THE INTERVIEW AS A LEARNING TOOL: AN EXPERIENCE OF EMOTIONAL MOTIVATION IN ENGINEERING DEGREES

N. Laguarda-Miró, J.M. Terrés-Haro, J. Monreal-Trigo, J. Ibáñez Civera, L. Gil Sánchez, C.A. Olguín Pinatti

Universitat Politècnica de València (SPAIN)

Abstract

Technical studies in Higher Education have traditionally been seen as complex, difficult and abstract by students, and particularly when compared to university careers in the field of humanities, more related to social and human aspects. In the line of innovating in the field of engineering teaching, and with the intention of bringing engineering and learning strategies based on the social dimension, this paper presents an experience of motivation and emotional bonding of students with their degrees in the field of industrial and aeronautical engineering.

In this experience, the interview has been used as an educational tool. So, it has been applied to a very specific topic (sustainability and development in the industrial age) of the subject Sustainable Development and Environmental Ethics (DSEA), included in the program of all the degrees at the School of Design Engineering (ETSID) of the Universitat Politècnica del València (UPV). The experience consisted in interviewing a family member or close person who had lived the industrialization age in the Spanish countryside, in order to enrichen the contents given at class with the personal experience of the interviewed relative.

As a result, the experience is considered very satisfactory by the students as it allows them to reinforce the knowledge acquired in in the classroom being able to link theory to the personal experiences by people close to them who had the chance to experience the emergence of industrialization in the Spanish countryside. Thus, the interview provides students an emotional bond with the matter they are studying, achieving at least three main objectives, as the experience: 1) lets the students know about real experiences by relatives or close people in the industrialization age in Spain, 2) facilitates the contextualization of the matter in this specific historical period and 3) motivates the students to the subject and their careers.

Keywords: interview, motivation, innovation, engineering, higher education.

1 INTRODUCTION

The European University has evolved greatly since the Bologna process entered into force in 2010 from previous institutional statements and the enormous work done to finally become a common European reality [1,2]. The three main aspects in which the process emphasized (students' employability, competitiveness and mobility promotion) have allowed progress in European Higher Education, creating the well-known European Higher Education Area (EHEA) and developing multiple improvement strategies in these three fundamental pillars and also others more or less directly linked to them [3].

Additionally, modernization of the European university has also allowed to reduce the gap between technical and humanistic studies, as technical degrees have been traditionally perceived as complex, difficult and detached by students compared to humanistic careers more social and related to human aspects. Reducing this difference means improving the learning-teaching process in engineering studies and bonding students to their corresponding careers in a closer way [4].

Following the line of other works presented before regarding motivation of students by developing their active role at class, in research projects and in university management activities [5-8], this particular case introduces an experience to improve the emotional motivation of students in class and their active role in the learning-teaching process by performing a complementary action that also allows revising and consolidating concepts learned in the classroom.

Thus, this paper describes the performance of an activity based on interviewing a close relative, as an action focused on improving their motivation and integration in the classroom and specifically in the development of the learning-teaching process of the subject DSEA. This subject is given in all the

Engineering Degrees of the ETSID at the UPV as a transversal matter to educate the future engineers in environmental aspects. One of the sections in this subject shows an overview of the evolution of the human relationship with the environment. Thus, the introduced activity was designed to be applied to one of its lessons: Human-nature relationship in the industrial age.

Finally, the proposed activity provides students an emotional bond with the matter they are studying, achieving interesting results at least in three main aspects: knowing real experiences by relatives who lived the industrialization age in Spain, facilitating the contextualization of the matter and motivating the students to the subject and their careers.

The obtained results let us introduce this experience as a successful activity to reach the intended purposes.

2 AREA OF APPLICATION

2.1 Universitat Politècnica de València

The UPV is one of the leading universities in Spain and the first Spanish technological university in the Academic Ranking of World Universities (ARWU or Shanghai Ranking) [9]. Since its inception in 1969, it has been characterized as a university at the service of the society from which it nourishes, providing professionals trained to the highest standards and adapted to the new demands of a modern and changing society,

At the present time, the UPV is formed by more than 35,000 people of whom 30,750 are students, 3,422 are professors and research staff who study and teach in 40 Bachelor's degrees, 80 Masters and 30 Ph.D. programs. The UPV degrees are given with a modern teaching based on the criteria of the EHEA and according to the best teaching practices to train the best professionals [10].

For instance, the Reverse Teaching program is an innovative and remarkable program that is being developed for 6 years at the UPV. This project pursues improving the learning-teaching process through an active role of students in the classrooms [11].

This is just an example of the UPV compromise with the teaching improvement and the use of learning-teaching processes in the classrooms at the highest level. In this line, the introduced activity seeks to improve education through the autonomous and active role of the students in their learning-teaching process at the DSEA course.

2.2 School of Design Engineering

Nowadays, the ETSID conducts its educational activity at the UPV although it started to offer engineers in the industrial area to the Valencian society in 1851 with the native name of "L'Escola Industrial de València" [12].

The ETSID is characterized as a leading and adaptative School able to satisfy the requirements of a changing society and bet on educational innovation. Excellence and life-long learning contribute to the highest formation of our students not just in a technical aspect but also in the humanistic one.

The ETSID is currently offering 5 Bachelor's degrees and 6 Masters with more than 4000 students. In these grades, educational innovation and the most modern methodologies are the basis of training engineers at the highest level. The excellent educational standards let the ETSID to be a reference school not only at the UPV but in the region.

2.3 Sustainable Development and Environmental Ethics

DSEA is an optional subject (4.5 ECTS) scheduled in the 3rd and 4th courses of the five different degrees offered by the ETSID. This subject focus most of the environmental knowledge the students will acquire in their respective Degrees before they become engineers [13].

The main goal of the subject is to be a window to look at the natural environment and understand the remarkable unsustainability of the human behavior in the planet. Additionally, it will also help the students to acquire knowledge, ability and sensitivity to behave in a sustainable way both as responsible citizens and as engineers in the near future.

The structure of the subject is as follows:

- Section 1. A little bit of history: the human being – nature relationship throughout the time.
- Section 2. The principles of environmental ethics.
- Section 3. Sustainable development today.
- Section 4. The consequences of uncontrolled growth.
- Section 5. Future prospects.

Although the subject was already described in depth in a previous communication [14], DSEA is characterized by its practical nature in which the active role of the students at class is fundamental and, therefore, it is likely to be evaluated in a continuous way. The nature of the subject allows new teaching methodologies to be applied and facilitates innovations such as using flipped classroom and performing transversal activities like the one introduced in this communication.

3 THE EXPERIENCE

The experience consisted in suggesting the students to carry out an additional activity to reinforce the acquired knowledge in Lesson nº 7 “The industrial revolution” belonging to Section 1 “A little bit of history: the human being – nature relationship throughout the time”. The proposed activity consisted in a personal interview to a family member or close person who had lived closely the industrialization of the Spanish countryside in the decades of 1960-1970.

Once the family member to be interviewed was defined, the students had to ask a series of questions regarding to aspects dealing with this topic and thus, synthesize the complete interview or its most interesting sections in a maximum of four pages. Finally, the interview had to be uploaded to the PoliformaT platform to be latter reviewed by the teacher.

The questions should be about: Industrial revolution and jobs, studies, economy, food, society, women, traffic and transportation, leisure, communications ... and any other aspect that could be considered important for the student or the interviewed person. These questions were suggested with the intention of guiding the students without limiting their work and thus promoting creativity and the free progress of the interview.

The deadline to upload the interviews was 15 days after the lecture, given that there were Erasmus students and people from different places throughout Spain and different personal cases who experienced difficulties in contacting and interviewing a family member, close relative or friend, due to the distance or absence. For those cases, the most appropriate solution or alternative was proposed.

4 RESULTS

An overall of 34 students carried out the proposed activity. It meant the 43.4% of the total amount of students enrolled in the subject.

As a preliminary result, it was observed that the experience allowed the participating students to reinforce the concepts and theoretical knowledge acquired in the class room and they were able to link theory to the personal experiences by relatives or close people who had the chance to live the rise of industrialization in the Spanish countryside. This first result was easy to recognize when reading and evaluating the interviews. Most of the uploaded interviews clearly showed this link about the previously matter exposed at class and the experiences lived by the interviewed relatives. So, there was a family reinforcement of the matter given at class.

Next, and given that the subject is assessed in a continuous evaluation process, there was a chance to conduct some statistical studies to check the effects of the proposed activities on the final results of the students. Thus, a box and whiskers analysis was done with the data of the continuous assessment of the students enrolled in the subject. The result is shown in figure 1.

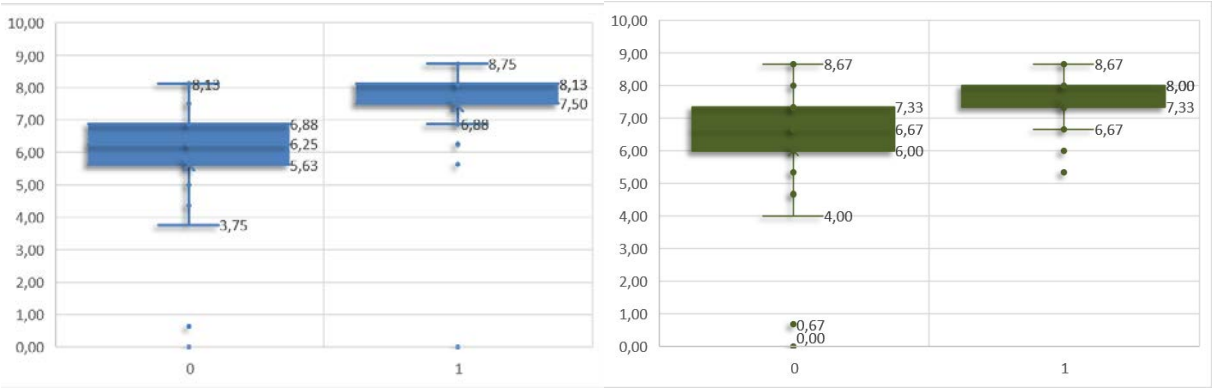

Figure 1. Overall mark of the activities conducted in the subject for both students having conducted the interview (1) and those who did not (0). Box and whiskers graphs for the overall mark including the assessment of the interview (in blue) and not including the interview (in green).

The box and whiskers analysis showed interesting results. Firstly, a comparison of the overall marks of the activities conducted in the subject by the students depending on they had conducted the interview or not was carried out. This analysis is shown in blue in figure 1 and clearly shows a difference between these two groups of students. Those not having conducted the proposed activity obtained remarkably lower final marks in an average of 6.25 in a range of 8.13 and 3.75 and upper (75%) and lower quartiles (25%) of 6.88 and 5.63 respectively. Students having conducted the interview obtained higher results in an average of 7.81 in a range of 8.75 and 6.88 and upper and lower quartiles of 8.13 and 7.50 respectively.

These overall marks were compared to the obtained not including the interview in the final mark. It allowed to study the final results independently and not directly affected by the mark obtained in the interview by the students. Results are shown in green in figure 1 and reinforce the above-mentioned results: students having conducted the interview obtained remarkably higher qualifications than those who did not. In this specific case, students not having conducted the activity obtained marks between 8.67 and 4.00, upper and lower quartiles of 7.33 and 6.00 respectively and an average mark of 6.67 with two values out of this range. Opposite, students having conducted the interview obtained marks in the range of 8.67 and 6.67, upper and lower quartiles of 8.00 and 7.33 respectively and an average mark of 7.66.

These results reinforced the preliminary one and also showed that there is an effective link between the proposed activity and the learning-teaching process in this matter. The improvement in the marks are clear and remarkable demonstrating the effectiveness of emotional motivation as conducting this activity not just led into a higher final mark including this activity but also into a general motivation for the subject that provokes higher marks independently of the individual result obtained in the interview.

5 CONCLUSIONS

As a conclusion, the experience is considered very satisfactory by the students as it allows them to reinforce the knowledge acquired in in the classroom being able to link theory to the personal experiences by people close to them who had the chance to experience the emergence of industrialization in the Spanish countryside. Thus, the interview provides students an emotional bond with the matter they are studying, achieving at least three main objectives, as the experience: 1) lets the students know about real experiences by relatives or close people in the industrialization age in Spain, 2) facilitates the contextualization of the matter in this specific historical period and 3) motivates the students to the subject and their careers obtaining better qualifications.

REFERENCES

[1] Conference of Ministers responsible for Higher Education, The Bologna Declaration, Bologna, 1999.

[2] Conference of Ministers responsible for Higher Education, Realising the European Higher Education Area, Berlin, 2003.

[3] Cátedra Unesco. Propuestas para la renovación de las metodologías educativas en la universidad. Comisión para la renovación de las metodologías educativas en la universidad. Ministerio de Educación y Ciencia. 2006.

[4] N. Laguarda Miró et al. Mejora de la enseñanza mediante participación espontánea y recurrente del alumnado. X CONGRESO DE INNOVACIÓN EDUCATIVA EN LAS ENSEÑANZAS TÉCNICAS. ISBN 84-9705-208-0. Universitat Politècnica de València, Valencia, 2002.

[5] N. Laguarda, et al. *La motivación personal y la adquisición de conocimientos en las enseñanzas técnicas.* XIII Congreso Universitario de Innovación Educativa en las Enseñanzas Técnicas. Las Palmas de Gran Canaria, Spain, 2005.

[6] N. Laguarda et al., Profiting Students' job experiences at class: Acquiring perspectives for professional future. 5th International Technology, Education and Development Conference (INTED), Valencia, 2011.

[7] N. Laguarda Miró, N et al. Valoración por las Empresas de las Competencias en las Prácticas Realizadas por Alumnos de la Escuela Técnica Superior de Ingeniería del Diseño. 26 Congreso Universitario en Innovación Educativa en las Enseñanzas Técnicas (CUIEET). ISBN: 978-84-17445-02-7, Gijón, 2018.

[8] N. Laguarda-Miro et al., Students participation in University management tasks: a motivation strategy. Environmental sensitization under review, 13th International Technology, Education and Development Conference (INTED), Valencia, 2019.

[9] Shanghai Ranking Consultancy., Academic Ranking of World Universities. (www.shanghairanking.com/) Visited on-line: 23/12/2019

[10] UPV., Mission statement, vision and values, Universitat Politècnica de València. (www.upv.es) Visited on-line: 23/12/2019.

[11] UPV., Competencias Transversales. Conoce el Proyecto Institucional. Universitat Politècnica de València (http://www.upv.es/contenidos/COMPTRAN/) Visited on-line: 23/12/2019.

[12] ETSID., La Escuela. Design Engineering School. Universitat Politècnica de València (http://www.etsid.upv.es/alumnos/). Visited on-line: 23/12/2019.

[13] UPV., Course Description 2018/2019. Sustainable Development and Environmental Ethics, Universitat Politècnica de València. (www.upv.es) Visited on-line: 23/12/2019.

[14] N. Laguarda-Miro et al., Assessing transversal competences in sustainable development and environmental ethics. Environmental sensitization under review, 10th International Technology, Education and Development Conference (INTED), Valencia, 2016.