

# APPLICATION OF ACTIVE METHODOLOGIES IN A UNIVERSITY SUBJECT

**Raúl Oltra-Badenes**

*Universitat Politècnica de València (SPAIN)*

## **Abstract**

The European Higher Education Area (EHEA) implies the transmission of an educational model centered on teaching, towards a model centered on the autonomous learning of the student. Therefore, traditional subjects, for their adaptation to this EHEA, must be adapted with participatory practices for the achievement of the new objectives, and taking into account that the students must acquire a series of capacities, that, in general, had not been imparted or evaluated previously.

This kind of capacities could be, for example, the capacity of work in group, the capacity of oral presentations making, solving problems, etc.

In this environment, concepts as "cooperative learning", "group activities" and "group work techniques" are getting more and more important each time.

The present work explains the different techniques used in the subject "Integrated Information Systems in Industrial Companies" of the "Degree in Industrial Organization Engineer" with the purpose of motivation, self-learning and improving the development of competences by the student, including some of them of transversal type, as, for example, the capacity for group work or oral presentation

Keywords: Active methodologies, cooperative learning, group activities, group work.

## **1 INTRODUCTION**

### **1.1 Active methodologies**

Nowadays "active methodologies" in education can be understood as the methods, techniques and strategies that are used by the docent to convert the teaching-learning process into activities that encourage the student's active participation and learning. When the docent is designing a comprehensive educational program that prepares the students for their profession, is necessary to take into account what the environment demands: professionals with skills such as autonomy, multidisciplinary teamwork, participative attitude, communication and cooperation skills, problem solving, creativity, etc. All these aspects must be covered in the curriculum.

The philosophy of the European Higher Education Area (EHEA) represents an educational change in which several elements are related. On the one hand, the harmonization of higher education systems, the mobility of students and teachers and the quality of education; on the other hand, the change from teaching to learning in which students are taught to think, speak and do, which is an opportunity to improve university teaching practices.

From the point of view of training, this reality is the theme of university learning in this knowledge society, which is increasingly translated into important changes in training models.

In this sense, without deepening the features that characterize a new culture of learning and teaching, there are certain tendencies in the nature of "knowledge" that the university manages and must be considered as challenges for the knowledge society world. that arises in teaching and university learning. In the first place, the knowledge is becoming more and more extensive. Second, knowledge presents a tendency to fragmentation and specialization and, thirdly, the pace of production of that knowledge is increasingly accelerated and, therefore, its obsolescence also grows [1](Alvarez, 2009).

Active methodologies are necessary to integrate into the process of adapting university education to the EHEA and research into these techniques will undoubtedly facilitate their incorporation. An adequate change in teaching practices will allow society to offer creative, reflective professionals with a solid base of technical and technological knowledge, capable of learning throughout life and with essential communication skills nowadays.

The university, as a trainer of professionals and a creator of science and technology, faces an important challenge: to pay its land in an appropriate way to obtain graduates with knowledge, skills and abilities, as well as competent in the working world; qualities that undoubtedly foster these methodologies actively.

## 1.2 General environment and Cooperative Learning

The European Higher Education Area EHEA involves the transition from an educational model centered on teaching to a model centered on the autonomous learning of the student. In this new approach, the protagonist is the student himself, who abandons his traditional passive position to take an active role in the learning process [1]. The teacher, ultimately, cannot act only as a simple transmitter of knowledge; he will have to promote the learning of the skills and abilities that students have to acquire [2].

In this environment, "Cooperative learning" seems to be gaining more and more importance [3]. Cooperative Learning is a method of learning based on team work of students. It includes diverse and numerous techniques in which students work together to achieve certain common objectives for which all team members are responsible. Some of these techniques are those that have been used and are described in the communication presented. Therefore, cooperative learning is a didactic methodology that starts from the organization of the class in small mixed and heterogeneous groups where the students work together and in a coordinated way to solve academic tasks and develop their own learning [4].

However, that students work together, without more, does not necessarily produce a cooperative learning situation. The basic elements necessary for a group work to be truly cooperative are five [1]:

- 1 Positive interdependence
- 2 Positive face-to-face interaction
- 3 Individual responsibility
- 4 Teach students to develop interpersonal and group skills
- 5 Self-analysis or reflection on the work of the group,

With all this, you can reach some competences, that other types of learning do not develop, or at least, not so specifically. The competences that students develop when they apply learning methods based on cooperation are [5]:

- Search, selection, organization and evaluation of information.
- Deep understanding of essential abstract concepts for the subject.
- Adaptation and application of knowledge to real situations.
- Creative problem solving.
- Summarize and synthesize.
- Oral expression.
- Interpersonal skills: performance of roles (leadership, organizer, etc.) and express agreements and disagreements, resolve conflicts, work together, show respect, etc.
- Organization / personal management: planning of times, distribution of tasks, etc.

From these competences the advantages of Collaborative Learning can be glimpsed [6]:

- Development of interpersonal skills and teamwork.
- Development of high-level intellectual skills.
- Responsibility, flexibility and self-esteem.
- Everyone's work: each student has a part of responsibility towards other classmates, inside and outside the classroom.
- Generates "networks" of support for students "at risk": first-year students with difficulties to integrate clearly benefit from this way of working.
- Generates greater enthusiasm and motivation.
- Promotes deep learning against the superficial or memory.

## **2 METHODOLOGY**

### **2.1 Contextualization of the subject.**

The subject in which this action of teaching innovation is carried out is the subject with code 11517, which is called "Integrated Information Systems in Industrial Companies" (SIIEI) and is taught in the Industrial Organization Engineering Degree (GIOI), in the Technical School of Industrial Engineers (ETSII), of the Universidad politécnica de Valencia (UPV).

This subject is taught in the 4th year, and in the second semester, within the intensification of "Information Systems and Knowledge Management". Therefore, it can be said that the students are in the final stage of the Degree, and after completing the subject, they will be able to complete and present the Final Degree Project, and join the labor market, as Graduates in Industrial Organization Engineering.

For this reason, it is considered by the author that transversal competences as, for example, the capacity for group work or oral presentation, are fundamental, because, soon, students are incorporated into the real occupational world, in which the domain of this competences is essential.

### **2.2 Teaching-learning procedures used.**

Some specific activities have been carried out to specifically develop the capacity for group work and oral presentation. These activities are been developed in addition to the explanations of the lecturer, who all the time tries to transmit knowledge so that transversal competences can be developed. That is, explaining practical cases, giving examples of the real business environment, using questions, proposing readings, moderating forums and debates, etc.

These specific activities are: Case Analysis, Project, Report Writing, Oral Exposure and Professional Talks. Below, in the following points is presented an explanation of how each of these training activities have been carried out.

#### *2.2.1 Case analysis*

To develop this formative action, cases based on real situations are presented. The students, divided into groups of 4 people, discuss the solution for about thirty minutes, approximately. Afterwards, there's a general sharing is made, with the participation of the lecturer in the group. In this way, active participation is obtained and the student is motivated, while being taught to analyze problems. It can be obtained in this way that students can come into contact with different ideas, even contrary to their own.

In fact, in some of the cases proposed, the case is presented in the way that the answers that seem more logical, or the more obvious conclusions according to the writing style, are erroneous, in relation to some common errors in the area of knowledge. In this way, the students will be critical with the case, either because they detect this situation, or because they do not detect it, but in the explanation and discussion of the group, are aware of it.

So also the critical thinking of the student, another of the transversal competences of the UPV

#### *2.2.2 Project*

In this formative activity, the students must find themselves a Project to be carried out, based on a theme indicated by the lecturer. The Project must be developed in a real business environment, in which they must find themselves a specific problematic situation, which requires practical solutions in relation to the subject and the other concepts seen in the degree. In this way, in groups of 3 students, they must:

1. - Select the project to be executed, based on the identification of a problem to solve of the real environment.
2. Plan all the details of the Project, defining and distributing the tasks to be carried out to reach the objective.
3. Obtain and structure the information of the real environment (usually of a company).
4. Develop the Project, proposing solutions.
5. Track the project.
6. Present the project.
7. Analyze and evaluate the work done, both jointly, and each of the individual contributions.

Through this project methodology, students are encouraged to take initiative and creativity, but also to deepen time management, responsibility and, above all, to formulate and evaluate hypotheses, plan, find solutions, consult sources of information, write reports, etc.

### 2.2.3 Report writing and oral presentation

These two educational actions are carried out in relation to the Project. As a final result of the same, the students must make a memory in which they present in writing the Project, its development, planning, results and conclusions. This is done based on an orientation guide, which is provided to the students through a template, with a script that they can follow (but also modify based on the specific needs of the Project) for the writing of the final report.

Finally, the students must also make an oral presentation of the work in class, in which all the members of the group must participate.

In this way, with the activities proposed and followed by the students of the subject, transversal competences of Communication, both oral and written, are developed, and of course, working group as well.

## 3 RESULTS

The methodology used in the different practical activities received a very positive feedback from the students. This feedback from the students can be extracted from the results of the ICE (Institute of Education Sciences) of the UPV, which responded positively to the question "The methodology used and the activities carried out in the course help students to learn about the course", obtaining a 9.8 out of 10 in this section of the survey. In addition, a specific survey was made for it on the last day, in which they asked about the activities carried out, and the focus of the subject.

The specific survey was designed using a Likert scale. In it, students were asked to evaluate each of the activities to achieve the objectives of this study, as follows: 1 Very negative; 2 Negative; 3 Normal; 4 Positive; 5 Very Positive 85% of the students of the subject answered the survey.

The answers indicate that, the activity of "Case analysis", receives a "Very Positive" of 50% of the students, a "Positive" of 35.7%, and a "Normal" of 14.3%

In the case of the project activity, it receives a "Very Positive" of 42.9% of the students, a "Positive" of 42.9%, and a "Normal" of 14.3%.

In the Report writing and presentation activity, the rating is "Very Positive" in 35.7%, "Positive" in 42.9% and "Normal" in 21.4%

In addition, the students were asked if they would add more activities, to which 35.7% answered yes, indicating that they would add more case analysis. It was also asked if any of the activities would be eliminated, to which 100% responded that they would NOT eliminate any of the activities carried out.

## 4 CONCLUSIONS

This paper presents the implementation of active learning methodologies in a subject in the subject "Integrated Information Systems in Industrial Companies" of the "Degree in Industrial Organization Engineer" with the purpose of motivation, self-learning and improving the development of competences by the student, including some of them of transversal type, as, for example, the capacity for group work or oral presentation

The response of the students to these new activities introduced was sharply positive, as reflected in the results of the survey carried out to know their assessment to achieve the objectives set. In all cases, the majority responses have been positive assessment, emphasizing that there has not been any response that negatively evaluates the activities and their purpose.

## REFERENCES

- [1] M. S. Álvarez, "Aplicación de la técnica del Puzle de Aronson en la docencia del Derecho Financiero y Tributario", *Documentos - Instituto de Estudios Fiscales*, Vol 30, pp-237-246, 2009.
- [2] A. Fernández March, "Metodologías activas para la formación de competencias", *Educatio siglo XXI*. Vol. 24, no.1, pp 35-56, 2006.
- [3] G.A. García, "El aprendizaje cooperativo como metodología para la enseñanza de la materia Sistema fiscal español", *Documentos - Instituto de Estudios Fiscales*, Vol 30, pp. 119-130, 2009

- [4] J.A. Traver Martí & R. García López, "La enseñanza-aprendizaje de la actitud de solidaridad en el aula: una propuesta de trabajo centrada en la aplicación". *Revista Española de Pedagogía*, 229, 419-438, 2004.
- [5] P. Apodaca, "Estudio y Trabajo en Grupo" in *Metodologías de enseñanza y aprendizaje para el desarrollo de competencias*. pp. 169-190, Madrid: Alianza 2006
- [6] A. Benito & B. Cruz, *Nuevas claves para la docencia universitaria*. Madrid: Narcea, 2005