação direta, de alunos, pais, professores e funcionários. Ela é o meio pelo qual todos os segmentos que compõem o processo

educativo participam da definição dos rumos que a escola deve imprimir à educação e da maneira de implementar essas decisões, num processo contínuo de avaliação de suas ações. (GRACINDO, 2009, p.136-137).

Já a construção de formas de participação de todos os sujeitos na gestão educacional, dialoga com os fundamentos de Bordignon (2004) que trata do processo participativo e compromisso, fenômeno saliente no horizonte educacional, que segundo o autor, “Só há efetiva participação e compromisso quando se adquire a cultura do querer participar, para exercer poder sobre o que lhe pertence, o que diz respeito à sua vida e ao seu futuro”. (BORDIGNON, 2004, P.307).

Sobre esses princípios Lück (2006) comenta: “a democracia é vivência social comprometida com o coletivo, à construção do conhecimento da realidade escolar é resultado da construção da realidade em si, a participação como uma necessidade humana”. Portanto, ao longo do estudo, será observado o diálogo estabelecido entre diferentes autores e as diferentes abordagens sobre a gestão democrática e participativa.

Desta forma, o espaço de discussão da gestão democrática ganhou corpo no contexto de transição democrática, que estimula a luta pela construção de uma escola nova, aberta a participação e comprometida à coletividade e como parte de uma mobilização para melhoria da educação pública brasileira. A esse respeito, Alonso (1988), ressalta:

Repensar a escola como um espaço democrático de troca e produção de conhecimento é o grande desafio que os profissionais da educação, especificamente o Gestor Escolar, deverão enfrentar neste novo contexto educacional, pois o Gestor Escolar é o maior articulador deste processo e possui um papel fundamental na organização do processo de democratização escolar. (ALONSO, 1988, p. 11).

Nesse modelo, a gestão democrática constitui-se em condição decisiva, senão a mais importante, para assegurar as ações necessárias à organização e à articulação de um processo educacional voltado para garantir a promoção da efetiva aprendizagem de todos os alunos e enfrentar os desafios colocados pela sociedade. Essa nova ótica do trabalho do diretor em conjunto com a implementação de novas posturas e relações dentro dos sistemas educacionais, fez surgir à ideia de gestão educacional. Partindo deste princípio, surge a figura do gestor escolar, como sendo o indivíduo que irá articular e propagar ideias para que ocorram as transformações no contexto da comunidade escolar. Diante dessa constatação, Lück (2009), destaca ao definir o termo gestão,

O conceito de gestão está associado ao fortalecimento da democratização do processo pedagógico, à participação responsável de todos nas decisões necessárias e na sua efetivação mediante um compromisso coletivo com resultados educacionais cada vez mais efetivos e significativos. (LÜCK, 2009, p.1).

Considerando-se a modificação que vem ocorrendo na função do gestor ao longo da história e as novas demandas do processo de gestão democrática e participativa, observa-se que a realização do trabalho participativo não é função exclusiva do gestor, mas de todo coletivo educacional. Uma segunda particularidade da responsabilidade e comprometimento de todos nesse tipo de gestão é apontado por Gadotti (1994), no texto intitulado *Gestão democrática e qualidade de ensino*, no qual argumenta,

A gestão democrática da escola exige, em primeiro lugar, uma **mudança de mentalidade** de todos os membros da comunidade escolar. Mudança que implica

deixar de lado o velho preconceito de que a escola pública é do estado e não da comunidade. A gestão democrática da escola implica que a comunidade, os usuários da escola, sejam os seus dirigentes e gestores e não apenas os seus fiscalizadores ou meros receptores dos serviços educacionais. Na gestão democrática pais, alunos, professores e funcionários assumem sua parte de responsabilidade pelo projeto da escola. (GADOTTI, 1994, p.2, grifo do autor)

Porém, segundo Phontes (2007),

(...) de nada adianta até mesmo uma Lei de Gestão Democrática do Ensino Público que conceda autonomia pedagógica, administrativa e financeira às escolas, se Diretores, professores, pais, alunos e demais atores do processo desconhecem o significado político de autonomia, a qual não é dádiva, mas sim uma construção contínua, individual e coletiva (s.d.).

Neste contexto, todas estas demandas anteriores apontam para necessidade de gestores competentes e preparados para atuar de forma dinâmica e inovadora, suplantando a designação de administração, onde o diretor que antes era indicado por alguma autoridade da área educacional, passe a ser eleito democraticamente.

De acordo com Libânio (2004), a organização do trabalho pedagógico que abordam a perspectiva democrática é balizada pela autonomia das unidades escolas e da comunidade educativa que as compõe, num processo ativo que conta com o envolvimento da comunidade escolar, buscando sempre a formação continuada para o desenvolvimento pessoal e profissional dos participantes da respectiva comunidade e prima sempre por relações assentadas na busca de objetivos comuns.

Buscando avançar nos estudos sobre a temática, Lück (s.d), enriquece o debate trazendo as orientações para construção de um novo paradigma para a gestão escolar,

Gestão é uma expressão que ganhou corpo no contexto educacional acompanhando uma mudança de paradigma no encaminhamento das questões desta área. Em linhas gerais, é caracterizada pelo reconhecimento da importância da participação consciente e esclarecida das pessoas nas decisões sobre a orientação e planejamento de seu trabalho. O conceito de gestão educacional está associado ao fortalecimento da democratização de todos nas decisões necessárias e na sua efetivação mediante um compromisso coletivo com resultados educacionais cada vez mais efetivos e significativos.

Ainda segundo Lück (s.d.), uma gestão para ser democrática deve privilegiar o trabalho coletivo através da construção de formas consensuais de tomadas de decisões e da opção por estratégias que viabilizem a participação de diferentes interlocutores, de modo que os objetivos apresentados sejam discutidos e solucionados pela coletividade. Já Boaventura (1997, p.149) chama atenção para outro aspecto importante, a gestão democrática do ensino público não se direciona somente a eleição para diretores de escolas, faculdades, institutos, diretorias, chefias e reitorias, inspira também o processo de democratização do processo de ensino. Sendo assim, pais, professores, alunos, servidores e outros setores da comunidade devem atuar participativamente desse processo dentro da unidade de ensino.

Ao afirmar que novos desafios e exigências são apresentados constantemente à escola e que é preciso enfrentá-los e superá-los, Lück (2005) argumenta que é preciso entender a gestão democrática participativa como um processo no qual o enfoque de atuação se constitui a partir do envolvimento de todos os segmentos interessados na construção de uma proposta coletiva.

Como vimos, às bases da gestão democrática escolar tem seus princípios na Constituição Federal Brasileira e na Lei de Diretrizes e Bases, que implica primeiramente o repensar da escola, tendo em vista sua socialização, marcada por novas concepções que busque a efetiva participação de todos que compõem a instituição. Ressalta-se, portanto, a importância de uma conscientização e de um compromisso dos profissionais para que atuem e assumam responsabilidades como se fosse uma equipe. Pelo exposto, a participação, em seu sentido pleno, caracteriza-se por uma força pela qual os membros da escola reconhecem e assumem seu poder de exercer influência na dinâmica dessa unidade social.

Diretrizes Legais da Gestão Democrática

O ponto de partida para redemocratização da gestão democrática encontra-se expresso, no Art. 211, da Constituição da República Federativa do Brasil de 1988. Especialmente, no que se refere à democratização da gestão da educação, pois além de instituir a democratização do ensino público através da participação da sociedade, *estende aos municípios o direito de organizar seus sistemas de ensino em regime de cooperação com os estados e a união*. Ou seja, a ordem constitucional que nasceu em 1988 consagrou os princípios da democracia e da educação democrática.

Nos Artigos 206 e 211 da Constituição encontram-se os principais pontos de inovação, referentes às mudanças da gestão da educação, pois contém respectivamente, o princípio universal da gestão democrática, bem como, os princípios da descentralização e autonomia. Por tudo isso, esses artigos são considerados marcos legal do processo de democratização da educação, que servem como pontos de referência a ser seguida pelos Estados e Municípios.

Outra importante referência legal da gestão democrática aparece na Lei de Diretrizes e Bases da Educação Nacional- LDB nº 9.394/96, que em vários artigos reforça o que já fora posto na Constituição, adotando contornos e medidas mais definidos de descentralização no sentido da escola e do município. Dentre as novas atribuições definidas para a escola pela LDB podemos destacar:

Art. 3º. O ensino será ministrado com base nos seguintes princípios:

VIII - gestão democrática do ensino público, na forma desta Lei e da legislação dos sistemas de ensino;

Art. 8º. A União, os Estados, o Distrito Federal e os Municípios organizarão, em regime de colaboração, os respectivos sistemas de ensino.

Art. 11. Os Municípios incumbir-se-ão de:

I - organizar, manter e desenvolver os órgãos e instituições oficiais dos seus sistemas de ensino, integrando-os às políticas e planos educacionais da União e dos Estados;

Art. 12. Os estabelecimentos de ensino, respeitadas as normas comuns e as do seu sistema de ensino, terão a incumbência de:

I - elaborar e executar sua proposta pedagógica;

II - administrar seu pessoal e seus recursos materiais e financeiros;

VI - articular-se com as famílias e a comunidade, criando processos de integração da sociedade com a escola;

VII - informar os pais e responsáveis sobre a frequência e o rendimento dos alunos, bem como sobre a execução de sua proposta pedagógica.

Art. 13. Os docentes incumbir-se-ão de:

I - participar da elaboração da proposta pedagógica do estabelecimento de ensino;

II - elaborar e cumprir plano de trabalho, segundo a proposta pedagógica do estabelecimento de ensino;

Portanto, a transição da responsabilidade da gestão para as próprias escolas tornou-se uma das premissas da administração escolar democrática. Nesse

sentido, os artigos 3, 8, 11, 12 e 13 apontam para descentralização do ensino público que implicam um trabalho em equipe de toda a comunidade escolar. Já o artigo 15 assegura às unidades escolares públicas de educação básica, progressivos graus de autonomia pedagógica e financeira, abrindo espaço para a autonomia dos entes federados de encaminharem a gestão democrática para além do que está estabelecido na Constituição e na LDB. Outra importante base de orientação da gestão democrática é a Lei n. 10.127, de 9 de janeiro de 2001, mais conhecida como Plano Nacional de Educação (PNE).

Pautada nos princípios das políticas educacionais do Estado, a gestão democrática, deve ser regida pela transparência, impessoalidade, autonomia, participação, liderança, trabalho coletivo, representatividade e competência. Nesta perspectiva, como argumenta Curi (1995, p.19), a gestão democrática é uma gestão de autoridade compartilhada, cabendo às comunidades educacionais, lideradas por seus dirigentes oficiais, conjunto de docentes e as associações, ampliarem a consciência da relevância desse princípio. (CURI, 1995, P.19).

A Gestão Escolar Democrática e seus Mecanismos de Ação Coletiva

A democratização da escola requer novo redimensionamento das formas de escolha do diretor, na articulação e consolidação de outros mecanismos de participação. Sendo assim, é fundamental garantir, no processo de democratização, elementos que efetivem a construção coletiva do projeto pedagógico, a consolidação dos conselhos escolares e grêmios estudantis, entre outros mecanismos. Ou seja, faz-se necessário a compreensão de que a construção de uma gestão escolar democrática deve ser sempre processual e eminentemente pedagógica.

Logo, é preciso reconhecer que a escola passa por uma transição de modelo administrativo, ou seja, atualmente nas unidades de ensino, procura-se investir e incentivar formas de gestão escolar baseadas em grupos e equipes de trabalho (conselhos escolares), aproximando a escola do modelo de organização aberta, dotada de flexibilidade e conseqüentemente, atribuindo responsabilidade a todos que nela atuam.

Mediante essa mudança de modelo administrativo no contexto escolar, o planejamento estratégico passou a representar um instrumento de grande importância no campo da educação, que desembarca nas escolas através do Programa Fundo de Fortalecimento da Escola – FUNDESCOLA¹. A partir desse programa foi institucionalizado o Plano de Desenvolvimento da Escola - PDE, cuja finalidade destina-se a fornecer a visão e o suporte estratégico para a escola. Constata-se, portanto, que o PDE, representa o plano estratégico da escola. Diante deste fato Sobrinho (2001, p.17), afirma:

O PDE, como metodologia de planejamento estratégico, tem significado, para a grande maioria das escolas, a introdução de um processo inovador, pois reforça a figura e a função do diretor. Tem levado a um trabalho conjunto de toda a equipe escolar; a um engajamento das famílias e da comunidade; e tem permitido à escola saber o quanto custa prover certos serviços educacionais, conhecer seus problemas e pensar seu futuro. A experiência com a implantação do PDE em escolas estaduais e municipais vem mostrando que as escolas o assumiram, com todas as mudanças de rotinas e comportamento decorrentes, e que estão conseguindo avanços na forma de maior participação da comunidade escolar, da comunidade em geral e de maior interesse e melhor desempenho dos alunos.

¹ FUNDESCOLA foi desenvolvido pela Secretaria do Ensino Fundamental do MEC em parceria com o Banco Mundial.

Outro importante instrumento na busca pela democratização e autonomia na escola é o Projeto Político Pedagógico – PPP – pois, representa uma inovação que vem sendo implantada nas escolas públicas com uma grande expectativa de melhoria da qualidade da educação. No módulo III do *Curso de Gestão Escolar* da Secretaria da Educação e Cultura do Município de Salvador, encontramos a seguinte apresentação para o PPP,

Pode-se dizer que o PPP espelha a alma da escola; é o que dá vida, o que aponta o caminho que se deve seguir. Ele conjuga as dimensões política e pedagógica, e conforma a identidade da escola; é a condição essencial da autonomia. O PPP, enquanto inovação emancipatória, é de natureza coletiva. Sem essa marca do coletivo, o PPP não cumprirá sua função de inovação e não propiciará as condições para a formulação da identidade da escola. Mesmo que seja elaborado apenas por parte da comunidade escolar — levando-se em conta as dificuldades de participação massiva que toda escola comporta — o PPP deve refletir o conjunto dos valores e interesses coletivos. (p.30).

Apresentando como requisitos uma intenção inovadora e uma natureza coletiva, o PPP, inspira a definição social de cada escola, suas finalidades, seu currículo, a organização do ensino, utilização do seu tempo pedagógico e sua concepção de avaliação.

No processo de democratização que garante uma gestão escolar, podemos apresentar como um dos instrumentos que merecem destaque, o Conselho Escolar, que surge como um desses componentes que juntamente com o Grêmio Estudantil, Associação de Pais e Mestres e Conselho de Classe desempenham um papel imprescindível no exercício da prática democrática. Gracindo (1995, p.28), aborda a importância do Conselho Escolar,

O Conselho Escolar, como órgão consultivo, deliberativo e de mobilização mais importante do processo de gestão democrática, não deve configurar-se como instrumento de controle externo, mas como um parceiro de todas as atividades que se desenvolvem no interior da escola. E, nessa linha de raciocínio, a função principal do Conselho Escolar está ligada à essência do trabalho escolar, isto é, está voltada para o desenvolvimento da prática educativa, na qual o processo ensino-aprendizagem deve ser o foco principal, sua tarefa mais importante. Com isso, a ação do Conselho Escolar torna-se político-pedagógica, pois se expressa numa ação sistemática e planejada, com o intuito de interferir sobre a realidade, transformando-a.

Muitos outros processos e instrumentos podem ser usados pelas unidades de ensino para promover a sua democratização e autonomia, sendo abordado neste artigo apenas o PDE, o PPP e o Conselho Escolar, por considerá-los fundamentais para iniciar o processo de democratização de qualquer escola.

Tendências Atuais e novos Desafios da Gestão Democrática

De acordo com Bordignon (1995), “o grande desafio da gestão democrática está na mudança do paradigma que fundamenta as práticas educativas, através da desalienação tanto na relação sistema/escola, como na relação escola/estudante para que novas práticas possam ser instituídas” (1995, p.31). Pode-se dizer que a desalienação se dá através do processo de descentralização, previsto na Lei de Diretrizes e Bases da Educação Nacional,

O processo de descentralização da gestão das escolas públicas no Brasil se constitui num fenômeno importante para a história da educação brasileira. Esse fenômeno foi marcado por mudança de um modelo de gestão escolar baseado na centralização administrativa, decorrente dos efeitos vivenciados notadamente no regime de ditadura no Brasil, para um modelo descentralizado, aberto à participação democrática dos cidadãos na esfera da escola. A forma dessa descentralização está definida especialmente na Lei de Diretrizes e Bases da Educação Nacional (LDB, 9.394/96).

Em texto posterior, intitulado “*Papel e responsabilidades do gestor de unidade escolar*”, Portela (2004) aponta três desafios a serem enfrentados pelo gestor escolar democrático nessa nova conjuntura. Segundo a autora, o primeiro e maior desafio com o qual o dirigente escolar se defronta no exercício da gestão democrática é o de transformar-se de autoridade instituída (hierárquico, nomeado por decreto) em autoridade legitimada. Uma vez que, o processo de legitimação, na gestão democrática, exige do gestor: sensibilidade em relação aos problemas sociais e predisposição para o diálogo; capacidade de resolver conflitos e entendimento de que gerir é reunir vontades diferentes na busca de objetivos comuns, através da deliberação conjunta e do compartilhamento dos conflitos em unidades de propósitos.

Ainda de acordo com a autora, o segundo desafio é de natureza pedagógica. Ou seja, na condição de liderança educacional, o gestor, deve planejar seu trabalho de forma organizada, articulada e democrática, de forma a contribuir com o processo de ensinar e aprender.

Já o terceiro desafio diz respeito à experiência e competência profissional. De acordo com essa proposição, o enfrentamento desse desafio supõe, portanto, a combinação de duas características fundamentais: competência técnica e liderança

pedagógica e política, ou seja, o gestor precisa se apropriar, continuamente, de informações essenciais ao exercício das suas funções.

Todos esses elementos permitem afirmar que a educação emancipadora e gestão democrática são indissociáveis, pois somente se concretizam no exercício da cidadania com participação efetiva de todos os membros da comunidade escolar. Portanto, uma das principais premissas que orienta a gestão democrática é a adoção pela comunidade escolar de uma pedagogia mais formadora. Através da reformulação de conteúdos e finalidades (currículo escolar), que possibilitem a renovação da abordagem pedagógica de forma coletiva, visto que, a gestão democrática implica primeiramente o repensar da estrutura de poder da escola, objetivando sua socialização.

Monlevade (1995), consultor legislativo do Senado Federal, no Programa Salto para o futuro de número 02, anexo 01, aponta os cinco princípios da democracia na escola,

1. Gestão Democrática supõe ruptura com práticas autoritárias, hierárquicas e clientelísticas. Por isto, a eleição de diretores, embora não constitua a essência da gestão democrática, tem sido o sinal histórico para distinguir o “tempo autoritário” do “tempo democrático”. E tem que ser acompanhada de práticas administrativas do sistema que se adequem a uma nova forma – democrática – de decidir, de governar, de ordenar, de avaliar.
2. Gestão Democrática é participação dos atores em decisões e na avaliação. [...] Professores, funcionários, alunos, pais e direção passam a ser um colegiado que se reúne ordinariamente e vai propondo e avaliando o Projeto Político-Pedagógico da escola, que na nova LDB ganhou substancial importância.
3. Gestão Democrática supõe representação legítima dos segmentos.
4. A Gestão Democrática da escola se baliza pelo Projeto Político-Pedagógico da Escola. [...] Embora a Proposta Pedagógica deva ser cientificamente

assessorada pelos profissionais da educação, ela deve ser elaborada e avaliada por toda a comunidade escolar, presidida pelo Conselho.

5. Gestão Democrática da escola se articula com administração democrática do sistema de ensino. (MONLEVADE, 1995, p.28).

Tomando como base esses princípios, a empreitada coletiva que constitui a tarefa primordial da comunidade escolar para construção de um processo educativo emancipador e autônomo, deve ter como fundamento a formação de sujeitos críticos e participativos. Outros importantes princípios da gestão democrática são apresentados por Bordignon (2004), num texto denominado *Uma gestão democrática cidadã*. Destacamos alguns,

1. O aluno deve ser o da escola e a escola o centro do sistema de ensino;
2. O professor aparece como educador comprometido com a proposta pedagógica da escola;
3. Os conselhos escolares tem poder e por isso privilegiam a decisão plural;
4. As vivências e experiências inovadoras dos alunos são valorizadas como momentos de aprendizagem;
5. A pluralidade das vozes e das formas de ser devem ser acolhidas, ouvidas e defendidas;
7. Agir com suavidade nos modos e firmeza na ação; praticando a tolerância com as pessoas e a intransigência nos princípios;
8. Dar transparência às ações, eliminando a dissimulação;
9. Proporcionar um clima organizacional positivo, desafiador, valorizando as pessoas e o trabalho coletivo.

Tais princípios apresentam que a gestão democrática educacional só é viável através da mudança de paradigma da educação através do exercício efetivo da cidadania, pressupondo neste caso, a autonomia das pessoas e instituições. Nesse

contexto, a gestão democrática, representa uma nova práxis que será construída por sujeitos históricos concretos, que são os profissionais de educação, os estudantes e a comunidade da qual a escola faz parte, pois, somente esse sentimento de pertença é capaz de gerar comprometimento e envolvimento dessas diferentes vozes da sociedade.

De acordo com Lück (2000), para atender a essas novas demandas do papel do gestor é preciso romper com a postura autoritária herdada da sociedade pela escola, na qual, o papel do diretor era quase sempre:

[...] o de guardião ou gerente de operações estabelecidas em órgãos centrais. Seu trabalho constituía-se, sobretudo, em repassar informações, controlar, supervisionar, “dirigir” o fazer escolar, de acordo com as normas propostas pelo sistema de ensino ou pela mantenedora.

Na produção dessa nova organização escolar, é preciso reconhecer que tanto as novas disposições da Constituição Federal (1988), como da Lei de Diretrizes e Bases, implicaram em mudanças significativas no padrão de gestão e no papel do gestor, que passou a ser,

[...] um gestor da dinâmica social, um mobilizador e orquestrador de atores, um articulador da diversidade para dar-lhe unidade e consistência, na construção do ambiente educacional e promoção segura da formação de seus alunos. (LUCK, 2000, p.13).

Na mesma linha de argumentação, um trabalho conjunto desenvolvido entre a UNESCO e o MEC, apresenta o seguinte entendimento sobre a forma de agir do gestor no âmbito educacional:

O diretor é cada vez mais obrigado a levar em consideração a evolução da idéia de democracia, que conduz o conjunto de professores, e mesmo os agentes locais, à maior participação, à maior implicação nas tomadas de decisão (VALÉRIEN, apud LUCK, s. d., p. 1).

É imprescindível notar que passa a ocorrer o que chamaremos de redefinição do papel do gestor educacional. No “Curso Gestão Escolar” da Secretaria da Educação e Cultura do Município de Salvador, módulo I, as dimensões do papel do gestor são assim especificadas:

- a) O gestor e sua dimensão política – na dimensão política, o gestor ocupa um lugar de destaque nas relações de poder e precisa ter uma visão da escola como um conjunto de relações entre diversos segmentos (professores, alunos, funcionários e pais), para que possa atuar como mediador das divergências e dos conflitos próprias aos sistemas de ensino.
- b) O gestor como articulador – nesta dimensão o gestor é responsável pela articulação de sua escola no contexto nacional da educação, visando o cumprimento da legislação e normas educacionais em todos os âmbitos (LDB, Projeto Político Pedagógico, Regimento, etc.).
- c) O gestor como representante da escola – a partir do pleito eleitoral, o gestor trona-se representante da escola perante a comunidade local, atuando em diferentes instâncias de poder como porta voz da comunidade representada.
- d) O gestor e a dimensão pedagógica – nesse contexto, o principal papel do gestor é conquistar a adesão de todos (descentralização) e conduzir a reformulação do Projeto Político Pedagógico, no qual a escola tem uma função social bem mais ampla.
- e) O gestor e a dimensão técnica-administrativa – é considerada uma das principais preocupações dos gestores, pois, apesar de contar com normas e procedimentos

definidos, a viabilidade e fluidez do trabalho pedagógico encontra-se condicionada a administração dos recursos financeiros.

f) O gestor e a dimensão pessoal – trata-se de uma preocupação recente, que tem como objetivo a promoção de cursos para gestores no exercício dos cargos como a exigência de cursos de certificação como pré-requisito para candidatos a gestor.

Para atender a todas essas dimensões, a identidade do gestor deve ser constituída a partir de três elementos fundamentais: marcos legais (conhecimento e adoção das leis que regulam a gestão democrática), definição do seu papel mediante a comunidade escolar (função social) e essencialmente a sua formação.

5. CONCLUSÃO

As mudanças representadas pelas amplas participações de movimentos sociais repercutiram no panorama educacional através de regulamentação de artigos na Constituição Federal de 1988 e na LDB, lei de Diretrizes e Bases. Essas novas regulamentações voltadas para o sistema educacional preconiza uma nova ótica para a gestão no contexto das escolas, que representa uma nova forma de olhar para a educação, através de um planejamento diferenciado, que aposte na reestruturação da equipe e busque apoio na comunidade, onde são formados sujeitos.

Como foi abordado anteriormente, às bases da gestão democrática escolar tem seus princípios na Constituição Federal Brasileira e na Lei de Diretrizes e Bases, que implica primeiramente o repensar da escola, tendo em vista sua socialização, marcada por novas concepções que busque a efetiva participação de todos que compõem a instituição. Ressalta-se, portanto, a importância de uma conscientização e de um compromisso dos profissionais para que atuem e assumam responsabilidades com postura de uma equipe. Pelo exposto, a participação, em seu sentido mais amplo, caracteriza-se por uma força pela qual os membros da escola

reconhecem e assumem seu poder de exercer influência na dinâmica dessa unidade social.

Desta forma, a importância da discussão acerca da gestão democrática nas escolas perpassa um entendimento mais amplo, no qual cabe ressaltar que apenas mudar denominações nada significa, é preciso que a nova forma de representação denote originalidade e efetiva atuação. O desafio está em saber que gestor nesse novo contexto representa: saber à hora de inovar e criar, analisar o desempenho da equipe, redefinir o planejamento escolar, superar desafios, domínio, flexibilidade, criatividade, determinação e principalmente um novo olhar para educação.

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AS PERSONALIDADES DE JOGAR, À LUZ DOS INTERPRETANTES SEMIÓTICOS PEIRCEANOS

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Resumo

A experiência nos videojogos muitas vezes é tratada de maneira geral, quase intangível. Desta maneira, para colaborar com os estudos sobre as experiências do jogador, este trabalho procura abordar a questão da experiência em jogos, digitais ou não, através das possíveis personalidades de jogar [2], como elas podem ser estruturadas, e quais jogos atendem melhor determinadas personalidades. Tal conhecimento ajudará não apenas na criação de novos jogos ou interfaces, mas também profissionais, como psicólogos ou professores, que necessitem atender a públicos diversificados. A metodologia é qualitativa, tem origem nas personalidades propostas por Stuart Brown [2] e orienta-se através da semiótica peirceana para observar os jogos e os jogadores através de seus Interpretantes Imediatos, Dinâmicos e Finais. Em uma possível continuação pretende-se confirmar tais possibilidades através de entrevistas e exemplos conhecidos.

1. INTRODUÇÃO

Conhecer as experiências que os jogadores vivenciam durante o jogar é importante para entender o que estes sentem, buscam, e como desenham seu percurso em busca da experiência ótima [1]. Tal conhecimento pode ter uma aplicação imediata no projeto de novos jogos e interfaces, mas também em aplicações médias ou educativas, nas quais faça-se uso de jogos, digitais ou não.

A fim de entendermos um pouco mais sobre a experiência do jogar, procuraremos entender as personalidades dos jogadores, na classificação de Stuart Brown [2] através do Interpretante peirceano.

Para tanto, este trabalho está dividido em três seções: na primeira apresentaremos as personalidades dos jogadores, de acordo com Stuart Brown [2], na segunda apresentaremos a noção de Interpretante, um conceito central na Semiótica de Charles Sanders Peirce, e, por fim, na terceira, faremos a leitura das personalidades apresentadas à luz dos Interpretantes peirceanos.

Ressalta-se aqui a importância de notar o uso amplo da palavra Play, em inglês, ter significados muito mais amplos do que jogar, incluindo tocar (uma música, por exemplo) e encenar (um papel em uma peça, por exemplo), e que em suas diversas traduções possa perder ou reduzir o seu sentido. Assim, optou-se pelo uso da palavra jogador, mas em um contexto ampliado, que vá da brincadeira à encenação, passando por música, flertes, e, claro, jogos.

Trataremos também, no início da seção 2, a condição de Experiência Ótima como um motivador para tais personalidades.

2. PERSONALIDADES DE JOGAR

Conhecido por ser o fundador do National Institute for Play [7], o pesquisador e professor Stuart Brown já conduziu mais de 6.000 entrevistas dedicadas, por ele denominadas de “play histories”, definindo-as como “uma análise cuidadosa do papel do jogo na infância e na idade adulta” [3]. Os entrevistados vão desde assassinos até ganhadores do prêmio Nobel, passando por comerciantes e artistas.

Com base em tamanho catálogo, o pesquisador aponta 8 categorias que conseguiriam dar conta de diferentes modos de jogar que tornam-se dominantes quando o jogador vai ficando adulto. Esses modos são chamados de Play Personalities (personalidades de jogar, em livre adaptação), e o próprio autor afirma que não se tratam de categorias científicas, mas que considera bastante precisas [4]. Relembramos aqui o amplo uso da palavra Play, em inglês, ter significados muito mais amplos do que jogar (ver a seção Introdução).

As oito personalidades de jogar (Personality Play), de acordo com Brown são: (1) Joker, (2) Kinesthete, (3) Explorer, (4) Competitor, (5) Director, (6) Collector, (7) Artist/Creator e (8) Storyteller (ou em livre tradução: Brincalhão, Cinestésico, Explorador, Diretor, Colecionador, Artista/Criador e Contador de Histórias).

O Brincalhão

Muito objetivamente, o brincalhão é o tipo de personalidade do jogar mais básica de todas, pois nos remete à infância e aos gracejos bobos que os adultos fazem para que as crianças sorriam. Trata-se do indivíduo que almeja chegar ao *fun* através da diversão e do nonsense, como fazer piadas, brincar, ou pregar peças em seus colegas. No caso dos jogos digitais, são os apreciadores de Flash Games simples, como aqueles que se atiram coisas nas pessoas, como privadas e sapatos, assim como de personagens e narrativas cômicas.

O Cinestésico

O cinestésico é a personalidade que necessita estar em movimento para alcançar o fun, e até mesmo para concentrar-se. O caso conhecido de Gillian Lynne, dançarina, atriz e coreógrafa inglesa, que apresentava desempenho muito baixo em uma escola comum e alcançou suas experiências ótimas ao ser transferida para uma escola de dança, sendo reconhecida atualmente por sua grande produção. São notadamente as pessoas que gostam de dança, ginástica, esportes, e instrumentos musicais. Nos jogos digitais são as pessoas favorecidas pelas plataformas de movimento como Nintendo Wii e Microsoft Kinect, ou jogos como Guitar Hero e pelos tapetes DDR.

O Explorador

A terceira categoria, o explorador, também é uma personalidade bastante básica, visto que todas as pessoas começam suas vidas explorando o mundo ao redor delas, e “algumas pessoas nunca perdem o entusiasmo por isso” [5]. Este grupo de jogadores (em seu sentido amplo) tem sua imaginação motivada pela exploração, que pode ser tanto (1) física, quando estes são levados a conhecer novos lugares, que abarca personalidades desde viajantes a visitantes de museus e restaurantes, entre outros; (2) emocional, como os que buscam novos sentimentos através da arte, da música, da gastronomia ou do flerte; e (3) mentais, que tem seu prazer da descoberta na pesquisa e busca de novos conhecimentos, ou na projeção de sua imaginação, através da literatura ou suportes audiovisuais. Estas personalidades exploradoras incluem professores, pesquisadores e leitores de vários tipos de mídias. No caso dos jogos digitais, os RPGs de padrão americanos, ou o gênero de jogos de aventura (adventure games) são comuns, mas pode-se incluir uma parte exploratória em diversos outros tipos de jogos, como é comum em jogos de tiro ou lojas de jogos de corrida. Também é importante notar que tais personalidades são comuns simultaneamente. Um apreciador de vinhos, por exemplo, pode ler sobre um vinho em uma revista, e criar uma narrativa através de sua imaginação (1), depois provar o vinho (2), e viajar para alguma cidade, restaurante, ou até mesmo a vinícola ou país de origem (3).

O Competidor

Já a categoria de Competidores (4), preferem objetivos e regras específicos e bem delimitados, e jogam dentro desse escopo para se superar, ou a seus competidores, quer sejam jogos ou esportes solitários ou em equipe. Também são os indivíduos que gostam de se destacar em determinados grupos. Quando o objeto em questão não apresenta marcadores de pontuação, então alguns precisam ser criados ou convencionados. No mundo dos negócios, a “pontuação” é marcada por suas fortunas, e no mundo da internet, pelos seus

acessos. Prêmios, títulos, e diversos tipos de narrativas pessoais são também empregados. Esse tipo de personalidade também tem uma característica de trazer qualquer coisa, mesmo as não competitivas, para o seu âmbito de competição.

O Diretor

O Diretor, por sua vez, tem seu prazer no planejamento e execução de projetos e eventos. São pessoas muito organizadas e motivadoras, pois eles também costumam ser produtores. Organizam de festas a passeios, e gostam de sentirem-se como centro motor de algum núcleo social. Do lado oposto estes são os manipuladores, que tem apenas seus objetivos em mente, e usam os outros como meras peças em seus jogos políticos e sociais. No universo dos jogos digitais, eles vão de simuladores a jogos de estratégia, até chefes de guilda ou clans, que passam uma boa quantidade de seu tempo de jogo organizando equipes, estratégias, captando e treinando novos membros.

O Colecionador

A personalidade colecionadora tem o seu prazer na aquisição e organização de objetos e suas narrativas. Tampinhas de garrafas, cartões postais, fotografias, réplicas, bonecos, livros e coleções dos mais diversos tipos demarcam esse tipo de personalidade. A constante manutenção e reorganização dessas coleções trazem memórias e narrativas possíveis e aguçam também uma característica exploradora comum a essa personalidade. O seu exagero pode apresentar sinais de transtornos obsessivos compulsivos ou de acumulações compulsivas.

Nos jogos digitais estes acontecem em vários momentos, como colecionar recompensas por *quests* (missões) cumpridos, organizar e completar inventários e objetos, itens de lojas virtuais dentro e fora do jogo, e colecionar *achievements* por desafios realizados dentro e fora do jogo. Os jogadores que gostam de completar todos os desafios propostos pelos jogos são conhecidos como *achievement hunters* ou platinadores.

O Artista/Criador

Por sua vez, o Artista/Criador, tem seu prazer criando ou modificando coisas. Desenhos, cerâmicas e artesanato são comuns a esse tipo de personalidade, mas a nova geração de DIY (Do It Yourself, faça você mesmo), impulsionada pela facilidade da internet e do comércio eletrônico traz novos cervejeiros, músicos, designers, escritores, joalheiros, perfumistas, entre inúmeros outros. Tais personalidades procuram criar objetos únicos ou personalizá-los, por vezes para usufruto próprio e único, outras vezes para comercialização. Nos

jogos digitais vemos essas características em jogadores que investem muito tempo na customização de seus avatares, na criação de ambientes virtuais como Second Life e residências para os Sims, ou na criação de conteúdo personalizado, novos níveis, e modificações de jogos.

O Contador de Histórias

Finalmente, a personalidade de Contador de Histórias está presente não apenas em escritores, mas em leitores de diversas mídias, além de livros. Estes podem contar, ou ler, as suas histórias também em filmes, músicas, e jogos, englobando assim, roteiristas, compositores, e jogadores de RPGs, adventures, e qualquer gênero de jogos nos quais a história tenha um papel de destaque. Como são pessoas que estão sempre utilizando a sua imaginação, sua vida é rodeada de narrativas. Coisas simples como um prato de massa, ou um ponto em uma partida de tênis podem, ser transformadas em histórias de vida e superação.

Os Interpretantes peirceanos

Embora Brown não declare os fatores que levou em consideração para estabelecer essas categorias, podemos observar que, em sua generalidade, estas nos apontam o que mantém as pessoas, ou os jogadores, motivados em busca de seu objetivo, através do prazer, *fun*, no jargão dos games, ou, como prefiro, na Experiência Ótima, nos termos da Teoria do Flow [1]. Embora o termo *fun*, em game design se refira a diversos tipos de prazer, muitas vezes ele é entendido apenas como diversão, e por isso alguns game designers como Marc LeBlanc preferem criar uma tipologia própria para se desvincular da generalidade do *fun* [7]. A Experiência Ótima nos diz que o prazer também pode ser cansativo, persistente, e até sofrido, como em uma bailarina ou um lutador, que precisam desenvolver seus corpos, muitas vezes sofredamente, para alcançarem seus objetivos. “Os melhores momentos normalmente ocorrem quando o corpo ou a mente de uma pessoa é empurrado aos seus limites por um esforço voluntário para realizar algo difícil e interessante.” [8]

Brown relaciona tais Personalidades de Jogar ao crescimento: “Enquanto ficamos mais velhos, nós começamos a ter fortes preferências por certos tipos de *play* em vez de outros” [4]. Algumas coisas nos mantém interessados, outras não. Assim, mesmo que uma pessoa apresente mais de uma dessas categorias, uma é dominante sobre as demais. São suas preferências pessoais.

Na Semiótica de Charles Sanders Peirce, da mesma maneira, os signos existem em grande profusão, mas alguns ocorrem em maneira dominante a outros. O Interpretante é “aquilo que o signo produz como efeito, em uma mente, potencial ou atual” [9]. Por sua vez, “Todo o signo tem 3

interpretantes, um final (ou lógico) é o “efeito que seria produzido na mente pelo signo após o suficiente desenvolvimento do pensamento”, um interpretante dinâmico, que é “o efeito efetivamente produzido na mente”, e um interpretante imediato, que é “o interpretante representado ou significado no signo” (CP. 8343)”. [12]

O Interpretante Imediato

Diz-se por Interpretante Imediato o potencial interpretativo do signo, ou seja, um estado anterior ao signo encontrar o seu intérprete. Lembrando, mais uma vez, que Interpretante não é o intérprete, e sim o resultado que o signo produz como efeito em uma mente. Nos jogos, e em outras mídias, o público alvo pode ser considerado como esse estado interpretativo [9]. Um tipo de conteúdo, linguagem, e demais signos que pertencem a um Interpretante Imediato, por si só já seleciona um tipo de público, e não outro. Uma pessoa que joga apenas jogos de corrida, por exemplo, terá dificuldades para entender a necessidade de exploração e evolução em um gênero diferente, como um RPG.

O Interpretante Dinâmico

Este é o efeito propriamente produzido em um intérprete através do signo. Quando este atinge o intérprete podem ser produzidos três tipos de efeitos diferentes: (1) emocional, (2) energético e (3) Lógico

O Interpretante Dinâmico Emocional

Alguns efeitos são mais emocionais do que outros, mesmo que sejam vagos ou intermitentes. O andamento, a entonação, a aparência, são apenas alguns dos fatores que podem deixar um signo mais emocional do que outros.

- O Interpretante Dinâmico Energético

Quando o signo provoca uma reação ativa no seu receptor, seja ela física ou intelectual, trata-se de um Interpretante Dinâmico energético. Uma música que nos faz batucar, uma explosão que nos assusta e nos põe a correr, um *game over* que nos faz jogar o controle no chão, são exemplos desse tipo de Interpretante.

- O Interpretante Dinâmico Lógico

Quando este é interpretado através de uma regra interpretativa do receptor, como suas crenças, comportamentos ou intenções, temos o Interpretante Dinâmico Lógico. São signos que sugerem uma mudança de comportamento, uma tomada de ação, um convencimento.

O Interpretante Final

Por fim, quando o Interpretante provoca um resultado esperado, tratamos do Interpretante Final. Presentes nos discursos de palanques políticos, que visam angariar votos, no alistamento militar, a fim de angariar contingente, ou na educação, com o propósito de preparar cidadãos, se esse Interpretante atinge seus objetivos, trata-se de um Interpretante Final. Se não atinge, fica na esfera do Lógico.

Uma possível dúvida, quanto a opção do interpretante sobre o próprio objeto que o signo representa, o próprio Peirce nos alerta que “Em sua natureza geral, o interpretante é muito mais facilmente inteligível do que o objeto, desde que ele inclui tudo que o signo expressa ou significa dele mesmo” [13]. Por esta razão, optou-se por trabalhar no nível do interpretante.

3. RELAÇÕES

A fim de tecer as relações entre as experiências dos jogadores, e vê-las sob o ponto de vista dos Interpretantes peirceanos, precisaremos promover alguns recortes.

Inicialmente, reduziremos as lidas de personalidades de jogar apenas para jogos, e apenas jogos digitais. Precisamos disso para termos um modelo teórico mais tangível, menos abstrato. Depois escolheremos alguns gêneros de jogos, e verificaremos o Interpretante que consideramos mais apropriado.

Por fim, para visualizarmos melhor, nos utilizaremos de uma tabela, seguida de considerações, e, posteriormente, algumas considerações finais.

Personality Play	Gênero de Jogo	Interpretante
(1) Brincalhão	Jogos casuais de curta duração, com foco na brincadeira	Imediato: Diversão Dinâmico: Emocional Final: Regozijo
(2) Cinestésico	Jogos de dança, música e ginástica	Imediato: Movimento Dinâmico: Energético Final: Credibilidade
(3) Explorador	Jogos de aventura, RPGs e puzzles	Imediato: Curiosidade

Personality Play	Gênero de Jogo	Interpretante
		Dinâmico: Lógico Final: Descoberta
(4) Competidor	Corrida, tiro, RTS, e qualquer jogo que este consiga promover uma competição	Imediato: Superação Dinâmico: Emocional Final: Vencer
(5) Diretor	Organizar eventos, clans, treinar jogadores, esclarecer dúvidas, fazer escolhas	Imediato: Coletivo Dinâmico: Lógico Final: Realizar
(6) Colecionador	Captar, organizar e recuperar conteúdo em qualquer gênero de jogo que isso seja possível. Cumprir tarefas a fim da busca de recompensas.	Imediato: Reunir Dinâmico: Emocional Final: Completar, Ampliar
(7) Artista/Criador	Criar e modificar jogos, conteúdos e personagens	Imediato: Inconformismo Dinâmico: Emocional Final: Realizar
(8) Contador de Histórias	Contar ou ler (ouvir, assistir, interagir) histórias através de vários meios	Imediato: Narrativa Dinâmico: Emocional ou Lógico Final: Ter / Ser público

Sabemos que tal tipologia é uma tarefa árdua, necessita de muito debate, e muito propícia a interpretações, pois diversos signos acontecem simultaneamente, e o que pode ser o dominante para uma maioria, pode não ser uma totalidade. Mas a tabela acima parece bastante razoável, se bem que alguns tópicos necessitam de mais explicações do que uma tabela possa oferecer. É bom lembrar, também, que não se trata de uma tabela

consolidada, fechada, mas ainda aberta a interpretações, confirmações, e pesquisa.

O Brincalhão é bem simples de entender. Ele quer se divertir, tem uma relação emocional com o jogo, mais do que lógica ou energética, e atinge seu Interpretante Final quando se regozija com a experiência.

Também simples é o cinestésico, que quer se movimentar, e para isso precisa de Interpretantes dinâmicos energéticos que façam-no se mexer. O Interpretante Final é um pouco obscuro, pois teria de ser amplo o suficiente para abarcar pessoas que almejam objetivos práticos, como perder peso, ganhar tônus ou elasticidade muscular, ou simplesmente recreativos, como dançar ou se imaginar tocando um instrumento, como no jogo Guitar Hero. Assim, um Interpretante Final que possa ser comum a toda essa diversidade seja a credibilidade, ou no mínimo o sentimento de imersão que se está realmente praticando uma dessas atividades, mesmo quando se sabe que pode ser apenas uma simulação, como no caso do Guitar Hero, mas não no caso da ginástica, que é a atividade em si. Em um jogo de esportes, como o Vôlei de Praia, da franquia *Kinect Sports*, usam-se os movimentos do jogo real, mas em um espaço de um metro quadrado, e, mesmo assim, pode levar os jogadores a considerarem os jogos bem semelhantes.

Exploradores são levados pela sua curiosidade, e realizam-na frente às descobertas que conquistam, através de um Interpretante Lógico movido pela sua intenção de conhecer coisas novas e diferentes. Competidores, por sua vez, são movidos pela superação, de objetivos que eles mesmos se propõe, ou de outras pessoas e desafios propostos. Seu Interpretante Dinâmico embora à primeira vista pareça Lógico, é emocional, visto que tal personalidade precisa sentir-se superando a si ou aos outros, e nem sempre tal sentimento esteja ligado a uma regra ou uma crença, apenas ao sentimento de superação.

Se as primeiras quatro categorias sejam aparentemente bem delimitadas, as outras quatro são mais enevoadas, e requerem mais debate, e, posteriormente, entrevistas tabuladas com sujeitos que se enquadrem nessas classificações.

Diretores não se realizam sozinhos. Uma realização dessas os deslocaria para a categoria de artista/criador, mesmo em coletivos artísticos. O seu Interpretante Dinâmico dominante é o Lógico, visto que criam uma série de condições para que a sua realização seja alcançada. Saindo um pouco da ordem da tabela, abordaremos agora a categoria de Artista/Criador, pois de início ela parece muito próxima a de Diretor. Neste momento os Interpretantes peirceanos foram de muita valia para entender essa diferença, visto que o objetivo Final de ambos é realizar alguma obra ou mesmo um evento, como um *happenig* ou performance. Entretanto, os caminhos para

isso são diferentes, visto que o primeiro, o Diretor, trabalha nos termos da lógica, movido pelo coletivo, enquanto o segundo parte de uma insatisfação, que o leva a criar ou transformar objetos e eventos em favor de sua realização.

O Colecionador, por sua vez, também opera no âmbito do coletivo, mas de objetos. É movido pela reunião de coisas, fatos, ideias, e o que mais possa ser reunido. Embora possa acontecer dentro de uma lógica ou condição favorável, como trabalhar nos Correios, e ter a oportunidade de comprar sempre um selo para sua coleção, muitos colecionadores não sabem porque colecionam determinados objetos. Podem remeter a sua infância, a um objetivo de vida, ou simplesmente objetivos narcisistas. Isso nos leva a crer que seus Interpretantes dominantes devam ser os emocionais. Muitos artistas com projetos chamados obsessivos, do tipo uma foto ou desenho por dia poderiam se enquadrar nessa categoria, se não diferenciados pelos seus Interpretantes Imediatos e Finais.

Por fim, o Contador de Histórias. Este, sem dúvida o mais complexo e de difícil categorização do que os outros, pois vai desde o escritor ao leitor, do músico ao ouvinte, do roteirista ao cinéfilo. Esta, apresenta características de explorador, colecionador e artista. Inicialmente, a enorme profusão de Interpretantes dos mais diversos tipos nos leva a crer que esta categoria encontrava-se superdimensionada. Enquanto o objetivo Final de um escritor seja, na maioria das vezes, ser lido, ter público, para um leitor isso pode ser irrelevante. Leitores gostam de convencer as pessoas próximas a lerem seus livros, para gerar uma diversidade de visões, e alguns gostam de contar as histórias que andam lendo, nesse caso sendo realmente contadores de histórias. Assim, partindo do princípio que leitores, audiófilos, cinéfilos, gostam de compartilhar suas opiniões para outras pessoas, ou seja, necessitam de público, mesmo pequeno, para poderem descrever seus sentimentos e descobertas, manteremos o Interpretante Final como ter (algum) público. O Interpretante Imediato também nos parece bastante simples, pois reside na possibilidade de transformar até mesmo fatos simples em narrativas. Porém, o Interpretante Dinâmico volta a ser problemático, pois se pensado como emocional compartilha com o Interpretante Final de ter público. Mas se for Lógico, atendendo a regras e objetivos definidos, então o mesmo Interpretante Final poderia ser repensado até mesmo em seus extremos, apenas uma questão de quantidade, como fazer sucesso, ou apenas sustentar-se.

4. CONSIDERAÇÕES FINAIS

Como alertado anteriormente, a tabela apresentada não é, nem nunca poderia ser, um objeto final. Mas isso não quer dizer que ela não seja útil. Tais categorias ainda precisam de discussão, pesquisa, entrevistas, e mesmo assim ainda sofreriam atualizações de acordo com cada época, que altera os processos produtivos, e portanto as pessoas afetadas por estes.

Caso estivéssemos nos anos 19(90) ou anteriores, antes do advento da autopublicação facilitada pela internet, talvez o objetivo Final de um escritor ou músico fosse ser publicado ou gravado. Atualmente, o custo comercial de uma autopublicação chega a zero, então tal objetivo não faz mais sentido, a não ser que se almeje uma grande editora ou gravadora.

Embora o trabalho de Brown [2], não seja específico sobre jogos digitais, nem tampouco se refira a eles, apenas em momentos esparsos, este artigo procura ampliá-lo neste sentido, ao mesmo tempo que busca trazer considerações da semiótica peirceana para que tais categorias possam ser mais definidas e precisas. Mas mesmo assim, este texto não se encerra em jogos digitais, pelo contrário, mais abre portas para discussões do que as encerra. Os jogos digitais ainda estão evoluindo muito. Às vezes estes ficam estagnados copiando outras mídias, ou refazendo jogos antigos em alta resolução, mas existem adventos, como a popularização dos acessórios que captam movimentos (Kinect, Move e Wii, entre outros), que abrem novas possibilidades para tais jogos.

De qualquer modo, acreditamos que o detalhamento de tais categorias seja importante não somente para a área de jogos digitais, mas também para quaisquer profissionais que trabalhem em áreas criativas, que envolvam o *play* (jogar no sentido amplo), ou que precisem definir públicos tomando como base as suas personalidades de jogar. Designers, professores, editores e demais profissionais que trabalhem na diversidade de públicos podem se beneficiar de tal tabela. Na indústria de jogos digitais, por exemplo, é importante ampliar cada dia mais o público, pois a produção de jogos tem atingido valores muito altos [10], e as vendas precisam aumentar também. Assim, os jogos tem ficado mais diversificados, por vezes mais fáceis, mas precisam também expandir suas linguagens de maneira que abarquem mais público. Tomemos como exemplo os jogos de zumbis, como *Dead Island* [11], que envolvem mundo aberto, puzzles, tiros, explorações, criação de armas, tipos diferentes de personagens e ambientes de jogos. Se antes, jogos como esses residiam em poucas possibilidades, como atirar e explorar, aumentando as possibilidades do jogo aumenta-se também o número de

jogadores que vão se identificar, motivar, ou se sentirem aptos a jogar determinados títulos.

Em termos semióticos, um jogo, ou outra atividade, que envolva poucos Interpretantes, está fadada a motivar poucas personalidades de jogar, e, em última instância, ter pouco público, ou pouca participação. Uma tabela como essa colabora no sentido de se identificar os Interpretantes em falta, e ampliar as possibilidades de motivação e sucesso de uma atividade, quer seja um jogo digital ou uma aula.

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PROMOÇÃO DA EDUCAÇÃO AMBIENTAL ATRAVÉS DE JOGOS DIDÁTICOS

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Resumo

Face às problemáticas ambientais que atualmente se vivem, o discurso oficial tem acentuado a relevância da Educação Ambiental (EA) em diferentes contextos de aprendizagem, incluindo a escola. Neste sentido torna-se pertinente encontrar estratégias de ensino/aprendizagem inovadoras que facilitem a construção de significados, e, conseqüentemente, atitudes e comportamentos ambientalmente responsáveis. Neste enquadramento, o trabalho que apresentamos refere-se ao desenvolvimento de um projeto de EA envolvendo 95 alunos de 4 turmas de 10º Ano, numa escola do ensino secundário em Jaguaribe (Ceará-Brasil). Com este estudo pretendeu-se sensibilizar os alunos para questões ambientais através da utilização de jogos didáticos em suporte digital. Numa primeira fase foi aplicado um questionário aos alunos para conhecer as suas concepções sobre as práticas ambientais. Posteriormente, a partir dos dados recolhidos, os docentes e discentes que integravam o projeto desenvolveram jogos em suporte digital com o objetivo de alertar para algumas das principais ameaças ambientais. As respostas dos alunos foram registradas pelos docentes, aquando da aplicação dos jogos na sala de aula. Os dados recolhidos permitiram dinamizar palestras e dinâmicas de grupo, no sentido de orientar os alunos para a apresentação de propostas alternativas para reconstruir o seu pensamento sobre a preservação do meio ambiente. Por último, foi aplicado outro questionário para que os alunos fizessem a avaliação do projeto. Com base nos dados recolhidos verifica-se que a maioria dos alunos (87 %) considera importante a abordagem da EA na escola, embora 35 % assumam que não se preocupam com questões ambientais. Após a aplicação do projeto, 96% dos alunos referem que a metodologia baseada nos jogos didáticos foi adequada e que constituiu uma mais-valia para alertar sobre as questões ambientais. Concluímos que metodologias inovadoras, como os jogos didáticos, podem constituir um contributo para o sucesso de projetos no âmbito da EA.

Palavras-chave: Educação, Meio Ambiente, Jogos, Computação.

1. INTRODUÇÃO

Estratégias didáticas, em uma perspectiva lúdica e criativa, como parte integrante do processo formativo docente, caracteriza-se como algo de fundamental importân-

cia. A prática lúdica se relaciona com o processo de ensino-aprendizagem, contribuindo assim com a valorização do conhecimento em geral. [1] Segundo Pedroso (2009) as atividades lúdicas, tais como, jogos, brinquedos e brincadeiras são reconhecidas pela sociedade como um meio de trazer ao indivíduo um ambiente motivador, prazeroso, planejado e enriquecido, que possibilita a aprendizagem de várias habilidades.

[2] Para Campos (2002) a utilização dos jogos didáticos como estratégia de auxiliar o ensino, tem sido uma alternativa interessante e viável, para preencher as lacunas deixadas no processo de transmissão – recepção dos conteúdos. Essas lacunas encontradas podem ser complementadas através de um ensino motivador, dinâmico e interacionista, que proporcione a sensação de prazer pelo aprendizado. Portanto, buscar novas práticas pedagógicas é o desafio que deve impulsionar os professores em cotidiano escolar. Muitas dificuldades e limitações são encontradas pelos docentes em trabalhos onde estão envolvidos a ludicidade nas suas práticas didáticas pedagógicas.

Nesse sentido, torna-se fundamental investir na formação dos professores para que sejam capazes de compreender a necessidade de mudança, de criação, inovação e utilização de metodologias diferenciadas de ensino em sua prática pedagógica, que propiciem a mobilização dos conhecimentos, valores e atitudes, de forma integrada, diante das necessidades impostas pelo meio.

[3] Segundo Flemming (2004) os jogos auxiliam o desenvolvimento das operações cognitivas necessárias ao aluno, facilitando seu processo de construção da aprendizagem e não propriamente permite a aprendizagem direta, cabendo ao professor o intermédio deste processo. [4] Paranhos et al. (2007) afirma que no processo de ensino-aprendizagem o professor deve ser um agente mediador, ou seja, estar entre o aluno e o conhecimento, agindo de forma contextualizada, formando assim um cidadão capaz de fazer uso dos conhecimentos adquiridos no seu dia-a-dia. Desse modo o professor no contexto educacional é o mediador, que busca a construção do conhecimento pelos seus alunos através de suas metodologias. O docente precisa aplicar e adquirir métodos, técnicas e práticas que facilitem o entendimento dos conteúdos pelos estudantes. Cabe, assim, ao professor, identificar as reais dificuldades e procurar soluções que sancionem um método, que aproximem os discentes dos objetivos pretendidos.

O ensino de Biologia representa um grande desafio aos professores, pois a maioria dos conteúdos associados a essa disciplina requer conhecimentos abstratos e microscópicos que vão desde o ensino da genética até os conhecimentos sobre ecologia e meio ambiente.

[5] O ensino de Biologia ainda hoje se organiza de modo a privilegiar o estudo de conceitos, de métodos científicos e

de hipóteses. Essa prática é comumente considerada descontextualizada e desmotivadora pelo aluno, gerando a necessidade de novos encaminhamentos metodológicos pelo professor (Zuanon et. al, 2010, p. 50).

Em relação especificamente ao meio ambiente, um dos campo de estudo das Ciências Biológicas [6] para Jacobi (2003), a reflexão sobre as práticas sociais, em um contexto marcado pela degradação permanente do meio ambiente e do seu ecossistema, envolve uma necessária articulação com a produção de sentidos sobre a educação ambiental.

Dentro desta temática ambiental a escola pode despertar nos alunos a importância do meio ambiente; o impacto que o mesmo tem sofrido pela ação do homem; como impedir tanta degradação através de ações sustentáveis. Dessa forma, é crucial o papel da escola no processo de educar os discentes para que estes tenham a consciência de que o uso sustentável dos recursos naturais é a única maneira possível de progresso.

[7] Sorrentino (2005) afirmam que a educação ambiental visa urgentemente a transformação social através da superação das injustiças ambientais e sociais causadas pela apropriação capitalista e funcionalismo da natureza e da própria sociedade.

Para o combate das injustiças causadas à natureza, e a garantia de um mundo ecologicamente e economicamente equilibrado, é necessário pensarmos de maneira sustentável.

[8] Hammarström (2012) afirma que o desenvolvimento sustentável pressupõe a evolução, o crescimento em todas as esferas, de forma a suprir as necessidades dos homens sem com isso afetar os recursos ambientais. Por isso, esta pesquisa teve como objetivo principal sensibilizar os alunos para questões ambientais através da utilização de jogos didáticos em suporte digital.

Os objetivos específicos dessa pesquisa foram: a elaboração e construção de jogos didáticos eletrônicos pelos alunos; aplicação dos jogos didáticos para os alunos do 10º ano; elaboração de seminários sobre meio ambiente; elaboração de atividades de Educação Ambiental e Sustentabilidade; Identificação da aceitação dos jogos didáticos pelos estudantes; Identificar o conhecimento dos alunos e a opinião dos mesmos sobre o tema Educação Ambiental e suas variáveis.

Para a realização desse trabalho, foram desenvolvidos jogos didáticos eletrônicos pelos próprios estudantes utilizando - se para isso o programa Microsoft PowerPoint, que é utilizado na criação/edição e exibição de apresentações gráficas.

[9] Segundo Lopes (2001), aprender por meio de jogos é muito mais eficiente. O envolvimento com o jogo aumenta o interesse do aluno, que, por sua vez, se torna sujeito ativo do processo. Os jogos didáticos eletrônicos são fermentas importante

na fortificação do lúdico nos alunos. Em perspectiva do sentido lúdico, [10] Luckesi (2005) fala que “o ato lúdico propicia uma experiência plena para o sujeito”.

A elaboração de um jogo eletrônico didático constitui-se atrativo por sua praticidade e aplicação no setor educativo, podendo o mesmo ser colocado a disposição nas salas de informática e gravados em CDs distribuídos aos alunos. O jogo eletrônico foi elaborado sobre o conteúdo de meio ambiente, com ênfase a sustentabilidade e aplicado nas salas de aulas em uma escola pública de ensino secundário na cidade de Jaguaribe – Ceará. O tema foi trabalhado com 4 turmas de 10º ano durante um período de 2 meses.

Nessa perspectiva a proposta do jogo didático eletrônico caracteriza-se como uma importante e viável alternativa na construção do saber. [11] Segundo Moratori (2003), os jogos educativos computadorizados são atividades inovadoras onde as características do processo de ensino-aprendizagem apoiado no computador e as estratégias de jogo são integradas a fim de alcançar um objetivo educacional determinado.

[12] Para Teixeira, Rocha e Silva (2005), “os alunos envolvidos por uma atividade lúdica sentem-se mais livres para criticar e argumentar, enquanto que, quando estão expostos somente aos métodos tradicionais de educação, nada mais são do que consumidores de informações prontas.” Desta forma, é importante que a escola trabalhe o conteúdo ambiental com seus alunos de maneira que as aulas fiquem mais instigantes e interessantes. Assim, a aplicação de jogos didáticos eletrônicos tanto trabalha a participação e aprendizagem dos alunos sobre o tema Educação Ambiental quanto estimula a prática ativa desta Educação Ambiental na escola.

2. METODOLOGIA

Inicialmente foi aplicado um questionário aos alunos para conhecer as suas concepções sobre as práticas ambientais. A partir da análise dos dados obtidos foram desenvolvidos jogos em suporte digital. Esses jogos didáticos eletrônicos tiveram a finalidade de alertar os estudantes de uma escola do ensino secundário da cidade de Jaguaribe, Ceará, Brasil, para algumas das principais ameaças ambientais. Os jogos foram desenvolvidos por estudantes do décimo ano do ensino secundário da própria escola.

Após a elaboração dos jogos, os alunos também ministraram palestras sobre o tema Educação Ambiental e aplicaram os jogos para dinamizar a temática com os outros discentes da escola e ao mesmo tempo possibilitar a compreensão do problema abordado de uma maneira objetiva, mas lúdica, e consequentemente interferir na escola de forma positiva.

Possibilitar um ensino agradável sobre educação ambiental através do uso de novas tecnologias didáticas como jogos didáticos eletrônicos pode ser uma ferramenta

importante para a escola. Esta metodologia foi aplicada nas aulas de Formação Cidadã, com o tema: Educação Ambiental e seus múltiplos fatores. Enfocou-se a Sustentabilidade e o Meio Ambiente Escolar. Após isso, outras atividades visando à preservação do meio ambiente foram desenvolvidas na escola. Houve brincadeiras para estimular a conservação do meio ambiente escolar organizado, com sustentabilidade, através de atitudes como poupar energia e água, poupar papel dentre outras.

Assim, a pesquisa, caracteriza-se como pesquisa-ação, pois interferiu-se de maneira positiva na escola.

[13] A pesquisa-ação surgiu da necessidade de superar a lacuna entre teoria e prática. Uma das características deste tipo de pesquisa é que através dela se procura intervir na prática de modo inovador já no decorrer do próprio processo de pesquisa e não apenas como possível consequência de uma recomendação na etapa final do projeto (Engel, 2000, p. 182).

Em um segundo momento houve nova aplicação de questionários fechados sobre a opinião dos estudantes em relação à importância desta metodologia para o ensino da Educação Ambiental e à eficiência da mesma em relação à aprendizagem. Nesse questionário coletou-se também informações sobre o conhecimento dos alunos e a opinião dos mesmos sobre o tema Educação Ambiental e suas variáveis.

O ciclo de palestras e a aplicação dos jogos ocorreram com alunos do 10º ano do ensino secundário, pertencentes a 4 turmas com cerca de 120 alunos matriculados. Porém, nos dias das aulas em que os questionários foram aplicados, apenas 95 alunos estiveram presentes e todos esses participaram da entrevista. As atividades realizadas na escola duraram 2 meses.

Escolheu-se trabalhar o tema Meio Ambiente através de jogos no computador, pois o mundo virtual é uma tendência que deve estar presente na civilização humana nas próximas décadas e as TICs (Tecnologia de Informação e Comunicação) devem ser usadas em prol da escola e sua formação técnica-científica e cidadã.

3. RESULTADOS

1ª. Etapa: Aplicação de questionários aos estudantes para conhecer as suas concepções prévias sobre as práticas ambientais.

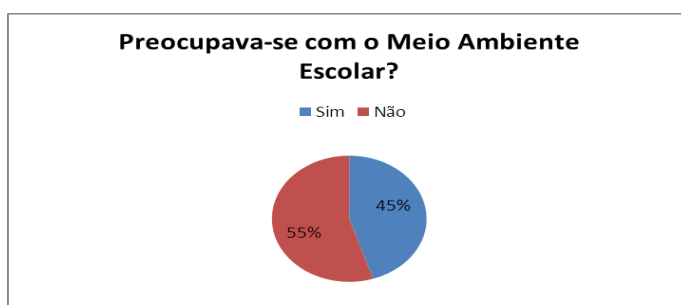
O primeiro questionamento realizado aos estudantes direcionou - se a identificar o conhecimento prévio dos alunos sobre a temática Educação Ambiental, onde 66% dos entrevistados afirmaram conhecer efetivamente o que era Educação Ambiental, enquanto 34% dos entrevistados reconheceram não ter consciência do que signifi-

cava esse termo. Essa informação é importante, pois demonstra que um grande número de estudantes ainda é desconhecedor dessa temática estando alheios aos graves problemas ecológicos e ambientais que o planeta Terra vem sofrendo devido a ação humana.

O segundo questionamento realizado determinou - se a investigar o nível de compreensão dos alunos em relação ao termo Sustentabilidade, conceito importante para o desenvolvimento da Educação Ambiental. A grande maioria dos entrevistados (65%) afirmaram não conhecerem esse termo enquanto a minoria (35%) dos entrevistados afirmaram terem conhecimento sobre esse termo. O terceiro questionamento realizado verificou se os estudantes se preocupavam com o meio ambiente. A maioria dos entrevistados (62%) disseram que sim, enquanto a minoria (38%) afirmaram que não. Esse dado é preocupante, pois a manutenção da vida no planeta depende de como deixaremos o ambiente para as gerações futuras, assim, a manutenção da nossa espécie depende da preocupação que precisamos ter hoje com o meio ambiente.

2ª. Etapa: Coleta das respostas dos alunos pelos docentes depois da aplicação dos jogos na sala de aula.

Durante as palestras, um aspecto foi muito enfatizado, a questão de que o meio ambiente não é só as florestas, bosques, matas. Ambientes que sofreram intervenção dos homens também são meios ambientes, tais como prédios, ruas e as escolas. Dessa forma, deve existir grande cuidado com o meio ambiente escolar e com especial atenção para com as salas de aulas, que são um dos ambientes que os alunos mais passam tempo. 55% dos alunos revelaram que antes das atividades, não se preocupavam com o meio ambiente escolar. Enquanto 45% disseram que se preocupavam.

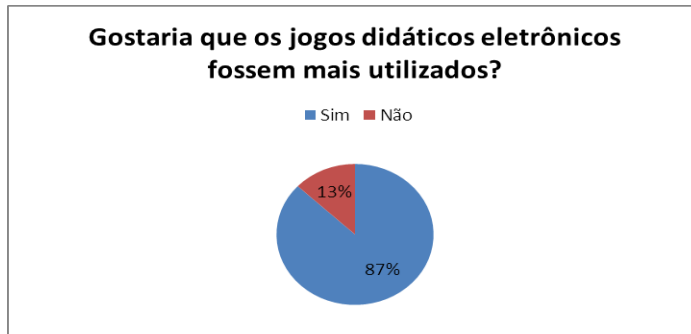


Gra. 1: Você preocupava-se com o Meio Ambiente escolar antes desta palestra?

Fonte: Própria

A maioria dos entrevistados (87%) afirmaram que gostariam que a metodologia dos jogos didáticos eletrônicos fosse mais utilizada na escola. Dessa forma, os jogos didáticos, seja os eletrônicos ou não, são boas ferramentas para melhorar as práticas

pedagógicas contribuindo para a diversificação das atividades de ensino e aprendizado dentro de sala de aula ou fora dela. Esse recurso funcionou para o ensino de Educação Ambiental e eventualmente pode ser aplicada em outras áreas de ensino.



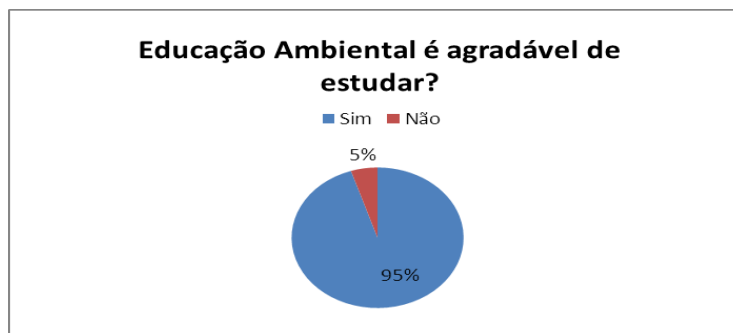
Gra. 2: Você gostaria que esta metodologia de utilização de jogos didáticos fosse mais presente na sua escola?

Fonte: Própria

A grande maioria dos entrevistados (96%) gostaram da metodologia dos jogos didáticos eletrônicos para o ensino da Educação Ambiental. Ademais, 93% afirmaram que essa metodologia contribuiu para a sua formação, alertando-os sobre as questões ambientais. Esses dados são importantes, pois demonstram que os jogos didáticos eletrônicos podem ser um forte aliado no ensino de Educação Ambiental.

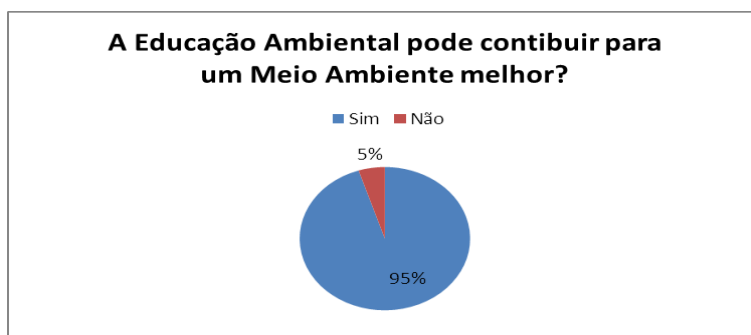
3ª. Etapa: Aplicação de questionário para a avaliação do projeto

Na terceira etapa, foi analisado se os alunos consideravam o tema Educação Ambiental agradável de estudar depois da proposta colocada diante os discentes, a de se trabalhar Educação Ambiental através dos jogos. A maioria (95%) dos alunos afirmaram que sim. Mediante tal resposta, inferimos que os alunos gostaram da metodologia para se trabalhar a Educação Ambiental e que esta estratégia pode deixar o tema mais motivador e incentivar atitudes cuidadosas em relação ao Meio Ambiente por parte dos alunos.



Gra. 3: Você acha o tema Educação Ambiental agradável de estudar?
Fonte: Própria

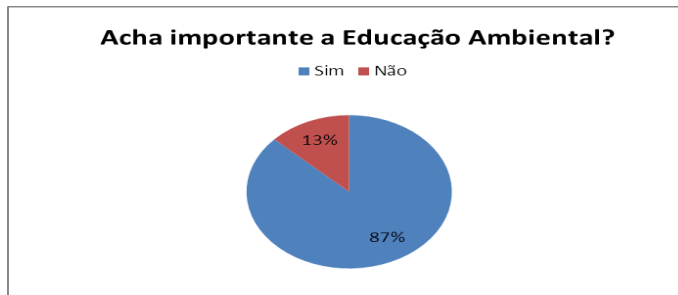
Quando os alunos foram questionados, se na visão deles a Educação Ambiental realmente pode contribuir de alguma forma para cuidarmos melhor do meio ambiente, 95% disseram que sim, que acreditam que a Educação Ambiental realmente pode servir para a melhor preservação do nosso meio ambiente, do qual necessitamos para vivermos.



Gra. 4: Você acha que o trabalho com os alunos sobre Educação ambiental pode contribuir de alguma forma para cuidarmos melhor do Meio Ambiente?
Fonte: Própria

No final, apesar de muitos alunos revelarem não saber anteriormente o que era Educação Ambiental, Sustentabilidade, não se preocuparem com o meio ambiente em geral e com o meio ambiente escolar, depois da aplicação da metodologia dos jogos e palestras, 87% dos entrevistados considerou o tema Educação Ambiental importante de ser trabalhado com os alunos pela escola, enquanto apenas 13% não consideraram importante. O compromisso da escola para com os alunos e a sociedade vai além do repasse de conteúdos técnicos, a escola deve contribuir para formar cidadãos conscientes e que possam

cuidar de nosso planeta, inclusive das várias questões ecológicas e ambientais que estão diretamente envolvidos com a vida na terra.



Gra. 5: Você acha importante a escola trabalhar com os alunos o tema Educação Ambiental?
Fonte: Própria

4. CONCLUSÃO

Conclui-se que antes das atividades desenvolvidas na escola e a utilização dos jogos didáticos eletrônicos, 34% dos alunos não sabiam o que era efetivamente Educação Ambiental; 65% não sabiam anteriormente o significado do termo Sustentabilidade; 38% dos alunos admitiram não se preocuparem com o Meio Ambiente e da mesma forma, 55% também não se preocupavam com o meio Ambiente Escolar. Porém, depois das ações desempenhadas nesta pesquisa, 87% dos alunos afirmaram considerarem importante a Educação Ambiental ser trabalhada na escola. Na perspectiva de conhecer o grau de satisfação dos alunos, quantificamos que 96% gostaram da metodologia dos jogos didáticos eletrônicos e 87% justificaram que esta metodologia poderia ser mais utilizada na escola. Além do mais, os alunos acham em sua maioria, 95%, que o incentivo através da Educação Ambiental com a utilização dos jogos, pode ajudar os alunos a cuidarem e preservarem melhor a Natureza para termos um Meio Ambiente mais saudável.

Sendo assim, os jogos didáticos eletrônicos caracterizam-se por proporcionarem a possibilidade de aluno e professor juntos construírem um processo de ensino e aprendizagem dinâmico e prazeroso para ambos. Dessa forma, a Educação Ambiental pode ser desenvolvida na escola com sucesso, confirmando a possibilidade do uso da metodologia como prática de sala de aula. Portanto, os jogos didáticos eletrônicos caracterizam - se por serem eficientes meios didáticos.

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AS PLATAFORMAS COLABORATIVAS E DE APRENDIZAGEM E AS FERRAMENTAS DE AUTORIA DE CONTEÚDOS EDUCATIVOS – ESTUDO DE CASO NUM CURSO DE FORMAÇÃO PEDAGÓGICA INICIAL DE FORMADORES

V. GONÇALVES

RESUMO

Muitos investigadores de Tecnologia Educativa defendem que o futuro da aprendizagem passa pelos conteúdos ou objetos de aprendizagem. Paralelamente, outros defendem que os contextos não podem ser menosprezados, pois os conteúdos só têm valor se usados em contextos de aprendizagem. A criação de objetos de aprendizagem pode ser concretizada em ferramentas de autoria genéricas para conceção de aplicações multimédia ou em ferramentas de autoria específicas para a criação de objetos de aprendizagem. O facto de algumas destas ferramentas terem uma curva de aprendizagem demasiado longa e de os custos inerentes a equipas multidisciplinares serem elevados limitaram o desenvolvimento de conteúdos e materiais didáticos durante muito tempo. Atualmente, temos ao nosso dispor uma panóplia de soluções gratuitas ou de código aberto, compatíveis com a norma SCORM (*Sharable Content Object Reference Model*), para o design ou projeto de cenários de aprendizagem, para a criação de conteúdos de aprendizagem e para a sua distribuição através ambientes virtuais de aprendizagem, muitas delas amigáveis e intuitivas para indivíduos com competências básicas em TIC. Em primeira instância, o objetivo deste artigo é esclarecer os conceitos de objeto de aprendizagem e de contexto de aprendizagem, bem como apresentar as plataformas colaborativas e de aprendizagem, não esquecendo as novas formas virtuais de aprendizagem, tais como os *Personal Learning Environments*, os *Personal Learning Networks*, os *Massive Open Online Courses*, os espaços de aprendizagem nas redes sociais, entre outros ambientes que sugerem a transição dos ambientes virtuais de aprendizagem institucionais, normalmente formais e fechados, para ambientes mais informais, abertos e personalizados. Em última instância, pretende-se apresentar, classificar e analisar um conjunto de soluções informáticas gratuitas ou livres para a criação de objetos de aprendizagem compatíveis com a norma SCORM,

sugerindo-as em diversos cenários de aprendizagem, de acordo com a observação resultante num Curso de Formação Pedagógica Inicial de Formadores.

1. INTRODUÇÃO

Nas últimas décadas tem-se falado, investigado e escrito bastante sobre os conteúdos de aprendizagem para ambientes virtuais de aprendizagem. Paralelamente, alguns dos obstáculos ao seu desenvolvimento e utilização no contexto educativo foram sendo anulados ou pelo menos minimizados: as escolas foram equipadas com tecnologias, os preços das tecnologias de informação e comunicação (TIC) passaram a ser acessíveis, as formações para aquisição de competências em TIC foram sendo disponibilizadas aos professores, a resistência à mudança das práticas educativas e a longa curva de aprendizagem das ferramentas de criação de conteúdos foram diminuindo e, conseqüentemente, os conteúdos educativos foram aparecendo gradualmente, quer desenvolvidos pelos próprios professores, quer por equipas interdisciplinares compostas por especialistas da área científica, designers instrucionais, designers gráficos e programadores.

Tecnologias, Plataformas, Ferramentas, serviços e aplicações, entre outros termos no contexto do desenvolvimento, distribuição e utilização de objetos de aprendizagem digitais são conceitos cada vez mais usados e que convém esclarecer desde já. No contexto deste artigo as ferramentas multimédia, incluindo as ferramentas de autoria, correspondem a programas ou pacotes de software aplicativo que permitem o desenvolvimento de aplicações multimédia (objetos de aprendizagem, conteúdos educativos, recursos didáticos ou atividades educativas em formato digital). Uma aplicação multimédia é um programa que controla a apresentação ao utilizador de informação de vários media, recorrendo a serviços multimédia (por exemplo, um jogo multimédia é uma aplicação interativa que controla a interação do utilizador com medias como cenários gráficos, imagens, animações e sons). Um serviço multimédia é a função responsável pelo fornecimento dos meios (tecnologias) para que a aplicação multimédia disponibilize a informação ao utilizador (por exemplo, visualização de um vídeo na web). As tecnologias multimédia correspondem ao conjunto de áreas tecnológicas que suportam o desenvolvimento de serviços multimédia (por exemplo, técnicas de compressão de áudio, imagem e vídeo), embora o termo possa ser usado genericamente para se referir ao ambiente que harmoniza hardware e software. As tecnologias de hardware e de software integradas no sentido da constituição de um ambiente específico para suportar aplicações multimédia formam uma plataforma multimédia.

Um dos objetivos principais deste artigo é repensar a integração curricular das TIC, refletindo sobre os conceitos de objeto de aprendizagem e de contexto de

aprendizagem. O outro objetivo incide na apresentação, classificação e análise de um conjunto de soluções informáticas gratuitas ou livres para a criação de objetos de aprendizagem compatíveis com a norma SCORM, sugerindo-as em diversos cenários de aprendizagem de acordo com o estudo de caso realizado num Curso de Formação Pedagógica Inicial de Formadores.

2. DOS OBJETOS DE APRENDIZAGEM AOS CONTEXTOS DE APRENDIZAGEM

De acordo com Wiley [1], um objeto de aprendizagem é um recurso digital (texto, imagem, som, vídeo, applet Java, filme flash, programa de simulação, entre outros componentes distribuídos por intermédio de plug-ins apropriados) que pode ser reutilizado para apoiar a aprendizagem.

Com vista a clarificar o conceito de objetos de aprendizagem, a comunidade científica usou metáforas, das quais se destacam a metáfora das peças LEGO® ou dos Lincoln Logs (pequenos blocos de madeira usados na construção de edifícios e castelos em miniatura) e a metáfora do átomo.

A primeira metáfora evidencia que os objetos de aprendizagem são como peças LEGO e permitem construir pequenas peças de instrução para serem (re)utilizadas em diferentes contextos de aprendizagem. Para introduzir a filosofia dos objetos de aprendizagem (objetos de aprendizagem são como peças de LEGO que têm em comum o mesmo modelo e que podem ser encaixadas e reutilizadas) é suficiente. Mas, convém esclarecer que nem todas as propriedades são comuns, já que qualquer peça é combinável com qualquer outra, pode ser combinada da forma que entendermos e por qualquer pessoa, o que nem sempre ocorre com os objetos de aprendizagem, tal como argumenta Wiley [2], sugerindo em alternativa a metáfora do átomo.

A metáfora do átomo afasta-se da metáfora das peças de LEGO, já que nem todos os átomos são combináveis com qualquer outro átomo, só podem ser combinados de determinados modos prescritos pela sua estrutura e são necessárias algumas competências para compreender como combinar átomos [3]. Por conseguinte, é desejável que o professor, ao (re)combinar objetos de aprendizagem com vista a produzir cursos ou unidades de aprendizagem para contextos diversos, possua conhecimentos sobre os diferentes contextos e modelos pedagógicos, para além de competências básicas em TIC de modo a reutilizar os objetos de aprendizagem.

Tal como constata Polsani [4], este facto conduz a uma antítese: se, por um lado, a abstração contextual deve orientar a construção dos objetos de aprendizagem de modo a garantir a sua integração em diferentes contextos de aprendizagem, pelo outro, os objetos de aprendizagem só terão valor quando forem integrados num determinado contexto de aprendizagem.

Embora o termo objetos de aprendizagem possa não reunir consenso, todos estão de acordo quanto às suas características: reutilização, interoperabilidade, durabilidade e acessibilidade.

A reutilização (facilidade de usar e de modificar um objeto de aprendizagem) corresponde à capacidade integrar um objeto de aprendizagem em diversos contextos. A interoperabilidade refere-se à capacidade de intercâmbio de conteúdos entre diferentes plataformas (objeto de aprendizagem adapta-se facilmente a diferentes hardwares, softwares ou browsers). A durabilidade é a capacidade de garantir a funcionalidade dos objetos de aprendizagem com a mudança da tecnologia (objeto de aprendizagem não necessita de alterações significativas face a novas versões da plataforma que o aloja). E a acessibilidade é a capacidade de aceder remotamente a objetos de aprendizagem e de os distribuir por diferentes localizações na web (objeto de aprendizagem pesquisável e disponível para quem dele necessita, incluindo públicos-alvo especiais). Um objeto de aprendizagem é normalmente composto por diversos elementos de media (os grãos do objeto de aprendizagem). A granularidade de um objeto de aprendizagem pode variar da simples imagem até ao currículo completo de uma lição ou mesmo de uma unidade de aprendizagem ou curso [5]. Não obstante, quanto maior for a dimensão do objeto, menor será a sua possibilidade de reutilização. Logo, quanto maior for a granularidade de um curso de formação, maior é a sua flexibilidade e, conseqüentemente, da plataforma que os distribui.

Com vista a garantir a reutilização, interoperabilidade, durabilidade e acessibilidade, surgiu o modelo SCORM, que mais não é do que um conjunto de normas, especificações e orientações técnicas para o desenvolvimento de conteúdos de aprendizagem e sua distribuição.

O modelo SCORM é composto por 4 manuais técnicos [6]:

- a) SCORM Overview Book: representa a introdução aos conceitos chave do SCORM, entre outras informações conceptuais;
- b) SCORM Content Aggregation Model (CAM): modelo de agregação de conteúdos que especifica como encontrar, combinar, agregar, descrever, sequenciar e mover recursos de aprendizagem, usando metadados na importação ou exportação entre sistemas;
- c) SCORM Run-Time Environment (RTE): ambiente de execução que especifica como executar os conteúdos e como registar o percurso do aluno, tendo como objetivo a interoperabilidade entre os recursos de aprendizagem e os sistemas de e-learning;
- d) SCORM Sequencing and Navigation (SN): modelo de sequenciação e navegação que descreve como os conteúdos podem ser ordenados para o aluno.

O desenvolvimento, o intercâmbio e a reutilização de objetos de aprendizagem facilita a criação novos e-cursos e a troca de objetos de aprendizagem entre e-cursos ou mesmo entre sistemas de e-learning. Nesta perspetiva, o recurso a metadados e ao IMS-CP (IMS Content Packaging) é crucial. IMS-CP não é mais do que uma especificação que permite gerar um pacote em formato zip (formato de compressão), contendo todos os conteúdos e um ficheiro XML (imsmanifest.xml) que inclui os metadados, a sequência de navegação e todos os recursos associados.

O desenvolvimento de objetos de aprendizagem digitais e respetivas ferramentas de autoria e plataformas que os disponibilizam, só por si, não serão suficientes para garantir o sucesso e a inovação no processo de ensino e aprendizagem.

Figueiredo (2012) refere que ensinar é criar contextos onde se possa aprender e aprender é explorar contextos onde se possam construir saberes, práticas, culturas e relacionamentos. Portanto, não podemos falar sobre conteúdos de aprendizagem sem incluir os contextos de aprendizagem e vice-versa, ainda mais face à crescente utilização de novas formas virtuais de aprendizagem, tais como os *Personal Learning Environments* (PLE), os *Personal Learning Networks* (PLN), os *Massive Open Online Courses* (MOOC), os espaços de aprendizagem nas redes sociais, entre outros ambientes que sugerem a transição dos ambientes virtuais de aprendizagem institucionais (*Learning Management Systems* (LMS) e *Learning Content Management Systems* (LCMS)), normalmente formais e fechados, para ambientes mais informais, abertos e personalizados. Nesta perspetiva, o mesmo autor parece defender o design de contextos de aprendizagem enquanto abordagem unificadora de conteúdos e contextos.

Ou seja, o professor fornece os conteúdos e os contextos, as TIC fornecem os contextos e possibilitam a interação com as atividades (que envolvem o conteúdo e o contexto) e com os parceiros de aprendizagem [7].

Reconhecendo que o construtivismo é uma corrente psicológica em que a aprendizagem é vista como um processo ativo, no qual o indivíduo, usando conhecimentos prévios, constrói o seu conhecimento em interação com o meio, cabe ao aluno o processo de (re)construir o conhecimento e ao professor o papel de promover ações facilitadoras desse processo, recorrendo às TIC, direta ou indiretamente, sempre que as considere adequadas.

Nesta perspetiva, os PLE, PLN e MOOC assumem-se atualmente como ambientes que contribuem para a implementação de contextos de aprendizagem. Um PLE é um ambiente pessoal de aprendizagem e corresponde ao conjunto de ferramentas ou plataformas da Web 2.0 reunidas pelo aprendente tendo por base palavras-chave como software aberto, interoperabilidade e aprendizagem controlada pelo utilizador [8][9]. Quando a partir do seu próprio PLE uma pessoa decide seguir ou ligar-se a outra pessoa numa rede social com a intenção específica de que algum tipo de

aprendizagem ocorra fruto dessa ligação, então estamos perante uma rede de aprendizagem pessoal. PLN concretiza a ideia de que cada um de nós é um nó na rede que consome e partilha conteúdos e experiências, aprende e ensina. Os MOOC, independentemente de serem cMOOC (aprendizagem centrada no contexto) ou xMOOC (aprendizagem centrada no conteúdo), correspondem a cursos online de acesso aberto. Estes ambientes baseiam-se em vários princípios inerentes à pedagogia conectivista [10].

Esta mudança de paradigma de aprendizagem permite ao aluno definir as suas próprias metas de aprendizagem, gerir a sua aprendizagem, envolver-se nos contextos e aceder aos respetivos conteúdos que bem entender, refletir e registar as suas reflexões intrapessoais ou interagir com os outros no processo de aprendizagem.

3. OBJETOS DE APRENDIZAGEM E FERRAMENTAS DE AUTORIA

Um ambiente virtual de aprendizagem ou um sistema de e-Learning deve integrar numa plataforma a interação interpessoal (interação professor/aluno(s) e aluno/aluno(s) através de tecnologias e serviços de comunicação assíncronas e síncronas), a interação intrapessoal (reflexão sobre a aprendizagem e registo do percurso e competências através de blogs, wikis, portfólios e outras tecnologias web 2.0) e a interação com os conteúdos (apresentação e interação de objetos de aprendizagem tais como lições, recursos, artigos, atividades, jogos, simulações, testes de avaliação e outros materiais didáticos).

Wiley apresentou uma das primeiras taxonomias para classificar objetos de aprendizagem digitais:

- Fundamental (ou seja, um vídeo sem som sobre um conceito específico);
- Combinado fechado (ou seja, um vídeo com som sobre um conceito específico);
- Combinado aberto (ou seja, uma página da web que contém uma imagem e uma animação com um texto interativo);
- Gerador de apresentação (ou seja, um applet java capaz de gerar um layout de uma página html ou um editor com o código correspondente ou um bloco de perguntas para o aluno);
- Gerador de instrução (ou seja, uma interface que ensina como tocar um instrumento).

Desde então têm vindo a ser sugeridas várias classificações no âmbito dos esquemas de metadados que descrevem os objetos de aprendizagem, entre outras classificações tais como as de González e de Churchill [11]. González classificou os objetos de aprendizagem para uso pedagógico em objetos de instrução, de

colaboração, de prática e de avaliação. Churchill classificou um objeto de aprendizagem em seis diferentes tipos: de apresentação, de informação, de prática, de simulação, modelos conceituais e representação contextual.

Atualmente, temos ao nosso dispor uma panóplia de ferramentas de autoria comerciais, gratuitas e livres para a criação de objetos de aprendizagem ou para o design da aprendizagem. Por um lado, temos ferramentas de autor comerciais genéricas, tais como: Authorware, Toolbook, ReadyGo, Adobe Flash, Director ou similares, Adobe Dreamweaver ou similares, applets JAVA, Quick Time Virtual Reality ou similar; ou ferramentas gratuitas ou livres genéricas, tais como: NVU, Mozilla-Composer ou o seu predecessor SeaMonkey, PageBreeze, Trellian WebPage, etc. Acresce que, atualmente, produzir conteúdo em páginas Web é cada vez mais fácil e intuitivo através de plataformas online de criação de sites Web, tais como: wix.com, webnode.com, weebly.com, zoho.com/sites/, sites.google.com, yola.com, jimdo.com, eznow.com, edicy.com, wikispaces.com entre muitas outras plataformas similares. Por outro lado, temos ferramentas de autoria específicas comerciais, tais como: Compositica, CourseBuilder (extensão do Dreamweaver para elearning), KnowledgePresenter X, easyGenerator, Rapid Intake eLearning Studio, Learning Tools MLOAT, e-Learning Authoring Tool, etc.; ou ferramentas de autoria gratuitas ou livres para a criação de objetos de aprendizagem, tais como: Reload Editor, eXelearning, CourseLab, Microsoft LCDS, Ardora, XERTE, Jclie, Hotpotatoes, Quizfaber, MyUdutu, QuickLessons, etc.

A escolha de uma ferramenta deve ter em conta aspetos como: a complexidade, a metodologia pedagógica escolhida e o nível de criatividade [12]. A ferramenta de autoria deve oferecer um ambiente gráfico WYSIWYG (What You See Is What You Get), ou seja, deve abstrair os utilizadores das instruções de programação, mas se estes o desejarem, deve fornecer a possibilidade de permitir alterar o código em HTML, Action Script, JavaScript, Java ou outra linguagem de programação de modo a tirar proveito das potencialidades das linguagens ou simplesmente ajustar e corrigir pormenores. Referimo-nos à amigabilidade, facilidade de utilização e flexibilidade da ferramenta. Esses níveis de usabilidade, de acessibilidade e de funcionalidades inerentes à ferramenta de autoria devem refletir-se também no conteúdo que produzem. A interoperabilidade é também um requisito fundamental, pelo que a ferramenta deverá exportar conteúdo em pacotes SCORM. A curva de aprendizagem da ferramenta, a redução do tempo e do custo intrínseco ao desenvolvimento de objetos de aprendizagem são também critérios a considerar na escolha de uma ferramenta de autor.

Se a ideia é reduzir custos e prazos de produção, tornando o processo de desenvolvimento de objetos de aprendizagem sustentável e conduzido pelos próprios professores, as ferramentas gratuitas ou preferencialmente open source (de modo a permitir a sua personalização e integração com outras se necessário) podem

garantir um nível de qualidade dos recursos e atividades bastante aceitável. Porém, quanto mais fácil de aprender e de usar é a ferramenta de autoria, provavelmente menor flexibilidade, menor complexidade, menor criatividade pedagógica e, conseqüentemente, menor “qualidade” terá o nosso conteúdo. Contudo, o outro extremo muitas vezes exige conhecimentos de programação que raramente professores de áreas não tecnológicas detêm.

No âmbito da análise e avaliação de ferramentas de autoria existem diversas investigações, das quais se destacam García-Barriocanal [13], Segura et al. [14], Zapata et al. [15], Battistela e von Wangenheim [16]. Sucintamente, para avaliar as ferramentas de autoria, estes estudos usaram a avaliação heurística, utilizando as 10 heurísticas de Nielsen [17] e os critérios ergonômicos de Bastien e Scapin [18], não menosprezando os aspetos pedagógicos, os tecnológicos, a reutilização e a interoperabilidade.

4 ESTUDO DE CASO

O estudo de caso incidiu sobre um grupo de 18 formandos no âmbito do módulo de Plataformas Colaborativas e de Aprendizagem do Curso de Formação Pedagógica Inicial de Formadores, cuja finalidade é reforçar a qualidade da sua Formação Profissional, que decorreu de Novembro de 2013 a Janeiro de 2014.

Os instrumentos de recolha de dados basearam-se num questionário inicial sobre as características individuais; grelha de observação para aferir a interação com as ferramentas de autoria; questionário final de avaliação da utilização das ferramentas de autoria e grelha de avaliação dos resultados (e-cursos e pacotes SCORM).

O grupo de formandos (11 do sexo feminino e 7 do sexo masculino) é bastante heterogéneo, já que os formandos têm diferentes qualificações académicas e diferentes competências em TIC. Não obstante, nenhum deles utilizou ferramentas de autoria de objetos de aprendizagem, apenas um usou plataformas colaborativas e de aprendizagem como formador e só 50% usaram plataformas colaborativas e de aprendizagem como formandos, antes de iniciar o módulo de formação referido.

Os critérios referidos no final da secção anterior foram usados nos instrumentos de recolha de dados com vista a aferir as ferramentas gratuitas ou livres que melhor se adequariam a esse grupo de formandos (futuros formadores) nos diferentes cenários de aprendizagem previamente planificados. Genericamente, os critérios que pautaram a escolha de uma ferramenta de autoria pelos formandos foram: (i) ser gratuita ou open source; (ii) ter uma curva de aprendizagem curta; (iii) ser usável por professores de áreas não tecnológicas e pouco habituados a criar conteúdo de aprendizagem digital; (iv) possuir um grau de complexidade baixo; (v) permitir flexibilidade e criatividade; (vi) ser adequada a diferentes metodologias pedagógicas; (vii) permitir a reutilização; (viii) garantir a interoperabilidade,

integrando devidamente nas plataformas de aprendizagem; (ix) produzir objetos de aprendizagem com níveis de qualidade, de acessibilidade e de usabilidade comparáveis aos materiais e recursos produzidos nas ferramentas comerciais; (x) ser adequado ao design do contexto de aprendizagem.

A seguir apresentamos as ferramentas sugeridas para análise, comentando sucintamente os resultados decorrentes da observação da sua utilização e da exploração dos objetos de aprendizagem criados.

authorPOINT Lite (<http://www.authorgen.com/authorPoint>)

Ferramenta de criação de apresentações de conteúdo que permite criar conteúdos multimédia a partir de apresentações eletrónicas do Power Point. A criação de pacotes SCORM para partilhar em plataformas LMS só está disponível na versão comercial. Outra ferramenta similar sugerida foi a iSpring Free (<http://www.ispringsolutions.com>). Cumpre o seu principal objetivo de transformar um Power Point num recurso multimédia para e-learning, é bastante intuitiva, amigável e de fácil aprendizagem, mas limitada ao nível da criação de objetos de aprendizagem mais complexos.

Reload Editor (<http://www.reload.ac.uk/editor.html>)

O Reload Editor (*Reusable eLearning Object Authoring & Delivery*) permite criar a estrutura de um e-curso, associando a essa estrutura objetos de aprendizagem já existentes (documentos, imagens ou páginas web) e respetivos metadados. Cumpre o seu principal objetivo (empacotamento de objetos de aprendizagem em formato SCORM ou IMS), é razoavelmente intuitiva e de fácil aprendizagem. Permite pré-visualizar o e-curso antes de proceder à sua exportação em formato SCORM. A sua limitação reside no facto de não permitir criar atividades ou recursos, havendo necessidade de usar previamente outras ferramentas para produzir objetos de aprendizagem.

CourseLab (<http://www.courselab.com/>)

Tal como a ferramenta eXe, também a CourseLab teve uma grande aceitação. A sua semelhança com o Power Point foi decisivo na redução do tempo de aprendizagem. É uma ferramenta de autor compatível com SCORM que oferece um ambiente gráfico para a criação de conteúdo interativo de e-learning que pode ser publicado na Internet, em um LMS, em CD-ROMs e outros dispositivos. As funcionalidades oferecidas pelo CourseLab são bastante intuitivas, facultando ao utilizador perceber o que pode fazer sem que tenha que a fazer para perceber o resultado. Permite a programação de ações entre objetos, bastando para tal clicar com o botão direito do rato sobre o objeto e escolher Actions, o que permite estender a interatividade e a utilidade do objeto de aprendizagem. É uma ferramenta de autor eficaz, mas

também eficiente pois rapidamente se podem alterar os elementos comuns no template correspondente.

Microsoft LCDS (<http://www.microsoft.com/learning/en-us/lcds-tool.aspx>)

A ferramenta de autoria gratuita *Microsoft Learning Content Development System* disponibiliza um conjunto de recursos que combinam texto, imagem, áudio, animação e vídeo. Contrariamente às ferramentas anteriores, o template das páginas é estático, não permite alterações de formato nem edição do HTML e a perceção de como proceder à publicação do conteúdo no formato SCORM não é evidente. Alguns botões da barra de ferramentas mantêm-se sempre ativos, confundindo utilizadores menos experientes ao nem sempre dar feedback quando clicados. Acresce o facto de que ao inserir alguns elementos de media maiores que a área disponível não é fornecido nenhum feedback, nem forma de os reduzir. Pode ser eficaz na produção de conteúdos simples, mas é pouco eficiente na produção de objetos mais complexos.

eXe - elearning XHTML editor (<http://exelearning.org/wiki>)

Ferramenta open source fácil e intuitiva na geração de conteúdo para e-learning. Usa o browser ou navegador Mozilla Firefox para apresentar a interface de autoria ao utilizador. Interface bastante simples e com design próximo ao do Moodle (Battistella e von Wangenheim, 2011), o que permite diminuir a curva de aprendizagem para professores que tenham tido contacto prévio com essa plataforma de e-learning. No painel diagrama permite criar rapidamente uma estrutura de páginas web baseadas em sete modelos existentes, de modo a hierarquizar os objetos de aprendizagem que vão sendo adicionados a partir do painel de idevices: questões de escolha múltipla, questões verdadeiras e falsas, atividades de preenchimento de lacunas, espaço de reflexão, artigos wikibooks, applets Java, etc. A exportação do objeto de aprendizagem pode ser realizada em página web única, sítio web, SCORM, etc. Não requer conhecimentos em programação, todavia permite a edição do código HTML. O painel principal permite total controlo e liberdade ao utilizador, adicionando, movendo ou anulando a adição de atividades ou recursos rapidamente. Acresce o facto de permitir a criação de novos idevices. Constatou-se que é uma das ferramentas avaliadas mais flexível.

XERTE (<http://www.nottingham.ac.uk/xerte/>)

O projeto Xerte fornece um conjunto completo de ferramentas de código aberto para programadores e autores de conteúdo de e-learning que produzem materiais de aprendizagem interativa. Das ferramentas apresentadas, a Xerte exigiu um esforço maior por parte dos formandos na sua aprendizagem, já que a interface se baseia nos fundamentos da linguagem HTML para elaboração de conteúdos simples e na

linguagem ActionScript para conteúdos mais complexos. Por conseguinte, embora tenha uma curva de aprendizagem mais longo, é aquela que permite maior flexibilidade na produção de objetos de aprendizagem. De salientar que oferece um conjunto de recursos e funcionalidades muito bastante mais vasto que as restantes ferramentas.

5. CONSIDERAÇÕES FINAIS

Nos últimos anos surgiram uma panóplia de soluções comerciais, gratuitas e livres ou de código aberto (open source) para o design ou projeto de cenários de aprendizagem, para a criação de conteúdos de aprendizagem e para a sua distribuição através de plataformas compatíveis com a norma SCORM.

As ferramentas gratuitas ou livres podem garantir a produção de materiais, recursos e atividades de forma simples e intuitiva, reduzindo custos e prazos de produção inerentes a equipas de produção especializadas. Não obstante, quanto mais fácil de aprender e de usar for a ferramenta de autoria, provavelmente menor flexibilidade, menor complexidade, menor criatividade pedagógica e, conseqüentemente, menor resultado no contexto de aprendizagem terá o nosso objeto de aprendizagem. Isso parecem transparecer os dados recolhidos, apontando o XERTE para a criação de objetos de aprendizagem mais complexos e o eXe como a ferramenta escolhida para a criação da grande maioria de objetos de aprendizagem.

O conceito de cloud computing veio impulsionar o aparecimento de serviços de criação de objetos de aprendizagem na Web. O Bookbuilder para criar, guardar, editar e partilhar livros digitais ou e-books online é um exemplo disso mesmo. Mas, ferramentas de autoria online que pouco ou nada deixam a desejar às ferramentas instaladas no desktop também já estão disponíveis: MyUdutu, QuickLessons, e Connexions. Esta poderá ser uma proposta para trabalho futuro: analisar a utilização destas ferramentas de autoria online.

Não obstante, as ferramentas de autoria por si só não garantem objetos de aprendizagem adequados aos contextos de aprendizagem, cabe a cada formador saber onde, como e com que significado vai utilizar as ferramentas e os conteúdos nelas criados.

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TeObs Online Community

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Resumo

TeObs Online Community é uma comunidade on-line, moderada, para armazenamento e gestão de recursos audiovisuais resultante de procedimentos de observação de crianças em jardins de infância. Será uma rede social utilizada pelos educadores de infância como forma de apoio à gestão, reflexão e ação em torno da melhoria dos processos educativos. É um serviço baseado na web que permite aos educadores de infância criar perfis públicos ou semipúblicos dentro da comunidade de aprendizagem. A conexão entre participantes é articulada através de uma lista, tendo sempre presente o comportamento ético e segurança da informação. Dentro destas restrições, cada utilizador, pode atravessar a sua lista de conexões bem como outras criadas por outros utilizadores dentro do sistema. A cada utilizador é atribuído uma função, podendo passar por supervisor, supervisor local, observador, consoante o seu nível de experiência, ou utilizador sem intervenção num determinado grupo.

A comunidade está a ser desenvolvida recorrendo a *Java Enterprise Edition* (JavaEE), contemplando as camadas de persistência, de negócio e interação com o utilizador. A camada de persistência está a ser implementada usando Object Relational Mapping (ORM). Para a camada de negócio usam-se os *Enterprise Java Beans* (EJB) e para a interação com o utilizador, *Java Server Faces* (JSF).

Esta rede social é complementada por uma aplicação para smatphone para reunião e exportação de dados (observações de atividades e interação de crianças e adultos) para estudo pela comunidade.

Introdução

As redes sociais apresentam um número de participantes e formas de utilização que aumentam diariamente, nomeadamente para interagir com pessoas conhecidas ou para conhecer novas pessoas (Ellison et al., 2007) ou criar grupos de interesse. Os contactos sociais desenvolvidos nestas redes têm grande impacto na interação, transmissão e partilha de informação entre os membros (Mayer & Puller, 2008)

A literatura sobre o desenvolvimento profissional dos educadores mostra que comunidades de prática formam centros para o desenvolvimento profissional. (Sheridan et al., 2009; Evans et al., 2006) Neste sentido, as comunidades de prática são grupos de pesso-

as que se juntam a partir de interesses profissionais comuns e o desejo de melhorar a sua prática, partilhar o seu conhecimento, ideias e observações. (Wegner, 2010)

O projecto Effective Early Learnig (EEL)(Bertram and Pascal, 2004)conhecido em Portugal como Desenvolvendo Qualidade em Parceria (DQP)(Bertram e Pascal, 2009) propõe a criação de comunidades que desenvolvem uma ação colaborativa, focada em pressupostos de partilha e num processo sustentado de mediação por um supervisor externo.

As interações entre educadores de infância são fundamentais para providenciar um ambiente estimulante de discussão e reflexão, essenciais para garantir baixo níveis de subjetividade e para melhorar as capacidades dos observadores. O processo EEL/DQP prevê várias reuniões presenciais para discussão sobre os dados recolhidos em todos os seus passos. (Lopes e Mesquita-Pires, 2014)

As relações sociais estabelecidas entre os participantes neste processo (amizade, trabalho, troca de informação, etc) pode ser mediada através de computador pela TeObs social network. Mediação de comunicação por computador dá a possibilidade para a troca de assíncrona informação, independentemente de onde estejam os participantes. Assim, a comunidade já não é definida como um lugar físico, mas como como um conjunto de relações onde as pessoas interagem socialmente para mútuo benefício. No entanto, isto não impede as reuniões presenciais caso a comunidade assim o decida.(Lopes e Mesquita-Pires, 2014)

MySpace, Facebook ou Twitter são exemplos notáveis de redes sociais, conectando milhões de pessoas em todo o mundo.

A TeObs pretende ser uma rede social com uma audiência específica, conectando educadores de infância e providenciar um conjunto de experiências e conhecimento atualizado. Pode resultar em conexões individuais, que de outra forma não aconteceriam, e que podem ser de valor para o processo geral bem como para o treino de cada participante.(Lopes e Mesquita-Pires, 2014)

Esta comunidade, on-line e regulada, providencia um repositório central, seguro, de dados de observações, resultados e anotações, que juntamente com uma aplicação para smartphones, media a comunicação entre participantes e mantém a memória de dados observados. (Mesquita-pires e Lopes, 2014)

O procedimento EEL/DQP

O procedimento EEL/DPQ segue quatro fases. Começa com a orientação inicial do trabalho a ser feito, onde todo o processo é preparado e todos os participantes informados em detalhe. Segue-se a recolha de dados inicial, onde toda a instituição é caracterizada, incluído os espaços interiores e exteriores, a filosofia de educação, as diferentes atividades de aprendizagem e outras. O terceiro passo inclui entrevistas com o diretor, colaboradores, crianças e pais. O quarto passo requer processos de observação.

Child Tracking Observations Schedule (CTOS)

O grande objectivo do CTOS é entender as rotinas diárias da criança. Esta técnica dá informação sobre as experiências de aprendizagem, nível de escolha, envolvimento da criança, organização de grupo e interação com adultos.

Child Involvement Scale (CIS)

O CIS procura entender os resultados de aprendizagem e os processos subjacentes. Essencialmente, reúne informação sobre a participação em atividades e projetos, assim fornece os indicadores de concentração e motivação assim como de satisfação.

Adult Engagement Scale (AES)

O AES avalia a interação entre o profissional e a criança. Aponta à efetividade do processo ensino-aprendizagem através da observação da interação adulto-criança. A qualidade da intervenção do adulto é um factor crítico para a criação de conhecimento da criança.

Segurança

O comportamento ético inerente a todos os processos de observação requerem medidas de segurança rigorosas. Em particular:

- Autenticação dos utilizadores;
- Os dados têm que ser mantidos em privado;
- Os utilizadores têm que ser autorizados a efetuar uma ação.

Cada um destes pontos dependem de mecanismos específicos. A autenticação é verificada através da identificação e validação do utilizador. A privacidade é assegurada através de criptografia, tanto simétrica, para a cifra de dados, como assimétrica, para lidar com a distribuição de chaves públicas. Finalmente a autorização depende do controlo de acessos, que passa por uma lista de controlo de acessos.

Utilizadores

Na rede social TeObs o conceito de comunidade define os membros com acesso privilegiado à informação. No entanto, políticas de controlo de acessos mais seleccionadas são aplicadas. Considerando as interações sociais anteriores temos vários tipos de perfis de acesso:

N – Sem Acesso;

R – pode ler;

W – pode escrever;

R/W – Pode ler e escrever;

D – Pode delegar acessos;

As conexões entre os utilizadores é articulada através da lista de outros utilizadores, tendo sempre presente o comportamento ético e questões de segurança. Dentro destas restrições, cada utilizador pode cruzar a sua lista de conexões e as listas de outros dentro do sistema.

Os utilizadores podem estar num de dois estados:

- *Idle*: o utilizador não está de momento a participar em nenhum projeto de observação, tendo acesso a conteúdos específicos e a notas e conteúdos anteriores.

- *Ativo*: O utilizador está a participar num projeto de observação, com conexões obrigatórias com os seus pares e com o consultor externo (supervisor).

A função do utilizador está associado ao seu nível de experiência, nomeadamente:

4 – Supervisor;

3 – Supervisor Local;

2 – Experiente;

1 – Treino básico;

0 – Sem treino.

O desenvolvimento de uma ferramenta de software requer e depende de um conjunto de procedimentos de engenharia, que abrangem desde a análise ao teste e optimização da ferramenta.

Análise

A análise inicia com o levantamento e desenho dos casos de uso, que descrevem detalhadamente as funções possíveis ao nível mais elevado, o da utilização (Figura 1).

1 – O caso de uso começa quando o utilizador acede à página de boas vindas da TeObs Social Network.

2 – O utilizador valida as suas credenciais, utilizando o seu e-mail e a sua password.

3 – O utilizador entra na sua área pessoal, onde tem as diferentes opções à sua escolha, de acordo com o seu “role”.

4 – Se utilizador está no “role” Supervisor Local, Experiente ou treino básico :

4.1 - Consultar e organizar as suas observações.

4.2 – Consultar as comunidades onde está inserido.

4.3 – Criar novas observações.

4.4 – Editar as suas observações

5 – Se utilizador está no “role” supervisor, pode:

5.1 – Criar novas comunidades.

5.2 – Adicionar novos utilizadores.

5.3 – Estabelecer relações entre elementos da comunidade.

5.4 – Conceder e remover permissões de acesso aos dados das observações

5.5 – Pode convidar utilizadores com “role” sem treino para se juntar a uma comunidade.

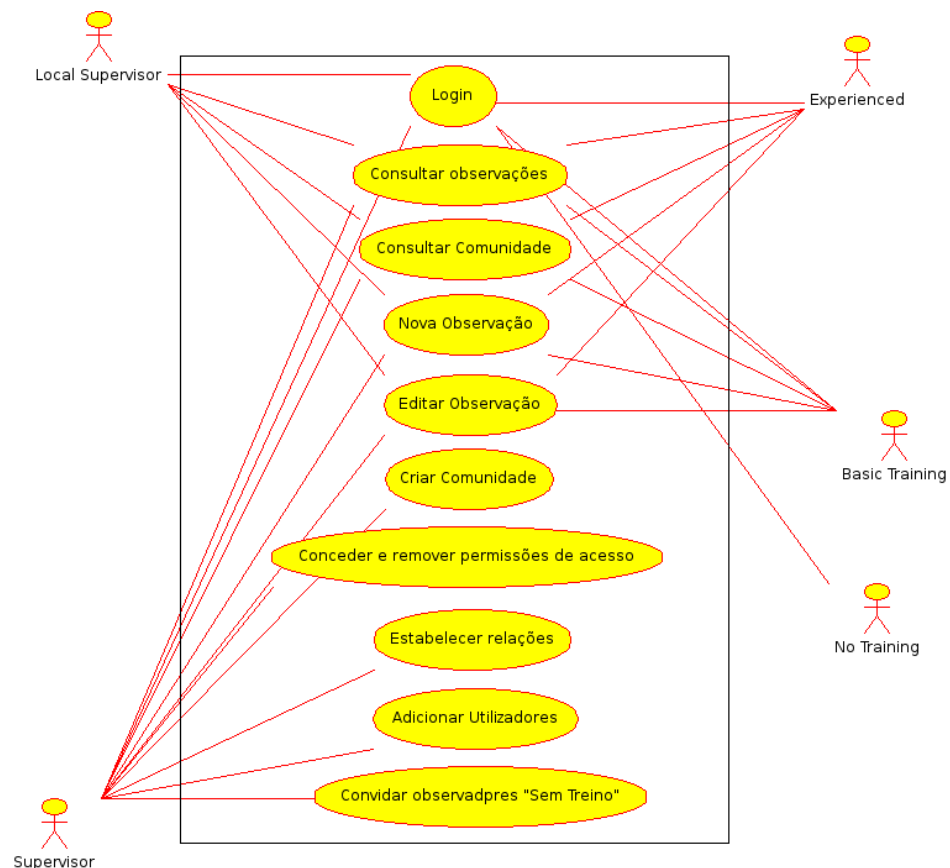


Figura 1: Diagrama de casos de uso

Fluxo alternativo: Utilizador não credenciado

- 1 – Utilizador solicita credenciais, colocando os seus dados pessoais e password.
- 2 – Utilizador verifica as suas credenciais através do link enviado para o seu e-mail pela TeObs.

Utilizador erra as credenciais

- 1 – Utilizador é convidado a inserir novamente as suas credenciais.

A informação gerada e armazenada pela ferramenta é descrita mediante um conjunto de entidades e atributos associados. As entidades são relacionadas de diversas formas, dependendo da cardinalidade e da interdependência que as caracteriza. As entidades são definidas num diagrama de classes, ilustrando toda a estrutura de informação (Figura 2).

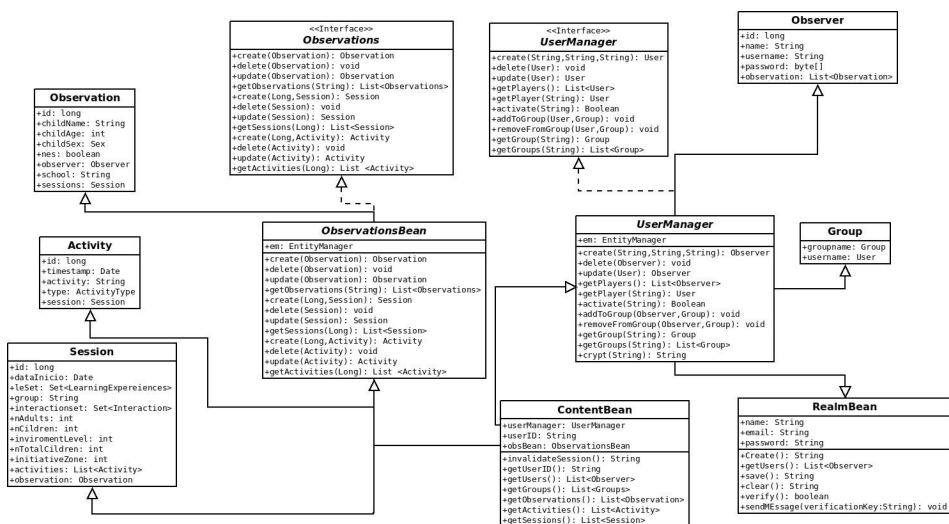


Figura 2: Diagrama de classes

Implementação

Seguindo as boas práticas de desenvolvimento de aplicações para a Web, a implementação da aplicação obedece ao padrão de desenvolvimento MVC (Model View Controller) arquitetura que foi introduzida por Trygve Reenskaug em 1979.

MVC é um padrão de desenvolvimento usado para isolar a lógica de negócio da interface com o utilizador. A lógica de negócio não se mistura bem com o código da interface com o utilizador. Quando as duas são misturadas as aplicações são muito mais difíceis de manter e menos escaláveis. (Goncalves, 2010)

Model é onde fica a toda a lógica de negócio da aplicação. A lógica de negócio pode ser qualquer coisa de específico sobre como uma aplicação guarda os dados ou usa serviços externos para preencher todos os requisitos do negócio. Se a aplicação acede a informação numa base de dados, todo o código para isso deve ser mantido na camada Model. (Pitt, 2012)

View é onde estão os elementos de interação com o utilizador. Tudo o que o utilizador vê ou interage deve ser mantido na View, e por vezes, o que o utilizador vê é na realidade uma combinação de várias Views no mesmo request. (Pitt, 2012)

Controller é o componente que conecta Models e Views. Isola a lógica de negócio dos elementos de interação com o utilizador da View, e lida com a forma como a aplicação vai responder à interação do utilizador na View. Controllers são o primeiro ponto de entrada, porque o request é primeiro passado ao Controller que depois vai instanciar os Models e Views requerido para satisfazer o request da aplicação. (Pitt, 2012) Gere a comunicação entre as camadas View e Model. (Goncalves, 2010)

Esta arquitetura está presente na aplicação através do uso das ferramentas da EE (Enterprise Edition). A camada de negócio (*controller*) é implementada pelos EJB (Enterprise Java Beans) que fazem a ponte entre a camada de persistência (model) implementada usando ORM (Object Relational Mapping) e a camada de apresentação (*view*) apresentada por JSF (Java Server Faces).

Quando aplicada a arquitetura MVC resulta numa aplicação francamente acoplada. Numa aplicação deste tipo é mais fácil modificar quer a aparência visual, quer as regras de negócio subjacentes sem que uma afete a outra. (Goncalves, 2010)

Conclusão

As redes sociais que se conhecem são uma forma de aproximação das pessoas. Elas permitem a partilha de informações que, de outro modo, permaneceriam anónimas ou confinadas a um grupo de pessoas muito restrito.

A TeObs pretende ser uma rede social específica para os educadores de infância, onde se pode partilhar conhecimento e experiências essenciais para a melhoria das suas capacidades profissionais e evolução das mesmas, tudo isto mediado por computador. Ficará toda a informação disponível num local central, de forma segura, para que possa, caso haja permissão, ser consultada por qualquer educador por forma a melhorar o seu desempenho profissional ou apenas para debate de ideias.

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DE GUTENBERG AO LIVRO NA ERA DIGITAL: REPERCUSSÕES NAS BIBLIOTECAS

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Resumo

O presente trabalho pretende ser uma reflexão sobre o surgimento do livro no formato impresso a partir da invenção dos tipos móveis por Gutenberg até a atualidade com o livro digital. O livro é aqui entendido como meio material no qual a informação e a cultura são disseminadas, seus novos suportes, principalmente, o digital, atrelados ao conceito de Sociedade da Informação, nos faz repensar o conceito de Biblioteca. A crescente necessidade de informação e sua procura cada vez mais em suportes e formatos diferentes provocam reflexões sobre o livro, suas perspectivas futuras. Serão apresentadas discussões sobre o processo histórico do livro, seus formatos e suas novas possibilidades de portabilidade e a partir destes conceitos, a biblioteca, seu surgimento, evolução e o impacto que estão sofrendo com surgimento do livro no formato digital.

Palavras-chave: Biblioteca digital, Biblioteca escolar, Interação

1. INICIANDO A PARTIR DA ESCRITA

A escrita é, em geral, considerada uma das invenções mais importantes da humanidade. Surgiu para registrar e armazenar informações, preservar tradições, cultura, história. Vários materiais serviram como suporte para a escrita como: pedra, ardósia, tijolo, cerâmica, osso, mármore, vidro, ferro e o uso destes materiais exerceram influência sobre a evolução dos traçados das letras.

Os artefatos utilizados para escrever variam desde a Antiguidade romana até os dias de hoje e a invenção da imprensa, no século XV, transforma ainda mais a técnica da escrita, bem como sua fixação.

Durante os séculos que precederam a imprensa, aqueles que se encarregavam de reproduzir livros a

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mão, haviam sabido, vimos, adaptar sua produção para responder a novas necessidades. De tal modo que no início, os contemporâneos de Gutemberg puderam talvez ver na reprodução mecânica dos textos apenas uma inovação técnica cômoda, útil sobretudo para a multiplicação dos textos mais correntes. Mas logo se revelaram as possibilidades que o novo processo oferecia bem como seus efeitos transformadores. (FEBVRE, 1992,P.355)

À medida que as tecnologias foram se transformando e as informações ganhando dimensões mais universais, os sistemas de notação reduziram sua complexidade e a utilização de meios eletrônicos como suporte textual representa uma nova transformação da escrita.

O que percebemos hoje é o computador cada vez mais usado na tentativa de aproximar alguns softwares do modelo do livro. Novos modelos de escrita, como a hipertextual, surgem com o avanço das tecnologias digitais, sendo o texto eletrônico muito difundido. Porém, não podemos esquecer a forte influência que o livro no formato o qual é tradicionalmente conhecido, exerce sobre o modo como executamos a tarefa da leitura.

A leitura está relacionada ao surgimento da escrita e esta por sua vez à evolução humana. Durante esta trajetória o homem vem procurando alternativas para uma comunicação mais rápida e que represente aquilo que visualiza, pensa ou sente. Assim, a tecnologia da escrita faz com que a sociedade estabeleça formas de comunicação mais eficaz e cada vez mais rápida.

2. UMA BREVE HISTÓRIA DO LIVRO

Falar sobre a história do livro implica em comentar sobre a história da comunicação na forma escrita. O livro no formato codex convive com uma enorme variedade de fontes, sejam elas manuscritas ou impressas, desde as obras literárias e não literárias. Incluímos aqui, também, outras formas de registro além da forma de escrita, como a pintura, o cinema, fotografia.

De Fato, a primeira tentação é comparar a revolução eletrônica com a revolução de Gutemberg. Em meados da década de 1450, só era possível reproduzir um texto copiando-o à mão, e de repente uma nova

técnica , baseada nos tipos móveis e na prensa, transfigurou a relação com a cultura escrita (CHARTIER, 1998, p.7)

Para Robert Darton (2010), ao se tratar da história do livro é preciso compreender de que maneira as ideias foram sendo transmitidas e como a palavra impressa afeta a maneira de pensar da humanidade, modificando inclusive seu comportamento. O livro assumiu diferentes formas ao longo da história além, é claro, de ser lido de modo variado desde sua invenção até os dias de hoje, sendo que a inovação ligada ao livro que mais marcou a cultura letrada foi a invenção da tipografia.

Mesmo após esta invenção há continuidade entre a cultura manuscrita e impressa, acreditou-se que haveria uma ruptura entre elas, porém, o escrito que era copiado à mão permaneceu por longo tempo depois da invenção de Gutenberg, seguiu até o século XVIII, e início do século XIX.

A inscrição do texto na tela cria uma distribuição, uma organização, uma estruturação do texto que não é de modo algum a mesma com a qual se defrontava o leitor do livro em rolo da Antiguidade ou o leitor medieval, moderno e contemporâneo do livro manuscrito ou impresso, onde o texto é organizado a partir de sua estrutura em cadernos, folhas e páginas. O fluxo sequencial do texto na tela, a continuidade que lhe é dada, o fato de que suas fronteiras não são mais tão radicalmente visíveis, como no livro que encerra, no interior de sua encadernação ou de sua capa, o texto que ele carrega, a possibilidade para o leitor de embaralhar, de entrecruzar, de reunir textos que são inscritos na mesma memória eletrônica: todos esses traços indicam que a revolução do livro eletrônico é uma revolução nas estruturas do suporte material do escrito assim como nas maneira de ler. (CHARTIER, 1998, p.13)

A sociedade em sua trajetória natural de evolução vai se tornando mais complexa, exigindo assim a circulação de materiais na forma impressa que foram sendo modificados e mais popularizados.

A circulação dos mesmos objetos impressos, de um grupo social a outro é, sem dúvida, mais fluida do que sugeria uma divisão sócio-cultural muito rígida, que fazia da literatura erudita apenas leitura das elites e dos livros

ambulantes apenas a dos camponeses. (CHARTIER, 1996, p.79)

Nesse sentido, o acesso ao livro começa a ser mais frequente, o que permite que uma quantidade maior de pessoas possa ter acesso ao livro, mesmo que ainda muito restrito.

Contando com o impulso das revoluções industrial e cultural, mais membros da sociedade vão tendo acesso à escola e por consequência à leitura, que começa a ser entendida como direito, ou seja, o livro torna-se peça crucial para divulgação e difusão do saber.

Na sequência, o surgimento das bibliotecas possibilita que toda população tenha acesso à leitura, enfim, possam usufruir deste direito ao conhecimento que circulava em meio impresso.

3. AS BIBLIOTECAS NESTE NOVO CONTEXTO

Designando o termo biblioteca, de acordo com Silva,

Do grego, o espaço onde se guardam livros e documentos em geral, a biblioteca passou a abranger, igualmente, o móvel onde eles se reúnem, uma coleção de obras selecionadas, um conjunto organizado de livros com determinados fins, de utilidade pública ou particular, e propósitos de formação científica, técnica, social, estética, um espaço onde se conservam, se ordenam e organizam, para se tornarem acessíveis, determinados conjuntos de informação. (SILVA, 2002, p.183)

A história da biblioteca remonta de 5 mil anos, tempo em que não havia comércio de livros e sua circulação era pequena, uma vez que sua produção era limitada e a reprodução se dava pela cópia. Seguindo este raciocínio era normal que os livros ficassem guardados e fechados em bibliotecas.

Inicialmente, as bibliotecas eram ligadas à religião, portanto, administradas por sacerdotes, acreditamos ser este um dos motivos de ser considerada como espaço sagrado. Da biblioteca mais antiga que se tem conhecimento, de acordo com Silva (2002, p. 184) “(24 séculos antes de Cristo) foi a de Assurbanipal, em Ninive, constituída por mais de 3 mil livros, em placas de argila, escritos em caracteres cuneiforme” até os gregos, e os romanos com suas bibliotecas públicas e particulares, o livro foi se popularizando e o material utilizado em sua produção evoluindo de acordo com as necessidades de comunicação cada vez mais rápida.

A pedra, o barro, papiro, pergaminho e o papel que contribuiu para o aumento da circulação do livro devido seu preço e acessibilidade. Quanto ao formato, entre outros, temos os rolos de papiro, os códices de pergaminho que foram sendo trocados por novos formatos devido as questões de armazenamento, resistência, durabilidade até chegarmos ao livro impresso em papel.

No final do século XX surge o livro no formato eletrônico, chamado de e-book, termo que surge da abreviação de “eletronic book”. Os e-books são livros em formato digital, surgem por volta de 1998 e vem evoluindo de maneira extraordinária. Em formato digital, o livro pode ser transmitido por meio da Internet para qualquer parte do mundo onde se tenha acesso à rede de computadores e compor o acervo de bibliotecas digitais que podem ser acessadas por diversas pessoas ao mesmo tempo e por diversos meios, desde computadores de mesa até os telefones celulares.

A evolução da biblioteca está intimamente ligada à evolução do livro que tornou-se mais acessível e a biblioteca continua sendo sua grande promotora. O livro em formato digital facilitou a veiculação de seus conteúdos, uma vez que desde sua produção até a divulgação, tem sua portabilidade como uma das principais características desta evolução.

Do rolo antigo ao códex medieval, do livro impresso ao texto eletrônico, várias rupturas maiores dividem a longa história das maneiras de ler. Elas colocam em jogo a relação entre o corpo e o livro, os possíveis usos da escrita e as categorias intelectuais que asseguram sua compreensão. (CHARTIER, 1998, p.77)

O livro eletrônico está remodelando as bibliotecas, sua estrutura, bem como sua oferta de serviços. A biblioteca tem assim remodelada toda sua estrutura de organização e divulgação de seu acervo, seu leitor não possui em sua maioria os mesmos hábitos dos de outrora, seus hábitos de leitura estão diferentes, como apresentado por Chartier.

A inscrição do texto na tela cria uma distribuição, uma organização, uma estruturação do texto que não é de modo algum a mesma com a qual se defrontava o leitor do livro em rolo da Antiguidade ou o leitor medieval, moderno e contemporâneo do livro manuscrito ou impresso, onde o texto é organizado a partir de sua estrutura em cadernos, folhas e páginas. O fluxo sequencial do texto na tela, a continuidade que lhe é dada, o fato de que suas fronteiras não são mais tão radicalmente visíveis, como no livro que encerra, no interior de sua encader-

nação ou de sua capa, o texto que ele carrega, a possibilidade para o leitor de embaralhar, de entrecruzar, de reunir textos que são inscritos na mesma memória eletrônica: todos esses traços indicam que a revolução do livro eletrônico é uma revolução nas estruturas do suporte material do escrito assim como nas maneira de ler. (CHARTIER, 1998, p.13)

Neste contexto surge as bibliotecas digitais, que possuem acervos de livros ou periódicos em formato digital, seu acesso é remoto e são consideradas as bibliotecas do futuro.

Tammaro (2008) apresenta duas visões sobre biblioteca do futuro, sendo que a primeira visão é aquela que se preocupa com o acesso ao conhecimento humano de forma universalizada. Já a segunda refere-se ao fato de que o emprego de novas tecnologias é fruto da necessidade da comunidade científica em acessar a informação, ou seja, a biblioteca do futuro tem ligações com a produção acadêmica e científica.

A diferença entre biblioteca digital e tradicional está na forma de apresentação e organização de seu material. Por biblioteca tradicional ou convencional, entende-se como sendo aquela na qual a maioria do material de seu acervo se constitui de documentos em papel. Este tipo de biblioteca existe desde que a escrita foi inventada, ou melhor, já existia. Antes, porém, outros tipos de suportes eram usados para registrar a informação. A biblioteca convencional tem evoluído também e nesta primeira década do séc. XXI já apresenta seu antigo catálogo em formato digital e geralmente, nas páginas iniciais de seus sites já é possível fazer buscas em outras bibliotecas através de links.

Aarseth (2005) refere-se ao fato que cada biblioteca, seja ela física ou digital, representa ideologicamente os ideais de seus criadores (idealizadores), podendo tanto incluir quanto excluir informações relevantes ou servirem apenas para manutenção de um pensamento tradicional, não contribuindo para o fortalecimento da crítica aos modelos já estabelecidos.

Mas a biblioteca é mais do que livros em prateleiras; é também uma ideologia, uma ética e às diligências por trás de fornecedores de informação tais como o projecto Gutemberg e outras fontes do sistema de hipertexto da Internet conhecido como World Wide Web. Por meio

dessas diligências, mantém-se a ideia da biblioteca, ainda que se substitua o médium (“a prateleira”). Mais importante ainda, nem a antiga biblioteca nem a nova estação de trabalho ligada à Internet deveriam ser encaradas como pró-canônicas ou anti-canônicas em si próprias. Ambas podem ser utilizadas para as duas finalidades opostas: preservação (inclusão) e seleção (exclusão) de informação (AARSETH, 2005, p. 198).

4. O DIGITAL E AS BIBLIOTECAS: ALGUNAS REPERCUSSÕES

A biblioteca digital traz em si uma questão importante sobre o livro que é sua portabilidade. O tempo de escrita de uma obra é o mesmo para sua versão impressa ou digital, o que modifica e muito é sua difusão, é a rapidez com que a obra digital chega ao seu usuário final. A obra ao ser terminada pode ser transformada imediatamente num dos formatos utilizados em uma biblioteca digital e ser divulgada via Web e assim, consultada, pesquisada. Neste sentido, a biblioteca digital se apresenta mais versátil, a informação chega ao leitor ou pesquisador de maneira mais ágil.

Não acreditamos que o formato impresso do livro irá perder seu mercado a ponto de não ser mais produzido, pensamos que cada vez, o formato digital será mais utilizado, uma vez que a obra impressa ocupa muito espaço, seja nas residências ou nas bibliotecas. O formato digital vem rediscutir a questão do espaço, ou seja, de armazenamento. Passaremos então a discutir o espaço virtual da obra e o espaço físico será cada vez menos importante.

Os dois formatos, impresso e digital se complementam, a existência de um não exclui de forma alguma o outro. Em algumas situações como caso da submissão de manuscritos às editoras de livros ou periódicos, o aceite ou não para publicação já são tarefas facilitadas pelo digital. Entendemos que os dois meios de divulgação coexistirão por muito tempo.

Uma das grandes vantagens da biblioteca digital é poder ser acessada a qualquer dia, horário e de qualquer local. Uma mesma pessoa pode ter acesso à quantidade maior de livros de uma única vez, em alguns casos, os livros podem ser baixados e serem utilizados por vários usuários ao mesmo tempo. Ou seja, o material em formato digital pode ser lido e utilizado em qualquer lugar, desde que o usuário esteja conectado a Web, esta consulta pode ainda ser compartilhada.

A era digital vem promovendo uma verdadeira revolução na maneira com que as pessoas têm acesso à leitura e esta mudança já chegou às bibliotecas, que estão a

cada dia que passa modificando sua forma de adquirir material, armazenar e promover o empréstimo. As grandes bibliotecas que possuem acervos históricos e raros estão digitalizando este acervo como uma forma de ampliar o acesso ao material e também como maneira de preservá-lo.

Deixando mais claro, uma obra escrita em pergaminho, por exemplo, que pela fragilidade do suporte não tem acesso permitido além de pesquisadores, uma vez digitalizada, tem seu acesso ampliado, o que já vem acontecendo. Por fim, mais democratizado desde que esteja disponível em uma biblioteca digital. Há um aumento no número de leitores para as obras, sua divulgação tem se tornado cada vez mais rápida e até mesmo instantânea.

Quanto ao espaço, a quantidade de livros que se pode reunir numa biblioteca digital é infinitamente maior que a quantidade que se poderia reunir em formato impresso, ou seja, armazenar em formato digital ocupa espaço virtual e o espaço físico pode ser utilizado para disponibilizar meios mais confortáveis para acesso ao material. Lembrando que este acesso se dá de preferência remotamente. O espaço passa a ser dividido muito mais com pessoas em situação de consulta e ou leitura, do que com armazenamento. Há uma redefinição dos espaços da biblioteca.

A biblioteca, ainda é por excelência o lugar para buscar leitura, principalmente, a forma digital. As bibliotecas tem outra preocupação além de tratar a informação que está sob sua responsabilidade, precisam pensar formas de disponibilizar a informação em qualquer meio que o usuário tenha mais facilidade de acesso. Seja em seus computadores pessoais, ou outros dispositivos e ainda nos computadores ou dispositivos da biblioteca. Já existem experiências nas quais as bibliotecas emprestam tablet para seus usuários lerem os livros digitais e até biblioteca física que possua apenas acervo digital e computadores para acesso ao material.

A informação está cada dia mais se desmaterializando devido à mudança do suporte, antes analógico e agora em grande parte digital. Esta mudança de suporte representa modificação na forma da biblioteca organizar, armazenar e disseminar a informação. As bibliotecas estão se transformando para garantir o acesso à informação, estão também se desmaterializando, descentralizando, enfim, em constante processo de evolução.

Portanto, menor custo na aquisição de material; portabilidade; duplicidade de acesso; agilidade na divulgação da informação, entre outras, são algumas das repercussões que vem ocorrendo no interior das bibliotecas tradicionais, quando estas também já se apresentam em formato digital.

5. CAMINHANDO PARA UMA CONCLUSÃO

Acreditando que as mudanças de paradigmas atingem a sociedade como um todo, o que traz modificações nas organizações que a compõem, é preciso que as bibliotecas tanto tradicionais quanto digitais tenham repensados seus papéis e se preparem para dar respostas efetivas aos seus usuários em constante mudança.

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GESTÃO DA INFORMAÇÃO CIENTÍFICA E REPOSITÓRIOS: O CASO DA BIBLIOTECA DIGITAL DO IPB

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Resumo

Os repositórios institucionais são estruturas de apoio à investigação que promovem a integração, a partilha e o acesso aberto à produção científica realizada e produzida pela comunidade académica. São ainda um garante para

a preservação da memória intelectual e da investigação aplicada de referência. Os repositórios institucionais revestem-se de uma importância cada vez maior para as instituições enquanto produtoras de ciência e de conhecimento. Servem como plataformas gestoras de informação e contribuem para uma maior visibilidade da instituição, dos autores e da própria produção científica. Acrescem ainda fatores organizacionais, como sejam o da preservação, integração e armazenamento da informação. Graças à tecnologia digital os repositórios podem ser interoperáveis com diversos sistemas. No caso da Biblioteca Digital do Instituto Politécnico de Bragança, existe interoperabilidade com a plataforma de Avaliação do Desempenho do Pessoal Docente.

1. A BIBLIOTECA DIGITAL DO IPB: DESENVOLVIMENTO E PARTICULARIDADES

A Biblioteca Digital do IPB é uma estrutura *web* que apoia a investigação e promove a integração, a partilha e o acesso aberto à produção científica realizada e produzida pela comunidade académica, em regime de auto-arquivo. É ainda uma aposta clara na disponibilidade pública da informação científica produzida no seio da comunidade académica do IPB.

Cientes que os repositórios institucionais são plataformas de partilha, os Serviços de Documentação e Bibliotecas do IPB, em harmonia com o Instituto Politécnico de Bragança (IPB), em junho de 2006, instalaram e criaram a Biblioteca Digital do IPB, com o software DSPACE. A Presidência do Instituto Politécnico de Bragança lançou um desafio aos Serviços de Documentação para que se candidatassem a financiamento. Em abril de 2006 efetuou-se a candidatura que foi aprovada em final de janeiro de 2007.

Este projeto foi enquadrado na missão primordial dos Serviços de Documentação e Bibliotecas do IPB, que recolhem, tratam, organizam, disponibilizam, fornecem e preservam os recursos informativos relevantes para as atividades educativas e de investigação científica e tecnológica que decorrem no IPB. Sabendo da inexistência de uma compilação sistemática da informação científica no IPB, este repositório foi a consolidação de um propósito e uma verdadeira mudança de paradigma na comunicação da informação científica no IPB. Desta forma, os Serviços de Documentação e Bibliotecas do IPB assumiram a gestão e administração do repositório.

Após a sua instalação, e porque todos os sistemas de código aberto podem ser parametrizados e podem ser expandidos de acordo com as necessidades de cada instituição, foram efetuadas as seguintes alterações, conforme a Figura 1.

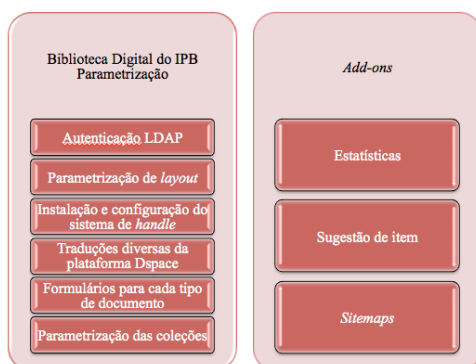


Fig. 1. Parametrizações efetuadas na Biblioteca Digital do IPB.

Aquando da instalação do repositório e com o objetivo de desenvolver um processo de tomada de decisões tão participado quanto possível, que fosse funcional e adaptado à realidade do Instituto Politécnico de Bragança (IPB), em 2007, foi constituído o Conselho Coordenador dos Serviços de Documentação e Bibliotecas do IPB (entretanto desativado), formado pelo Vice-Presidente do IPB, por um docente eleito em Conselho Científico, representantes de todas as Escolas do IPB e pela Coordenadora dos Serviços de Documentação e Bibliotecas do IPB. Este órgão definiu a estrutura e organização do repositório e pronunciou-se sobre a política de

auto-arquivo que, entretanto, tinha sido criada. Era ainda atribuição deste Conselho deliberar sobre situações que, eventualmente, contrariassem a política de auto-arquivo [1].

A organização da informação apresentada no repositório é baseada na estrutura orgânica do Instituto Politécnico de Bragança. Tem cinco comunidades representando as Escolas e tem trinta e cinco sub-comunidades que representam os Departamentos. Cada departamento tem treze coleções iguais definidas para o universo do IPB. A uniformidade das coleções foi aprovada em Conselho Permanente do IPB, no dia 30 de abril de 2010. As coleções agregam toda a produção científica de cada sub-comunidade e estão organizadas por tipologia documental, como artigos em revistas, artigos em *proceedings*, livros, capítulos de livros, dissertações, teses, relatórios, entre outros (Fig. 2).

- **Escola Superior Agrária** [3322]
 - **Ambiente e Recursos Naturais** [599]
 - ARN - Artigos em Proceedings Não Indexados ao ISI [84]
 - ARN - Artigos em Revistas Indexados ao ISI [73]
 - ARN - Artigos em Revistas Não Indexados ao ISI [43]
 - ARN - Capítulos em Livros [42]
 - ARN - Dissertações de Mestrado [3]
 - ARN - Livros [12]
 - ARN - Posters em Encontros Científicos Internacionais [38]
 - ARN - Posters em Encontros Científicos Nacionais [23]
 - ARN - Publicações em Proceedings Indexadas ao ISI [5]
 - ARN - Relatórios Técnicos/Científicos [6]
 - ARN - Resumos em Proceedings Não Indexados ao ISI [261]
 - ARN - Teses de Doutoramento [8]
 - ARN - Working Papers [1]
 - **Biologia e Biotecnologia** [1011]
 - BB - Artigos em Proceedings Não Indexados ao ISI [95]
 - BB - Artigos em Revistas Indexados ao ISI [232]
 - BB - Artigos em Revistas Não Indexados ao ISI [66]
 - BB - Capítulo de Livros [22]
 - BB - Dissertações de Mestrado [4]
 - BB - Livros [12]
 - BB - Posters em Encontros Científicos Internacionais [29]
 - BB - Posters em Encontros Científicos Nacionais [16]
 - BB - Publicações em Proceedings Indexadas ao ISI [13]
 - BB - Relatórios Técnicos/Científicos [7]
 - BB - Resumos em Proceedings Não Indexados ao ISI [505]
 - BB - Teses de Doutoramento [8]
 - BB - Working Papers [2]

Fig. 2. Coleções presentes na Biblioteca Digital do IPB.

2. PROCESSO DE APRENDIZAGEM E FORMAÇÃO

Com a conseqüente implementação do repositório, houve necessidade de promover ações de formação, tanto ao nível da edição de metadados, que é efetuada pelos responsáveis de cada Biblioteca, como ao nível dos depositantes e do auto-arquivo, transformando-se assim num instrumento educativo e de trabalho imprescindível para o sucesso dos depositantes e dos editores de metadados. Daí ter havido várias sessões de formação presencial em todas as unidades orgânicas a explicar o modo de acederem ao repositório e a forma como se efetua o depósito de documentos. Elaboraram-se guias de depósito de documentos, que ficaram acessíveis no micro-site dos Serviços de Documentação e Bibliotecas do IPB. O processo de

aprendizagem foi de fácil apreensão, porque todo o processo de *workflow* do repositório é muito simples, bastando seguir os passos, havendo apenas como preenchimento obrigatório os campos de autoria, título e ano de publicação. Ficou bem definido que os depositantes deveriam “digitalizar” a maior parte dos metadados constantes de um registo, para que a edição e a sua disponibilização na *web* fosse simplificada e rápida. Os campos principais devem estar preenchidos (autores, título, resumo) para que a recuperação dos metadados seja eficaz.

Integração Repositório Científico de Acesso Aberto de Portugal e Serviço de Alojamento de Repositórios

Atualmente um dos maiores problemas que se coloca a uma instituição é a falta de visibilidade e a interação com o meio envolvente. Graças à tecnologia digital, as redes entre investigadores expandem-se para passarem a incluir formas aprimoradas e inovadoras de representação e interligação do conhecimento [2]. Por isso, as organizações e os serviços têm necessidade de se interligar e participar em redes para assegurar a sua própria sobrevivência e assegurar a cooperação, partilhando objetivos comuns e incrementando recursos [3].

Por estas razões, em meados de março de 2009 foi efetuada uma candidatura ao RCAAP (Repositório Científico de Acesso Aberto de Portugal) e ao SARI (Serviços de Alojamento de Repositórios Institucionais), tendo o IPB sido selecionado.

O RCAAP foi criado com o objetivo de recolher, agregar e indexar os conteúdos científicos em acesso aberto existentes nos repositórios institucionais das entidades nacionais de ensino superior, e outras organizações de I&D, sendo um serviço avançado sobre a rede nacional de investigação e ensino, a Rede Ciência, Tecnologia e Sociedade [4].

A adesão ao RCAAP e ao SARI trouxe vantagens acrescidas para o IPB. Como não havia recursos humanos adstritos à Biblioteca Digital, o que condicionava a atualização e o desenvolvimento da plataforma, estes serviços, para além de promoverem a racionalidade de recursos no armazenamento do repositório, assumem mais-valias indiscutíveis em termos de atualização e desenvolvimento a nível da plataforma e de outros requisitos, tais como a integração do repositório num projeto nacional, dando assim mais visibilidade à produção científica do IPB, bem como ao reconhecimento dos seus autores. O valor acrescentado deste serviço é o desenvolvimento de novas potencialidades na plataforma DSPACE e integração com a B-on (Biblioteca de Conhecimento Online¹)

¹ <http://www.b-on.pt/>

O SARI é um serviço de alojamento gratuito em que a manutenção e gestão da infra-estrutura é assegurada pela FCCN (Fundação para a Computação Científica Nacional). Este serviço ainda garante cópias de segurança dos conteúdos do repositório, faz a manutenção e gestão da toda a infra-estrutura e tem um serviço de *helpdesk* [5]

3. O ACESSO ABERTO NO INSTITUTO POLITÉCNICO DE BRAGANÇA

Desde que a Biblioteca Digital do IPB foi implementada e uma vez que integra o RCAAP, foram desenvolvidos esforços que colocam a instituição numa posição de vanguarda relativamente a muitas outras instituições de ensino superior em Portugal.

Em 18 dezembro de 2007, fez-se a inscrição no *Registry of Open Access Repositories*²

Em 8 de novembro de 2009 o IPB assinou a Declaração de Berlim, aderindo formalmente ao acesso aberto.

Em 30 de abril de 2010 foi aprovada, por unanimidade, pelo Conselho Permanente do IPB, a Política de Auto-Arquivo de Publicações na Biblioteca Digital do IPB³, tornando-se na primeira instituição portuguesa de ensino superior politécnico a possuir uma política de obrigatoriedade no auto-arquivo de todas as publicações produzidas pelos docentes e investigadores. Os pontos mais importantes da Política de Auto-Arquivo das Publicações na Biblioteca Digital do IPB são:

- O depósito de documentos na Biblioteca Digital do IPB deve ser efetuado através do auto-arquivo.
- O Instituto Politécnico de Bragança adota uma política de obrigatoriedade no depósito de todas as publicações produzidas pelos docentes/investigadores.
- A Biblioteca Digital do IPB constitui o registo oficial da produção intelectual do IPB [6].

Em 19 de agosto de 2010, fez-se a Inscrição da política de auto-arquivo no ROARMAP⁴ (*Registry of Open Access Repositories Mandatory Archiving Policies*) e em 23 de novembro de 2010 a inscrição no diretório Luso-Brasileiro⁵, tendo-se

² <http://roar.eprints.org/433/>

³ <http://www.ipb.pt/go/e387>

⁴ <http://roarmap.eprints.org/292/>

⁵ <http://diretorio.rcaap.pt/handle/2/164>

ainda efetuado a inscrição no OpenDOAR⁶ (*The Directory of Open Access Repositories*)

Em 10 de janeiro de 2011, foi publicado o Regulamento n.º 14/2011⁷ - Regulamento do Sistema de Avaliação do Desempenho do Pessoal Docente do Instituto Politécnico de Bragança – que veio reforçar a obrigatoriedade do auto-arquivo, impondo o depósito prévio da produção científica na Biblioteca Digital do IPB para poder ser considerada na avaliação de desempenho. De facto, este regulamento estabelece que “São apenas considerados os artigos depositados na Biblioteca Digital do IPB”. Desta forma, o repositório do IPB foi o primeiro repositório em instituições do ensino superior a ser interoperável com o sistema de avaliação docente, desenvolvido pelo Centro de Desenvolvimento e Gestão de Dados do IPB.

4. A INTEROPERABILIDADE E O SISTEMA DE INFORMAÇÃO DO IPB

Segundo o grupo de trabalho da COAR (*Confederation of Open Access Repositories*) a interoperabilidade é a capacidade de comunicar entre sistemas, ou seja, aproveitamos o poder de computação para que possamos agregar dados, criar novas ferramentas e serviços, gerando novos conhecimentos a partir dos repositórios. A interoperabilidade nos repositórios efetua-se de várias maneiras. Ao nível do sistema, a interoperabilidade produz-se quando os repositórios estão configurados de uma maneira que permitem que os dados ou objetos digitais passem de dentro para fora do repositório através de sistemas externos. Um dos exemplos é o Protocolo OAI-PMH (*Protocol for Metadata Harvesting*), que especifica certos critérios que devem ser cumpridos para permitir a sistemas externos aceder e recolher os metadados dos repositórios[7]. Os metadados da Biblioteca Digital do IPB são recolhidos pelo RCAAP, pelo *OpenAire*⁸, motores de pesquisa e outros. Os conteúdos da Biblioteca Digital do IPB estão organizados de acordo com as orientações da Diretrizes *DRIVER* e *OpenAire*, como forma de normalização dos metadados, condição essencial para a integração com estes serviços agregadores.

A estratégia do IPB, para recolha e registo de informação relativa à produção científica, passa pela obrigatoriedade do depósito no repositório institucional e integração posterior com o restante Sistema de Informação do IPB. Desta forma, garante-se a validação e verificação dos dados relativos à produção científica – correção dos elementos que caracterizam cada publicação, coerência de formatos e

⁶ <http://opendoar.org/id/1255/>

⁷ <http://www.ipb.pt/go/d391>

⁸ <http://www.openaire.eu/pt>

eliminação de repetições – que fica a cargo dos Serviços de Documentação e Bibliotecas. Consequentemente, a disponibilização de informação respeitante à produção científica no portal do IPB e das suas Escolas – apresentação concisa, mas com acesso a informação detalhada, integração coerente ao nível gráfico e atualização periódica – pode ser efetuada de forma automática. Consegue-se ainda reduzir a sobrecarga de trabalhos dos docentes/investigadores, fazendo toda a recolha da produtividade científica, num ponto único, e produzindo posteriormente diversos relatórios/estatísticas.

Tendo em conta que não existem ainda *Web Services* bem definidos para interface com a Biblioteca Digital do IPB, a estratégia de integração com o Sistema de Informação do IPB baseia-se no acesso HTTP aos registos e na utilização dos *handles*.

Para se fazer a divulgação da produtividade científica no portal da instituição, foi desenvolvida uma aplicação que faz recolhas periódicas de todos os *handles* do IPB, navegando nas várias comunidades (as 5 Escolas do IPB) e fazendo a análise sintática do HTML devolvido. Sempre que surge um novo *handle*, a aplicação descarrega os metadados correspondentes (coleção, data de publicação, autores, título, título da publicação ISBN/ISSN, vol. N.º, pág.). Toda a informação necessária para apresentação resumida no portal do IPB é mantida numa base de dados local, mas o acesso aos detalhes do registo (com base no *handle*) é sempre efetuado

através da Biblioteca Digital.

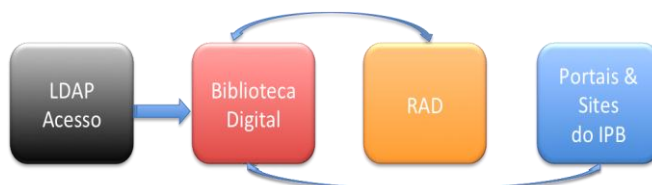


Fig. 3: Interoperabilidade da Biblioteca Digital com o Sistema de Informação do IPB

A plataforma de Avaliação do Desempenho do Pessoal Docente (RAD) trata-se de uma plataforma desenvolvida no IPB, que permite avaliar os docentes de uma forma integrada. Por exemplo, toda a informação pedagógica respeitante a um professor é carregada automaticamente da plataforma Gestão Académica.

Em relação à produção e para ligação ao repositório, os docentes são obrigados a indicar os *handles* dos registos correspondentes às suas publicações. Com base no *handle*, é descarregada da Biblioteca Digital informação de resumo (título, ano, autores), sendo logo de seguida apresentada a valoração respetiva (Fig. 4). A valoração é diferente conforme as tipologias documentais. Esta informação é

armazenada localmente, para garantir que o processo de avaliação pode continuar, mesmo quando o acesso à Biblioteca Digital deixa de ser possível.

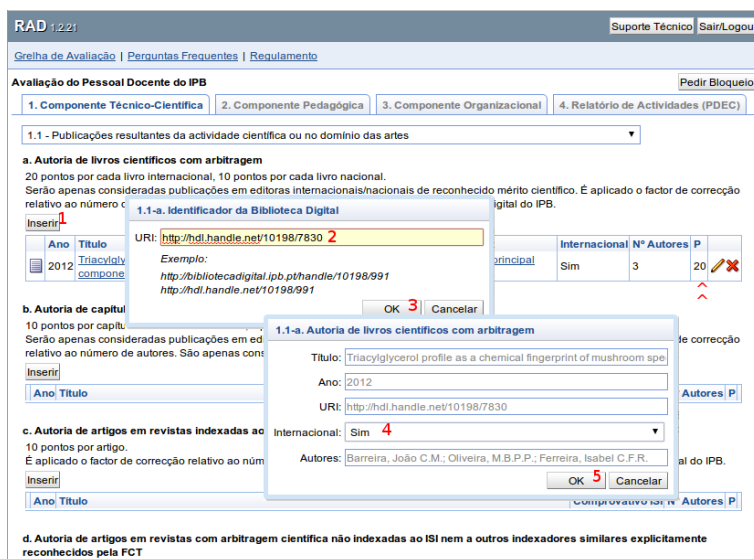


Fig. 4: Processo integral da inserção do *handle* na plataforma RAD

A existência de um identificador único como o ORCID, para cada autor, deverá facilitar a integração com esta plataforma e poderá ser feito o carregamento automático de registos em lote através da importação de ficheiros.

O Sistema de Informação do IPB é atualmente composto por vários produtos monoposto e plataformas *Web*, entre os quais se destacam o sistema eSIGEduc (Solução Integrada de Gestão Administrativa e Financeira) e vários sistemas *open source* desenvolvidos internamente no IPB, para as vertentes académicas (Fig. 5). A interoperabilidade entre estes sistemas tem sido desenvolvida ao longo dos últimos

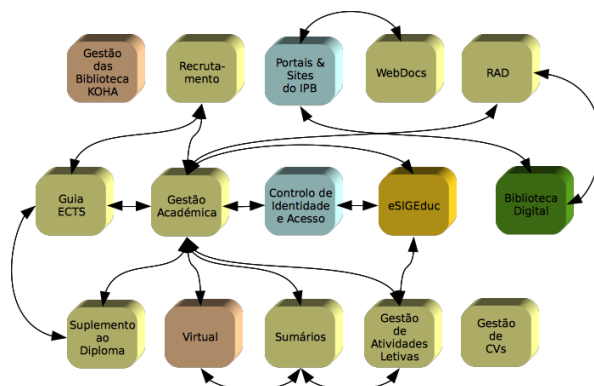


Fig. 5: Sistema de Informação do IPB. Componentes e sua interligação

A aposta que o IPB faz nos sistemas *open source* é notória, mas pretende-se caminhar para um sistema CRIS⁹ (*Current Research Information System*).

Este sistema, a nível institucional, é a ferramenta ideal para a formulação de políticas, permitindo medir, analisar e avaliar as atividades de investigação, usufruindo do acesso a informações comparativas. Para os conselhos de investigação, há uma otimização no processo de financiamento. Para os utilizadores finais individuais, o sistema CRIS é essencial para avaliar as oportunidades de financiamento da investigação, evitar a duplicação das atividades de investigação, analisar tendências, ter referências/links para o texto completo ou publicações académicas, localizar novas redes e identificar novos mercados para os produtos de investigação [8].

5. AVALIAÇÃO E ESTATÍSTICAS DA BIBLIOTECA DIGITAL DO IPB

Os repositórios institucionais revestem-se de uma importância cada vez maior para as instituições enquanto produtoras de ciência e de conhecimento, servindo como plataformas gestoras de informação. Existe uma multiplicidade de dados suscetíveis de serem aproveitados para gestão, monitorização e análise estatística sobre as publicações científicas, a evolução dos conteúdos e o sucesso decorrente das consultas e *downloads* efetuados.

Tal como as Instituições do Ensino Superior e os centros de investigação, os repositórios também são avaliados pelas ferramentas *webométricas*. O *Ranking Web of Repositories* é um dos mais comuns. A Biblioteca Digital do IPB, nesta última versão (janeiro de 2014) ficou em nono lugar no universo português, sendo o primeiro repositório das instituições politécnicas (Fig. 6).

Zonas	Ranking	Nº Repositórios analisados
Portugal	9	39
Comunidade Europeia	124	691
Europa	133	796
Mundo	266	1746
Top <u>Institutionals</u> nível mundial	260	1660

Fig 6. Posição da Biblioteca Digital do IPB no *Ranking Web of Repositories*

⁹ http://www.eurocris.org/Index.php?page=concepts_benefits&t=1

A recolha sistemática das estatísticas é útil para as instituições, para os administradores dos repositórios e para os próprios autores. O sucesso dos conteúdos da Biblioteca Digital do IPB é demonstrado na Fig. 7. Foram atingidos mais de 2,8 milhões de *downloads* com as seguintes origens: Portugal com mais de 37%, Estados Unidos com 26% e Brasil com 15%.

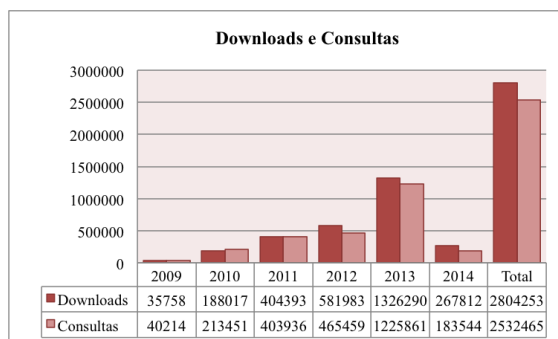


Fig.7: Downloads e Consultas na Biblioteca Digital

No ranking de autores por número de depósitos e *downloads*, verificamos que o primeiro autor se destaca com 600 documentos depositados e com uma média de 287 *downloads* por documento. Atualmente, no top de documentos com mais *downloads*, destaca-se um *e-book* com quase 34500 *downloads*, seguido de uma dissertação de mestrado e uma tese de doutoramento com mais de dez mil *downloads* por documento. Parece-nos verosímil que o sucesso do repositório se deve ao facto de 92% dos documentos depositados no repositório

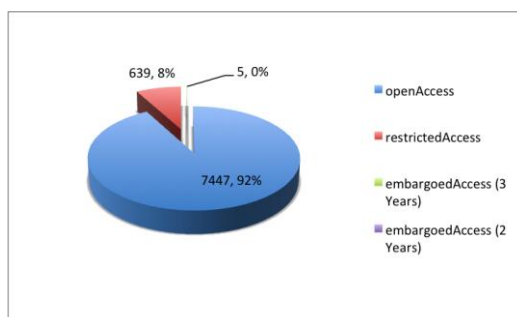


Fig. 8: Tipo de acesso aos documentos

estarem em acesso livre (Fig. 8). A título exemplificativo podemos referir que os 5 artigos mais citados na *Web of Knowledge* de autores do IPB se encontram

depositados na Biblioteca Digital em acesso aberto. Este facto, acrescido de estudos mais profundos, poderá contribuir para confirmar a hipótese de que a informação depositada num repositório institucional e em acesso aberto, para além de aumentar a sua visibilidade, poderá potenciar o impacto das publicações.

É indiscutível que o acesso aberto trouxe uma mudança de paradigma onde a mais-valia é a promoção do acesso à informação, sendo considerado já uma revolução que pretende mudar o sistema de comunicação da ciência, tornando acessíveis para todos, de igual modo e sem barreiras, os resultados dos trabalhos de investigação.

É neste enquadramento que assenta o espírito e a visão do IPB, como sendo uma instituição onde o conhecimento aberto vai contribuir para que a ciência seja partilhada e conhecida, uma vez que o conhecimento científico é um bem público essencial que deve ser distribuído por um vasto conjunto de pessoas, para que possam potenciar novas possibilidades de investigação.

6. CONCLUSÕES

A importância que este tipo de plataformas têm para as instituições de ensino superior suplanta os meros fluxos de informação e deve ser vista na perspectiva da gestão do conhecimento e estar incluída na visão estratégica da organização, porque aumenta o seu “valor público”. O sucesso da Biblioteca Digital do IPB deve-se ao facto de estar integrada na estratégia da instituição, pois para além de aumentar o seu valor público, serve de indicador de medida permitindo aferir a relevância científica da instituição.

Para que a Biblioteca Digital do IPB continue a ser uma plataforma indispensável e sustentável no seio da comunidade académica, encontra-se num processo de auditoria através da Norma ISO 16363 - *Audit and Certification of Trustworthy Digital Repositories*. Existem políticas, procedimentos e processos devidamente enquadrados e implementados, mas há aspetos normativos a melhorar e outros a implementar, pelo que ainda não se encontram devidamente formalizados, já enquadrados no processo de auditoria.

É, portanto, um repositório que integra todas as publicações científicas produzidas e um sustentáculo do Sistema de Avaliação do Desempenho do Pessoal Docente do Instituto Politécnico de Bragança. A sua missão primordial é continuar a apoiar os docentes/investigadores, bem como promover e gerir as publicações científicas do IPB, através de ações que promovam e facilitem o acesso aberto.

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PESQUISAS ACADÊMICAS EM BIODIESEL NO BRASIL: UMA ANÁLISE DOS GRUPOS DO CONSELHO NACIONAL DE DESENVOLVIMENTO CIENTÍFICO E TECNOLÓGICO (CNPQ)

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RESUMO

Preocupações com a segurança energética e mudanças climáticas têm incentivado muitos países a investimentos em energias renováveis. O Brasil possui uma longa e larga experiência em biocombustíveis, sendo hoje líder de produção de etanol de cana-de-açúcar. Em 2004, o país lançou o Programa Nacional de Produção e Uso do Biodiesel (PNPB), introduzindo o biodiesel em sua matriz energética em 2005. Implementado com sucesso, o PNPB posicionou o Brasil como um dos maiores produtores e consumidores desse biocombustível, assim como um dos maiores contribuidores de publicações indexadas e de depósitos de patentes em biodiesel. O presente trabalho objetiva apresentar indicadores científicos e tecnológicos sobre o biodiesel no Brasil, por cada uma das 5 grandes regiões geográficas do país, a partir de dados disponibilizados no Diretório dos Grupos de Pesquisa cadastrados no Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq), envolvidos na temática. Inicialmente apresenta a importância dos indicadores em Ciência e Tecnologia (C&T) como valiosos instrumentos para definição de diretrizes de atividades relacionadas à Pesquisa e Desenvolvimento e Inovação (PD&I). Discorre a seguir sobre

o biodiesel, relatando sua relevância no contexto energético mundial. Também apresenta o PNPB, assim como sua base tecno-científica e arcabouço legal. A partir de uma minuciosa investigação sobre os grupos em questão, são apresentados o quantitativo de pessoas alocadas em cada grupo, as suas especialidades do conhecimento, a interação com o setor produtivo e a produção científica e tecnológica. Os resultados encontrados são confrontados com a evolução produção e consumo em biodiesel no Brasil. Observa-se que é ainda é incipiente a interação das pesquisas acadêmicas com o setor produtivo, sugerindo que a expressiva produção de biodiesel ainda não é fundamental indutor de PD&I em biodiesel no Brasil.

Palavras-chaves: Biodiesel; Indicadores científicos; Brasil; CNPq

1. INTRODUÇÃO

Em consequência do desenvolvimento econômico e social estar cada vez mais ancorado na inovação e no conhecimento como agregadores de valor, o tema inovação tecnológica tornou-se uma palavra de ordem e uma das formas motrizes para o crescimento econômico, ocupando assim um lugar central nas esferas política, econômica e social dos países (TIGRE, 2006).

A importância que o tema inovação ganha também no âmbito acadêmico, reflete diretamente no aumento do número de grupos de pesquisas e publicações, o que justifica a criação de indicadores de Ciência e Tecnologia (C&T) com o intuito de medir, estimular e difundir o conhecimento da C&T, bem como para acompanhar e avaliar as políticas públicas (WINTER, 2011).

O processo de inovação tecnológica pressupõe a apropriação, ou seja, na necessidade de proteção intelectual. O Brasil vem se destacando pelo altodesenvolvimento científico, traduzido pelo elevado número de publicações científicas brasileiras. Entretanto, o número de depósito de patentes, indicador mais utilizado como esforço de atividade inovativa de um país, é ainda incipiente no Brasil, comprometendo a autonomia tecnológica do país. Um Brasil competitivo e

inovador supõe esforços cooperativos entre Ciência e Tecnologia (ROCHA NETO e NEHME, 2012).

A ferramenta da prospecção tecnológica tem sido decisiva na gestão de Ciência e Tecnologia, assim como na fundamentação nos processos de tomada de decisão referentes à pesquisa, ao desenvolvimento e à inovação. (QUINTELLA et al., 2009). É crucial na identificação de oportunidades e necessidades relevantes, entendendo que os desenvolvimentos científicos e tecnológicos resultam de complexa interação entre os atores diversos, das necessidades sociais, oportunidades e restrições econômicas e da consciência ambiental entre outros (COELHO et al., 2010).

Face às questões de segurança energética e aquecimento global, o Brasil formulou o Programa Nacional de Produção e Uso de Biodiesel (PNPB), com a participação de diversos ministérios. A diferença em relação aos de outros países é a dimensão social intrinsecamente incorporada ao Programa, suportada pelo Selo Social, concedido aos produtores de biodiesel que adquirem matéria-prima de agricultores familiares. Em contrapartida, os detentores do Selo possuem privilégios tributários e direito à participação nos leilões de biodiesel.

Abramovay e Magalhães (2007) assinalam o ineditismo do vínculo declarado entre a oferta de matérias-primas para a produção de biocombustível e a geração de renda pela agricultura familiar, sob o patrocínio do Estado e a operacionalização de empresas privadas. Cabe ao Ministério da Ciência e Tecnologia e Inovação (MCTI) o gerenciamento das ações de Pesquisa, Desenvolvimento e Inovação (P&D&I) e da Rede Brasileira de Tecnologia de Biodiesel (RBTB), base científico-tecnológica que fornece apoio e orienta o PNPB, buscando a identificação e eliminação de gargalos tecnológicos do biodiesel por meio de constante pesquisa e desenvolvimento tecnológico realizados no âmbito de

parcerias entre instituições de P&D e o setor produtivo (PORTAL DO BIODIESEL, 2005).

Nesse contexto, o presente trabalho apresenta, analisa e discute os resultados encontrados em indicadores de Ciência e Tecnologia (C&T), relacionados a grupos de pesquisa do biodiesel que estão distribuídos nas cinco regiões brasileiras – Norte, Nordeste, Centro-Oeste, Sul e Sudeste¹ a partir de dados disponibilizados no Diretório dos Grupos de Pesquisa cadastrados no Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq), envolvidos na temática, como mostra a figura 1.

São também apresentadas algumas considerações sobre indicadores científicos e tecnológicos e um panorama do biodiesel, relatando sua relevância no contexto energético mundial-

¹ Atual divisão regional do Brasil, utilizada elaboração de políticas públicas; subsidiar o sistema de decisões quanto à localização de atividades econômicas, sociais e tributárias; subsidiar o planejamento, estudos e identificação das estruturas espaciais de regiões metropolitanas e outras formas de aglomerações urbanas e rurais (IBGE, 2014).

Figura 1 - Divisão regional do Brasil



Fonte: IBGE (2013)

2. INDICADORES CIENTÍFICOS E TECNOLÓGICOS

Com o atual aumento da relevância do papel da Inovação, Ciência e da Tecnologia como determinantes do desenvolvimento econômico, tornou-se cada vez mais evidente a necessidade de medição das taxas de produtividade dos centros de pesquisa e dos investigadores individuais, para a identificação daquelas instituições e áreas com maiores potencialidades e para o estabelecimento das prioridades no momento da alocação de recursos públicos.

Assim, na década de 1960, tem-se o início da coleta de dados estatísticos sobre as atividades de C&T iniciada pela Organização das Nações Unidas para a

Educação, a Ciência e a Cultura (UNESCO) em vários países, principalmente nos considerados desenvolvidos com alto nível de desenvolvimento econômico e social. Entretanto, a diversidade de fontes de informação nacionais e a falta de uma equipe técnica capaz de analisar a informação dificultaram sistematização dos dados obtidos (LONGO 2004).

No mesmo período e fortemente influenciado pelos esforços da UNESCO, a Organização Europeia de Cooperação Econômica (OCDE) apresenta uma “Proposta de um Sistema Padrão para Avaliação em Pesquisa e Desenvolvimento”, que originou o Manual Frascati. Trata-se de um documento de classe mundial, considerado por muitos estudiosos como a pedra angular para entender e analisar as atividades de Pesquisa e Desenvolvimento (P&D) (OCDE, 2005).

O Manual Frascati apresenta o conceito de inovação sobre diferentes perspectivas como: transformar uma ideia em um produto novo ou aprimorado; em um processo novo ou aprimorado ou; em uma nova abordagem de um serviço. O Manual passou por revisões ao longo do tempo e, atualmente, os indicadores compreendem os dispêndios realizados, assim como os recursos humanos dedicados às atividades de P&D (OCDE, 1994; 2005).

Na década de 1990, novos instrumentos de análise das atividades de P&D e inovação foram criados pela OCDE com o intuito de ampliar os horizontes de abordagem sobre C&T, com destaque para os manuais da série *The Measurement of Scientific and Technological Activities*²: Canberra e Oslo.

O manual de Canberra, publicado em 1995, apresenta uma metodologia de exploração de dados já existente para confecção de indicadores com o intuito de dimensionar os recursos humanos envolvidos com C&T (FAPESP, 2005). Já o Manual de Oslo, publicado originalmente em 1992 com atualizações em 1997 e

² Conhecidos no Brasil como Família Frascati

2005, aborda a inovação no âmbito da empresa (atividades de negócios) e apresenta quatro abordagens para o conceito de inovação tecnológica - de produto, de processo, organizacional e de marketing – e orienta a construção e padronização de indicadores estatísticos de pesquisa de P&D (OCDE, 2005).

Embora desenvolvido para países industrializados, o manual de Oslo é considerado abrangente quanto a suas definições e possui metodologia flexível. Por isso mesmo, é considerado uma das principais referências para as atividades de inovação na indústria que objetiva a melhoria dos seus processos de inovação e de aspectos econômicos.

O desenvolvimento e a implementação de base de informação quantitativa sobre as atividades de ciência e tecnologia e de inovação (CT&I) são considerados ferramentas indispensáveis para avaliar o potencial da base científica e tecnológica dos países, além de monitorar as oportunidades em diferentes áreas e identificar atividades e projetos promissores que auxiliem as decisões estratégicas dos gestores nacionais (MCTI, 2013).

Duas famílias básicas de indicadores de Ciência e Tecnologia (C&T) são geralmente usados para a mensuração da inovação: recursos direcionados à P&D e estatísticas de depósitos de patentes. Além disso, indicadores bibliométricos e vários outros tipos de indicadores oferecem informações complementares (OCDE, 2005). Vale ressaltar que as patentes podem ser consideradas como indicadores de esforço inovativo.

Observa-se que no Brasil, a pesquisa científica e tecnológica concentra-se nas Universidades, ao contrário dos países desenvolvidos, onde as empresas demandam pesquisas. O Brasil vem se destacando com um grande produtor de artigos científicos indexados. Em 2009, foi ocupou o 13º lugar com 32.100 artigos publicados em periódicos científicos indexados pela Thomson/ISI (MCT, 2010).

3. BREVE PANORAMA DO BIODIESEL NO CONTEXTO MUNDIAL E BRASILEIRO

A situação mundial, a produção de biodiesel apresenta no cenário mundial com forte crescimento nos últimos doze anos, correspondendo neste período com um aumento na produção de 2.812%, uma média de 235% ao ano, totalizando em 2012 com 22,5 bilhões de litros/ano (REN, 2013).

No Brasil, atualmente, existem 59 usinas autorizadas para produzir e comercializar biodiesel através do sistema de vendas realizado via leilões, dados de outubro de 2013. Após oito anos após da sua efetiva implantação e execução, pode-se notar várias características no desempenho do PNPB. Primeiramente, destaca-se que o programa levou de forma quase que momentânea, o nascimento da indústria brasileira de biodiesel. Neste pequeno prazo, o programa obteve a constituição de um playground industrial, com capacidade instalada, em abril de 2013, de 7.243 bilhões de litros por ano. Destes, 86% são referentes às empresas que possuem o Selo Combustível Social (MME, 2013).

A partir de janeiro de 2005, através da Lei 11.097/05 (BRASIL, 2005), as refinarias e distribuidoras foram autorizadas a adicionar 2% de biodiesel ao diesel (B2). Em Janeiro de 2010, com fortes pressões dos agentes e dos produtores, o governo antecede o B5, criando uma demanda média de cerca de 2,5 bilhões de litros de biodiesel por ano (ANP, 2013).

Com a procura do B5, o Brasil tornou-se um dos maiores produtores mundiais e sem existência de ameaça de desabastecimento no horizonte de curto prazo no país, isto mantidas as condições legais vigentes.

4. METODOLOGIA

Para a realização deste trabalho foi feita uma análise documental dos indicadores científicos e tecnológicos extraídos do Diretório dos Grupos de Pesquisa no Brasil do Conselho Nacional de Desenvolvimento Científico e Tecnológico (DGP/CNPq) em junho de 2013.

Desenvolvido pelo CNPq desde 1992, DGP/CNPq constitui-se em bases de dados que contêm informações sobre os grupos de pesquisa em atividade no Brasil e que estão localizados em universidades, instituições isoladas de ensino superior, institutos de pesquisa científica, institutos tecnológicos e laboratórios de pesquisa e desenvolvimento de empresas estatais ou ex-estatais, sendo excluídos os grupos localizados nas empresas do setor produtivo (CNPQ, 2013a).

Cada grupo é situado no espaço (Divisão Regional, Unidade Federativa e Instituição) e no tempo. As informações do DGP/CNPq são alimentadas e atualizadas pelos líderes de cada grupo e a cada dois anos um censo é realizado pelo CNPq (CNPQ, 2013a). Para este trabalho, foi utilizada a base censitária de 2011 e as atualizações dos dados de junho de 2013. Cabe ressaltar que os dados finais consolidados do censo 2013 ainda não foram divulgados.

Os dados foram coletados na base textual do DGP/CNPq em junho de 2013, com a utilização da palavra-chave “biodiesel”. Em seguida, foram selecionados apenas os grupos considerados válidos, ou seja, que foram certificados pelos dirigentes de pesquisa das instituições aos quais pertencem. Foram identificados 372 grupos, mas dois grupos (Grupo de Pesquisa em Processos Químicos e Tecnológicos e Grupo de Pesquisas em Química), ambos da Universidade Federal de Alagoas (UFAL) e localizados na região Nordeste foram excluídos da amostra por não estarem certificados.

Os dados obtidos permitiram analisar: o número de grupos de pesquisas atualmente cadastrados e sua distribuição nas cinco regiões do Brasil; a interação dos grupos com o setor produtivo; o número de linhas de pesquisa exploradas pelos grupos; as áreas do conhecimento e; o quantitativo de pessoas alocadas em cada grupo.

5. RESULTADOS ENCONTRADOS

1975 marca o surgimento do primeiro grupo de pesquisa relacionado ao biodiesel³, comandado pela pesquisadora Francisca Pessôa de França e ligado às áreas de engenharias; engenharia química da Universidade Federal do Rio de Janeiro (UFRJ), na região sudeste do Brasil. O mais recente é o APLICABIO de 2013, ligado às áreas das ciências biológicas; microbiologia do Instituto Federal da Bahia (IFBA), no Nordeste brasileiro.

De 1975 até junho de 2013 o número de grupos de pesquisa certificados saltou para 370, sendo que 132 grupos estavam localizados na região Sudeste, seguido do Nordeste com 109 grupos, o Sul com 72, o Centro-Oeste com 37 e o Norte com 20 grupos como mostra a Tabela 1 a seguir.

Com relação à tabela 1, algumas ponderações são necessárias para uma melhor compreensão. Na década 1980, o governo brasileiro descontinuou o Programa Nacional de Óleos Vegetais para Produção de Energia (Pro-Óleo), paralisando todos os seus subprogramas. Somente na segunda metade da década de

³ De 1964 a 1985, o Brasil vivia sob o domínio de uma ditadura militar. Neste período, foram estimulados vários programas para a produção de combustíveis com base em produtos agrícolas com o objetivo de reduzir a dependência brasileira do petróleo importado do Oriente Médio. Entre os programas destacam-se Programa Nacional de Óleos Vegetais para Produção de Energia (Pro-Óleo) e o Programa Nacional do Álcool (Proálcool).

1990, o interesse em biocombustíveis foi retomado e junto com ele, crescimento no número de grupos de pesquisa.

Tabela 1 - Grupos de pesquisa em Biodiesel de 1975 a junho de 2013

Ano de formação	Número de grupos de pesquisa	Frequência relativa	Frequência acumulada
De 1975 a 1980	5	1,35%	1,35%
De 1981 a 1985	5	1,35%	2,70%
De 1986 a 1990	13	3,51%	6,22%
De 1991 a 1995	27	7,30%	13,51%
De 1996 a 2000	48	12,97%	26,49%
De 2001 a 2005	61	16,49%	42,97%
De 2006 a 2010	163	44,05%	87,03%
De 2011 a 2013	48	12,97%	100%

Fonte: DGP/CNPq (2013)

Os estudos para a reestruturação da matriz energética brasileira apontaram a necessidade de criação de uma política nacional para a substituição paulatina do óleo diesel pelo biodiesel de produtos vegetais e da biomassa (MATTEI, 2007). Em 1998, a ANP autorizou a realização de testes e comercialização de combustíveis não especificados, entre eles o biodiesel. Com isso, observa-se na Tabela 1 o aumento no número de grupos de pesquisas credenciados no DGP/CNPq. Dos 48 grupos cadastrados no período de 1996 a 2000, 64,58% foram criados a partir de 2008.

O número de grupos continuou a crescer na década de 2000 em dois momentos distintos. O primeiro de 2001 a 2005 com a criação de 61 grupos pode ter ocorrido em decorrência da instituição do PROBIODIESEL pela Secretaria de Política Tecnológica do Ministério da Ciência e Tecnologia. Junto com o PROBIODIESEL, uma rede de pesquisa foi organizada com o intuito de promover a competitividade técnica, econômica e ambiental do biodiesel em relação ao diesel disponível comercialmente (RAMOS e WILHELM, 2005).

O segundo momento coincide com o primeiro mandato do presidente Luis Inácio Lula da Silva (2003-2006), quando o PROBIODIESEL foi descontinuado por não contemplar aspectos sociais e em seu lugar foi instituído o PNPB. Assim, de 2006 a 2010, foram credenciados 163 grupos junto ao DGP/CNPq, englobando diferentes áreas do conhecimento que não faziam parte do escopo original (dominado pelas engenharias), o que mostra a boa receptividade e o aumento da importância da temática biodiesel no cenário científico brasileiro.

Entre as novas áreas estão grupos relacionados com economia, administração e direito das ciências sociais aplicadas; tecnologia de alimentos e recursos pesqueiros das ciências agrárias e; bioquímica e botânica das ciências biológicas.

Com relação à distribuição média de grupos por Estados de cada região, a região Sudeste lidera com 33 grupos, seguida do Sul com 24 grupos, do Nordeste com 12, Centro-Oeste com 9,25⁴ e o Norte com 2,86. O Quadro 1 apresenta uma distribuição dos grupos de pesquisas pelas cinco regiões do Brasil e seus respectivos Estados

Quadro 1 – Distribuição dos grupos de pesquisas credenciados por Região e Estados brasileiros

Região	Distribuição dos Grupos		Representatividade por Estado		
	Número de grupos	% nacional	Estado	Número de grupos	% regional
Sudeste	132	35,68%	São Paulo	49	37,12%
			Rio de Janeiro	42	31,82%
			Espírito Santos	7	5,30%

⁴ Cálculo levou em consideração os três Estados que compõem a região Centro-Oeste mais Distrito Federal.

			Minas Gerais	34	25,76%
Sul	72	19,46%	Paraná	42	58,33%
			Santa Catarina	22	30,56%
			Rio Grande do Sul	8	11,11%
Centro-Oeste	37	10,00%	Mato Grosso	10	27,03%
			Mato Grosso do Sul	15	40,54%
			Goiás	6	16,22%
			Distrito Federal	6	16,22%
Nordeste	109	29,46%	Bahia	31	28,44%
			Sergipe	9	8,26%
			Alagoas	4	3,67%
			Pernambuco	13	11,93%
			Paraíba	16	14,68%
			Rio Grande do Norte	10	9,17%
			Ceará	12	11,01%
			Piauí	7	6,42%
			Maranhão	7	6,42%
Norte	20	5,41%	Tocantins	6	30,00%
			Pará	4	20,00%
			Amapá	-	-
			Amazonas	8	40,00%
			Roraima	1	5,00%
			Acre	-	-

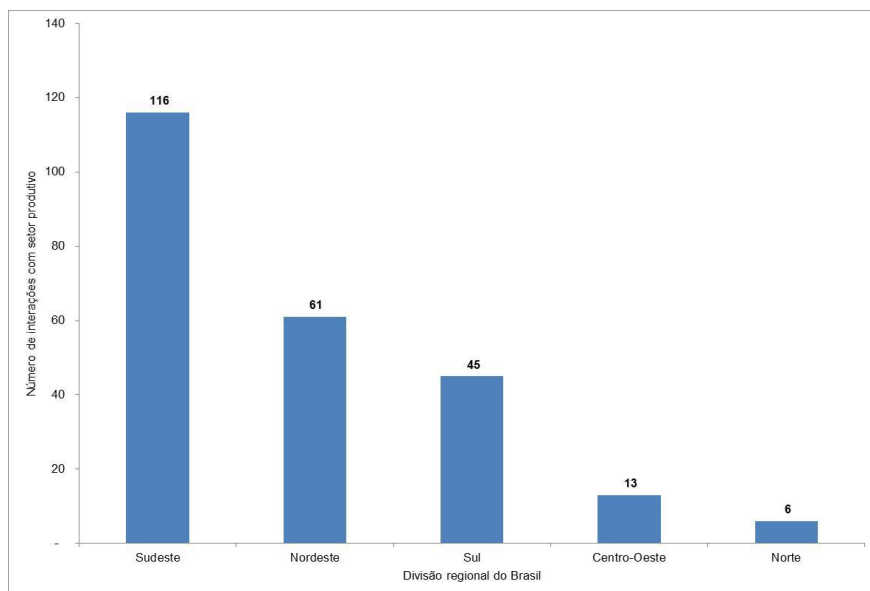
			Rondônia	1	5,00%
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Fonte: DGP/CNPq (2013)

Pondera-se que o as tecnologias em biodiesel atinjam uma maturidade que acarretará uma diminuição de criação de novos grupos, conforme estimado por extrapolação tendo como base o ano de 2013.

Já a análise do indicador interação dos grupos de pesquisa com o setor produtivo mostrou que a região Sudeste, a mais industrializada do Brasil, foi a que mais estabeleceu parcerias com o setor produtivo, seguida pelo Nordeste, Sul, Centro-Oeste e Norte como mostra o Gráfico 1.

Gráfico 1 - Grupos de Pesquisa por Região e Interações com o Setor Produtivo



Fonte: DGP/CNPq (2013)

Mais uma vez, se levar em conta o número de Estados que compõe cada região, os valores do Sul superam em quase 50% os do Nordeste. O Sudeste se mantém na liderança com uma média de quase 30 interações por estado, coerente com o alto grau de industrialização da região.

Já a região Centro-Oeste demonstrou pouca interação com o setor produtivo apesar de responde por quase 50% da produção de biodiesel no país. Este indicador reforça a ideia de que existe ainda um distanciamento da Academia com o setor empresarial.

Quanto aos indicadores números de linhas de pesquisa e contingente de recursos humanos organizados em função dessas, constatou-se que 47,30% dos grupos exploram entre uma e cinco linhas, como mostra a Tabela 2. Vale salientar, que a região Sudeste é a que possui uma maior diversidade de linhas de pesquisa, seguida do Nordeste, Sul, Centro-Oeste e Norte.

Tabela 2 – Número de pesquisa de pesquisas exploradas pelos grupos de 1975 a junho de 2013

Número de linhas	Número de grupos de pesquisa	Frequência relativa	Frequência acumulada
De 1 a 5	175	40,30%	40,30%
De 6 a 10	140	37,84%	85,14%
De 11 a 15	40	10,81%	95,95%
De 16 a 20	10	2,70%	98,65%
Mais de 20	5	1,35%	100,00%

Fonte: DGP/CNPq (2013)

Quanto ao contingente de recursos humanos, estes são classificados pelo CNPq como: pesquisadores, estudantes e técnicos. Nesta análise, somente o quantitativo de pesquisadores e técnicos foi levado em consideração. Assim,

observou-se que o Grupo de Nanotecnologia Aplicada ao Agronegócio tinha o maior número de pesquisadores cadastrados: 188; o Grupo Agroenergia - Oleaginosas Alternativas Potenciais possuía o maior número de técnicos cadastrados: 34. Ambos os grupos são da Empresa Brasileira de Pesquisa Agropecuária (Embrapa). Contudo, 68,11% dos grupos possuem de 1 a 10 pesquisadores.

Já com relação ao número de técnicos, 48,92% possuem de 1 a 5 técnicos como cadastrados como membros do grupo. Entretanto, um dado chamou atenção: 47,30% dos grupos não possuem técnicos em sua equipe. A Tabela 3 apresenta uma distribuição do número de pesquisadores e técnicos pelos grupos de pesquisa.

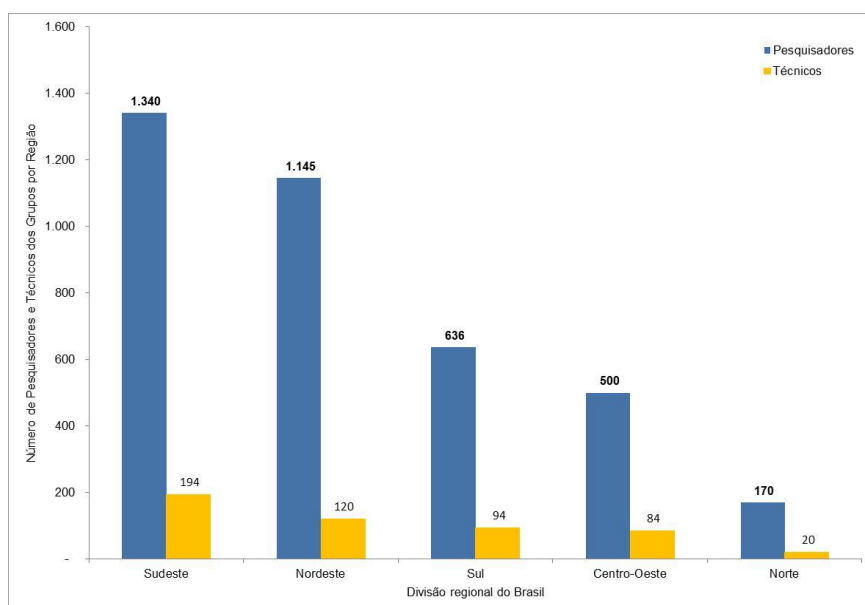
Tabela 3 - Número de pesquisa de pesquisas exploradas pelos grupos de 1975 a junho de 2013

Pesquisadores			Técnicos	
Quantidade de pessoal	Número de grupos de pesquisa	Frequência relativa	Número de grupos de pesquisa	Número de grupos de pesquisa
De 1 a 5	115	31,08%	181	48,92%
De 6 a 10	137	37,03%	9	2,43%
De 11 a 15	71	19,19%	1	0,27%
De 16 a 20	19	5,14%	3	0,81%
Mais de 20	28	7,57%	1	0,27%

Fonte: DGP/CNPq (2013)

Em termos absolutos, foram identificadas 4.303 pessoas envolvidas com os grupos de pesquisa relacionados ao biodiesel, sendo 3.791 pesquisadores e 512 técnicos. Quanto a distribuição desse contingente por região, observou-se que a região Sudeste é que concentra maior número de pesquisadores e técnicos, seguida pelo Nordeste, Sul, Nordeste, Centro Oeste e Sul, como mostra o Gráfico 2.

Gráfico 2 - Número de Pesquisadores e Técnicos dos Grupos por Região



Fonte: DGP/CNPq (2013)

Com relação aos números apresentados no gráfico acima, cabe ressaltar que os pesquisadores podem pertencer a vários grupos de pesquisa, inclusive a outras instituições e outros estados. Logo, esses números não indicam que a totalidade do contingente de pesquisadores esteja localizada nessas regiões, embora seja raro o pertencimento de um pesquisador a uma instituição de outro estado de outra região.

Antes de abordar o indicador denominado grupos por área de áreas do conhecimento, algumas explicações são necessárias. As Áreas do Conhecimento é um conjunto de conhecimentos que se inter-relacionam e que foram reunidos segundo a natureza do objeto de investigação com finalidades de ensino, pesquisa e aplicações práticas, proporcionando assim às instituições que atuam em ciência e tecnologia uma forma prática de sistematizar e divulgar informações sobre o desenvolvimento científico e tecnológico (CAPES, 2013).

Esta hierarquização esta estruturada em quatro níveis, que vão do mais geral aos mais específicos, abrangendo 08 grandes áreas, a saber: 1. Ciências Exatas e da Terra; 2. Ciências Biológicas; 3. Engenharias; 4. Ciências da Saúde; 5. Ciências Agrárias; 6. Ciências Sociais Aplicadas; 7. Ciências Humanas; 8. Linguística, Letras e Artes; 9. Outros⁵ (CNPQ, 2013b).

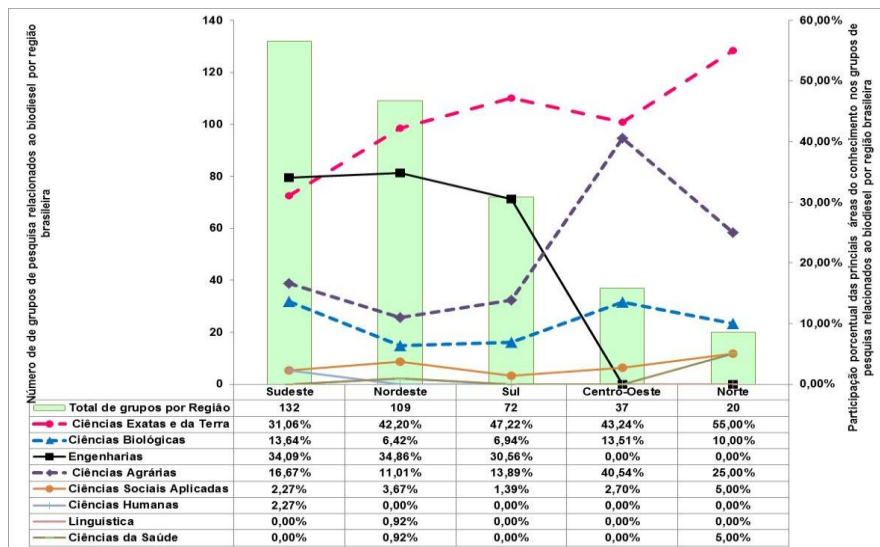
Na análise geral do Brasil, a área que apresentou a maior concentração de grupos de pesquisa no Brasil foi Ciências Exatas e da Terra com 40%, seguida das áreas de engenharias, Ciências Agrárias e Ciências Biológicas com 28,38, 17,30% e 10,00 % respectivamente. Também foi identificados grupos nas áreas das Ciências Sociais Aplicadas (2,70%), Ciências Humanas (0,81%), Ciências da Saúde (0,54%) e Linguística (0,27%). Pode atribuir o surgimento desses grupos com o lançamento do PNPB em 2005 que tem como um dos pilares a inclusão social com a inserção da agricultura familiar na cadeia produtiva do biodiesel.

O Gráfico 3 faz uma correlação entre números de grupos de pesquisas relacionados ao biodiesel por região brasileira com participação percentual das principais área do conhecimento nos grupos de pesquisas nestas regiões. Percebe-se claramente na região Sudeste apresenta um maior número de grupos de pesquisas e a área que de engenharias lidera com 34,09%, seguida da área de ciências exatas e da terra com 31,06%. Por outro lado, as regiões Centro-Oeste e Norte apresentam

⁵ Envolve: Bioética Ciências, Ambientais, Defesa e Divulgação Científica (CNPQ, 2013b)

baixos números de grupos de pesquisa e a área de engenharias não apresentam nenhum índice de grupos de pesquisas relacionados ao biodiesel, nestes referidas regiões. Ademais, a partir desta distribuição pode-se fazer várias análises e interpretações.

Gráfico 3 – Distribuição das Áreas de Conhecimento dos Grupos de Biodiesel no Brasil



Fonte: DGP/CNPq (2013)

6. CONSIDERAÇÕES

Em termos de produção do biodiesel, O PNPB superou as expectativas de sua real capacidade de abastecimento, o que possibilitou o adiantamento dos prazos de implementação dos percentuais mínimos de sua mistura ao diesel, posicionando o país como um dos maiores produtores de biodiesel em nível mundial.

Com a crescente substituição paulatina do óleo diesel pelo biodiesel de produtos vegetais e da biomassa, observa-se um crescente número de pesquisas relevantes com a temática e consequentemente, o número de grupos de pesquisa aumentaram significativamente a partir da década de 2000.

A pesquisa apontou que as regiões Sudeste, Sul e Centro-oeste lideram em todos os requisitos pesquisados e as regiões Nordeste e Norte apresentam grandes fragilidades em quase todos os requisitos.

A região Sudeste lidera o número de pesquisadores e técnicos, lidera a distribuição média de grupos por Estados, lidera a interação dos grupos de pesquisa com o setor produtivo e a que possui uma maior diversidade de linhas de pesquisa. A grande novidade é a região Nordeste aparecendo na 2ª posição da interação dos grupos de pesquisa com o setor produtivo e com relação ao número de pesquisadores e técnicos envolvidos na área em análise.

Ao se analisar a produção científica e tecnológica brasileira em biodiesel, o estudo aqui exposto, utilizando ferramentas de prospecção, aponta evidências de que as novas constituições de grupos de pesquisas espalhados no Brasil, tendo no seu escopo uma base técnico-científica que visa orientar as diversas áreas correlatas ao PNPB, foi decisivo para estimular o fomento à P&D na cadeia produtiva do biodiesel, reunindo um robusto grupo de pesquisadores, com elevada produção científica em um curto período temporal. Esse conjunto de condições consagrou o Brasil como um dos líderes em desenvolvimento tecnológico nesse biocombustível. O país hoje é um dos maiores contribuidores de artigos indexados. Além disso, é também um dos maiores depositantes de patentes. Por outro lado, observou-se que é ainda incipiente a interação das pesquisas acadêmicas com o setor produtivo.

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HUMOR EM COMUNICAÇÃO DE CIÊNCIA – MICROORGANISMOS AOS QUÁDRADINHOS

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Resumo

A comunicação de ciência à sociedade constitui um tema muito actual e de reconhecida importância. Na verdade, a ciência e a tecnologia dominam o nosso quotidiano com termos, conceitos e produtos que nos “esmagam” todos os dias. É pois imprescindível o aumento da cultura científica do público em geral, para que possamos viver numa sociedade informada, responsável e com capacidade de opção/ decisão nas mais diversas áreas. No entanto, ao comunicar ciência a um público não especializado, para que esta comunicação seja efectiva, é preciso ter em conta alguns pormenores, nomeadamente a linguagem utilizada e a capacidade de motivação do público receptor da mensagem. A espécie humana é maioritariamente visual, ou seja, “uma (boa) imagem vale mais do que mil palavras”. Por outro lado, o humor inteligente e moderado pode ser uma ferramenta valiosa como gatilho iniciador da resposta empática com o público. A arte sequencial animada em geral e o *cartoon* em particular, constituem uma ferramenta que consegue conjugar as duas facetas anteriores. No presente trabalho apresentamos o caminho percorrido na utilização de *cartoons*, para esclarecer e desmistificar uma série de conceitos associados à microbiologia *sensu lato*. Constata-se que esta área está fortemente associada a preconceitos e ideias erradas que, lamentavelmente, se encontram disseminadas pela população não especializada. A nossa actuação cobre as diferentes etapas do processo desde a triagem e escolha do tema, à redacção da mensagem com rigor científico usando linguagem ajustada ao público-alvo, à concepção da imagem, à finalização do *cartoon* e, ainda, à sua apresentação pública tanto em recursos *online*, como em feiras de ciência que implicam uma interacção directa com o público.

1.- O HUMOR NA COMUNICAÇÃO DE CIÊNCIA

A sociedade actual está cada vez mais refém de actividades de natureza científica e tecnológica, seja na gestão dos recursos naturais, na resolução das questões energéticas, ou na resposta a problemas de saúde e alimentares, entre muitos outros campos.

A Ciência é um mundo fascinante que deverá ser transmitido ao público não especializado, de forma apelativa e, simultaneamente, directa e precisa. Que estratégias

de comunicação devem ser usadas? De que formatos e suportes dispõem os comunicadores de Ciência, *sensu lato*, para passar a sua mensagem? Basicamente todas as estratégias são válidas desde que resultem conseqüentes no seu propósito. Em termos de suporte/ veículo da mensagem, as possibilidades são imensas e têm aumentado nos últimos tempos, com o desenvolvimento dos recursos tecnológicos e com a tomada de consciência de que a Comunicação de Ciência à sociedade é um direito, e um dever. Um direito de todos os cidadãos. Um dever de quem tem acesso privilegiado a este domínio do Conhecimento [1].

Para o sucesso do processo de comunicação é imprescindível que os vários actores envolvidos, emissor(es) e receptor(es) partilhem a mesma linguagem. Também a relação emocional criada entre ambas as partes, associada à comunicação não-verbal no caso de contacto directo, ou por exemplo a estratégias gráficas no caso da comunicação escrita, é de enorme importância. Um dos trunfos mais eficazes no desenvolvimento de *empatia* entre emissor e receptor, e responsável pelo aumento de motivação por parte do último, é a existência de ambiente descontraído, bem-disposto e algumas vezes, inesperado [2]. É nesta ferramenta que têm origem diversos *modus operandi* actuais em Comunicação de Ciência que vão da *stand-up comedy*, a oficinas temáticas, museus com estratégias *hands-on* e publicação de recursos – livros e jogos – com determinadas particularidades.

2.- O CARTOON COMO VEÍCULO DE COMUNICAÇÃO DE CIÊNCIA

O termo *cartoon* surgiu na Idade Média referindo-se ao esboço de uma obra de arte, pintura ou escultura. Só mais tarde, já no século XIX, foi associado a uma ilustração de carácter humorístico publicada na imprensa diária, de que é exemplo pioneiro a revista Punch [3] [4].

O *cartoon*, como forma de arte sequencial composta por texto e imagem, revela-se uma ferramenta interessante para a divulgação “descontraída” de conhecimento científico [5] [6]. Há mesmo quem defenda que a imagem, incluindo o *cartoon*, permite que os alunos se interessem por Ciência e a aprendam, para além do “decorar texto para os exames” [7]. Tal ocorre pois a maior parte da população faz uso da visão para obter e reter novas informações, pelo que compreendem mais facilmente uma imagem ou gráfico associado a algum texto do que a uma mancha de texto apenas [8]. No âmbito do campo virtual surgem alguns blogues e páginas em redes sociais que publicam regularmente *cartoons* sobre ciência e que, “à boleia” de algum humor, despertam o público que os visita para assuntos sérios e actuais de natureza científica [1]. Resumindo, quando utilizados de forma inteligente em Ciência, os *cartoons* permitem ao leitor adquirir conhecimentos sobre vários temas, mesmo que se usem abordagens mais fictícias e fantasiosas para explicar conceitos verdadeiros [9].

3.- O PROJECTO “MICRORGANISMOS AOS QUADRADINHOS”

3.1.- A escolha do conteúdo científico

A Microbiologia, como ramo da Biologia que se encarrega do estudo dos organismos de reduzidas dimensões (microrganismos) e das suas relações com o meio ambiente, é de facto de difícil compreensão para a população em geral. Para o cidadão comum os microrganismos, geralmente conhecidos por germes ou micróbios, existem mas passam despercebidos até que alguém adocece ou algum alimento se decompõe [10] [11]. As doenças causadas por microrganismos patogénicos, ou a deterioração de alimentos não conservados são os momentos altos do reconhecimento da existência de vida microscópica. No entanto, a actividade dos microrganismos não passa apenas por estes efeitos negativos. Na verdade, o papel benéfico dos microrganismos é incomensuravelmente maior. Chocolate, café, iogurte, queijo, vinho, cerveja, *pickles* e pão são apenas alguns dos alimentos cuja produção não seria possível sem a acção microbiológica. Adicionalmente, os microrganismos também são importantes na saúde, por exemplo na produção de antibióticos e de outros princípios activos, na formulação de probióticos e na constituição de vacinas, para citar apenas alguns. Passando para o campo do ambiente encontramos microrganismos a mitigar desastres ecológicos, a produzir (bio)combustíveis alternativos, a biolixiviar metais pesados, a agir como bioinsecticidas e em muitas outras soluções de cariz protector/ regenerador dos ecossistemas.

O projecto “Microrganismos aos Quadrinhos” surgiu no âmbito da Licenciatura de Biologia Aplicada da Universidade do Minho. Os objectivos inicialmente propostos passaram por agir de forma a desfazer preconceitos e mitos que rodeiam a Microbiologia, com recurso a mensagens claras, directas, assertivas, visuais e bem humoradas. Juntando todas estas características, a escolha recaiu sobre a utilização da arte sequencial animada, mais concretamente do *cartoon* sob a forma de tira, e permitiu criar uma colecção de seis *cartoons* que abordam o papel benéfico dos microrganismos em três grandes áreas: alimentação, saúde e ambiente. Em relação ao primeiro caso, alimentação, são contempladas diversas particularidades do papel das leveduras na produção de dois alimentos tradicionais, o pão (constituição do fermento de padeiro, crescimento da massa, gemulação) e o vinho (produção de gás e de etanol, multiplicação celular, fermentação primária e transfega do mosto). No campo da saúde optou-se por abordar a questão dos alimentos probióticos como potenciadores do bom funcionamento do sistema digestivo e da utilização das vacinas na estimulação do sistema imunitário. Neste último caso deu-se particular enfoque à vacina do tétano e diferia uma vez que, em Portugal, faz parte do programa nacional de vacinação e implica reforços de dez em dez anos, ao longo de toda a vida [12]. Por fim, em relação ao papel dos microrganismos em questões ambientais, aborda-se a capacidade de alguns metabolizarem derivados do petróleo (ajudando na limpeza dos ecossistemas quando ocorrem desastres ambientais designados marés negras), e ainda, ilustra-se a interacção

simbiótica entre bactérias fixadoras de azoto e células vegetais, que ocorre a nível dos nódulos das raízes das leguminosas.

3.2.- O procedimento gráfico

O processo de produção dos seis *cartoons* que constituem a galeria “Microorganismos aos Quadrinhos” ocorreu sequencialmente, por fases, obedecendo a uma lógica comum a todos eles e que passaremos a explicar com algum detalhe. O procedimento encontra-se ilustrado na figura 1.

Após a escolha do tema, ou seja, da aplicação biotecnológica do microrganismo, idealizou-se uma acção que fosse passível de ser representada com recurso ao *cartoon*. Nesta fase foi preciso ter em conta as características e limitações da técnica, a adequação do conteúdo científico e linguístico ao público em geral, e ainda, a componente humorística em dose sensata e inteligente, capaz de criar ligação emocional e funcionar como facilitadora da obtenção de conhecimento.

O grafismo começou com a materialização das ideias no papel usando lápis e/ou caneta (Fig. 1A). Uma vez esta finalizada, procedeu-se à digitalização dos desenhos que permitiu a sua manipulação digital (Figs. 1B e 1C). Para a edição digital usaram-se os programas Adobe Photoshop CS6 v13.0 e Adobe Photoshop CC v14.0. Nesta etapa procedeu-se à pintura tentando criar um contraste entre o fundo e as personagens (Fig. 1D). A presença de cores fortes nas personagens torna o *cartoon* mais apelativo e foca a atenção do público nos aspectos que importam realçar, para que a mensagem passe de modo efectivo. Seguidamente foram adicionados os elementos textuais, quer os balões de diálogo das personagens, quer o texto que acompanha cada quadrado (Figs. 1D e 1E). Este último é constituído por uma ou duas frases fragmentada(s) ao longo das vinhetas constituintes da tira e que, para além de criar(em) uma lógica unificadora da mesma, fornece(m) informação adicional acerca do assunto tratado. Em todas estas modificações foi necessário corrigir erros de traço inerentes ao desenho/ digitalização, o que requereu trabalhar com uma resolução mínima de 600dpi (*dots por inch*, pixéis por polegada) e um *zoom* de até 300%. Como seria expectável, foram necessárias várias adaptações da ideia original ao longo da produção do *cartoon*, numa lógica de actuação iterativa, à medida que os *cartoons* começavam a ganhar forma e a fazer sentido. Entre elas destacam-se: a adição/ remoção de quadrados, a reformulação de diálogos, a mudança de cores e a adição de novos elementos (Fig. 1F). Estas adaptações tiveram como objectivo tornar a compreensão mais fácil por parte do público.

Durante esta fase os protótipos dos *cartoons* foram alvo de análise qualitativa por parte de elementos externos ao projecto. Para isso a equipa contou com a participação de cerca de 15 pessoas das mais variadas áreas e idades, o que permitiu ajustar ainda alguns pormenores gráficos e de texto, de forma a tornar o *cartoon* mais claro e eficaz (Fig. 1G). Finalmente, foi ainda adicionado contorno de cor negra às vinhetas e, sobre ele, elementos de identificação do projecto (Fig. 1H).

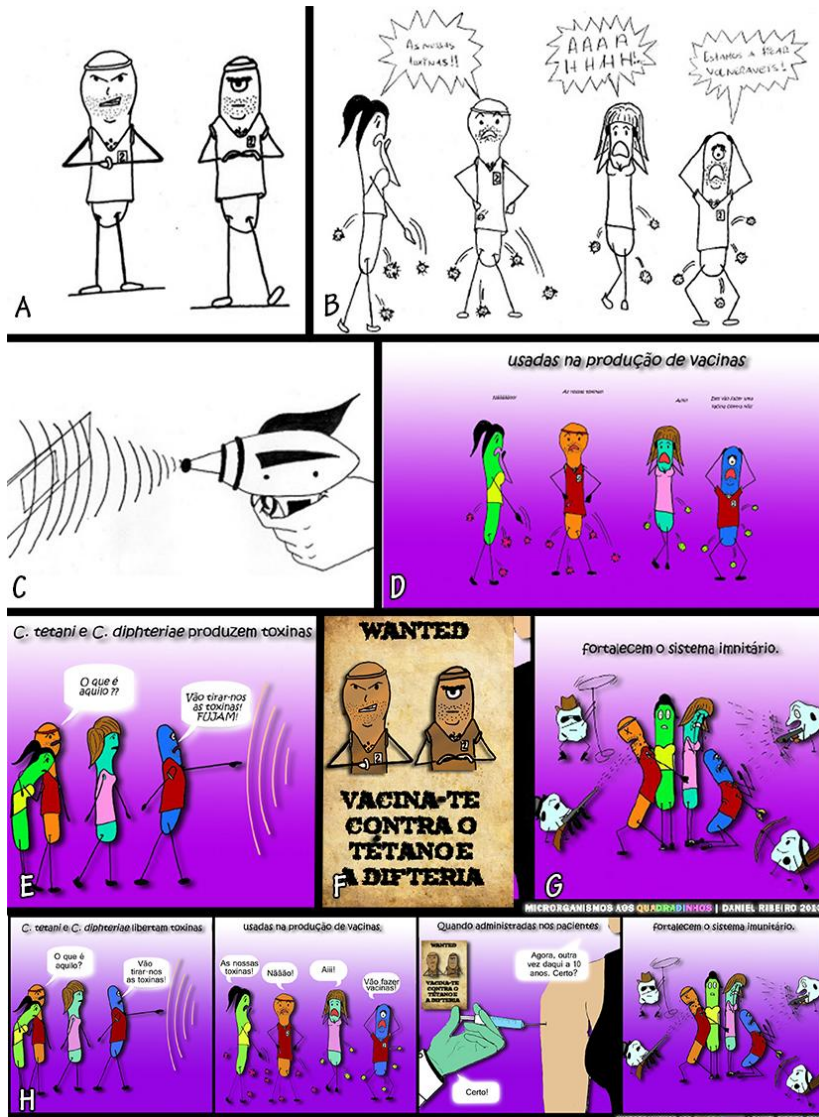


Fig. 1 Etapas da produção gráfica dos *cartoons*: desenho a lápis em papel (A), digitalização e manipulação digital da imagem (B) (C), pintura digital e introdução de texto (D),

introdução do texto com recurso a balões (E), adição de novos elementos no decorrer da produção do *cartoon* (F), adição de margens negras e identificação do projecto (G) e montagem final da tira (H).

4.- A DIVULGAÇÃO

Como referido anteriormente, os *cartoons* a que se refere o presente trabalho constituem uma galeria denominada “Microrganismos aos Quadrinhos” e foram produzidos no âmbito de um projecto de licenciatura. Posteriormente, e cumprindo o propósito com que foram criados – comunicar conceitos de ciência no âmbito da microbiologia, a um público não especializado - os *cartoons* foram divulgados através de diferentes abordagens e suportes de comunicação (Fig. 2). A galeria dos seis *cartoons* pode ser consultada na internet a partir da seguinte ligação <http://flic.kr/s/aHsjHiUtD9>.

Fazendo uso de recursos de comunicação *online* foi criado um álbum na página do projecto de divulgação de Ciência STOL (*Science Through Our Lives*) [13] na rede social Facebook, que conta com mais de 3000 visitas semanais. Este álbum, denominado “Ciência aos Quadrinhos” (<http://bit.ly/fb-stol>), para além da colecção, divulga ainda a evolução da ideia e o âmbito do projecto. E ainda, convida quem estiver interessado, a participar com ideias ou objectos criados, desde que estes obedeçam aos critérios exigidos: criatividade, rigor científico, qualidade de execução, clareza da mensagem e sua pertinência. Também em termos de *marketing* digital, o projecto foi tema de um texto de divulgação denominado “Ciência aos Quadrinhos” (<http://bit.ly/MaQ-drn>), publicado, a 27 de Julho de 2013, no blogue de ciência *De Rerum Natura* [14], um dos mais antigos e conceituados blogues de Ciência escritos em língua portuguesa. Pelos comentários escritos, foi clara a curiosidade que a ideia suscitou. Entretanto, quatro dos *cartoons* da galeria foram ainda submetidos ao concurso do Banco de Imagens da Casa das Ciências (portal colaborativo particularmente dirigido a professores, que disponibiliza livremente diversos recursos digitais) [15] na categoria de ilustração. Neste momento ainda está a decorrer o processo de avaliação das candidaturas.

Numa outra vertente de interacção, o contacto directo com o público em ambiente descontraído geralmente associado a festas ou festivais de Ciência, a colecção foi exposta no âmbito da Noite Europeia dos Investigadores 2013 (NEI13) [16], projecto europeu a decorrer em simultâneo, a 27 de Setembro, em mais de 300 cidades europeias. Na cidade de Braga as actividades NEI13 tiveram lugar no museu D. Diogo de Sousa e o evento atraiu centenas de visitantes. De realçar que entre as diversas actividades, a colecção Microrganismos aos Quadrinhos foi uma das poucas que recebeu particular destaque na imprensa regional sendo alvo de uma peça individual intitulada “A Biologia em *cartoons*” onde se são referidos e divulgados aspectos pertinentes deste trabalho.



Fig. 2 Alguns pormenores da divulgação da colecção “Microorganismos aos Quadrinhos”.

5.-Perspectivas futuras

Em termos futuros os projectos são muitos, até porque como já tivemos oportunidade de constatar, a ideia agrada e a estratégia funciona. Por um lado é nossa intenção continuar a ter uma relação directa com o público. Nesse âmbito vamos participar na Festa da Ciência entre de 12 a 14 de Maio, uma iniciativa organizada pela Escola de Ciências da Universidade do Minho, cujo programa integra actividades de divulgação da Ciência com workshops, sessões *hands-on*, concursos, palestras e exposições, dirigidas aos alunos dos ensinos pré-escolar, básico e secundário, (<http://bit.ly/FCiencia14>).

Por outro lado, e com vista a possibilidade de publicação em páginas de divulgação de Ciência com elevada taxa de visitantes, particularmente em redes sociais, está pensada a tradução dos *cartoons* para outras línguas, em particular para língua inglesa.

Numa outra vertente completamente diferente, com o objectivo de avaliar o desempenho até ao momento e, eventualmente, melhorar as linguagens escrita e/ou gráfica que têm vindo a ser utilizadas, ou mesmo de adaptar os textos a diferentes faixas etárias, está pensada uma colaboração com colegas das Ciências da Comunicação. Por exemplo, uma hipótese em consideração é a aplicação e análise de diversos instrumentos ao dispor, nomeadamente, entrevistas, inquéritos e grupos focais.

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