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IDENTIFYING BAD PRACTICES: A WAY TO INTRODUCE ETHICS IN THE CLASSROOM

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According to the Civil Engineering Bachelor Degree program, students should have acquired, among other knowledge, the skill: "to understand and assume the ethical and professional responsibility of the activity of the Civil Engineer". In order to do this, they can take an optional subject (not all the students enroll), called "ethics of civil engineering" and also the transversal skill "ethical, environmental and professional responsibility" is taught in several subjects of the degree program. This communication presents the methodology used in the subject "Constructions Materials" of second degree course to introduce this transversal skill. The great achievement of this methodology is to have this transversal skill present in all work sessions in the classroom, so the skill becomes part of the daily work of the student. Moreover, it presents additional advantages for the evaluation of the skill thanks to the continuous acquisition of evidence.

Keywords: Transversal skill, Engineering ethics, Professional responsibility, Rubric.

1 INTRODUCTION

The arrival of the European Higher Education Area (EHEA) forced the redesign of Spanish university degrees to match the characteristics of duration (number of credits) and contents of those given in the rest of the EHEA (EC 2009). In 2003, the Ministry of Education and Science published several reports that talk about "to provide a university education that harmoniously integrates the basic generic skills, skills related to the integral formation of persons and more specific skills that enable a professional orientation that allows graduates integration in the labor market" (ANECA 2004).

From these reports, the Civil Engineering Schools of Spain began to design the new degree programs incorporating the transversal skills that had to acquire the students. However, in spite of the fact that they were spelled out and assigned to different subjects, it is possible to say that, in the first years of implementation of these new degrees programs, transversal skills were not systematically worked and not evaluated, what meant that could not guarantee their acquisition.

For this reason, an initiative of the Vice-Rectorate for Studies, Quality and Accreditation of the Universitat Politecnica de Valencia (UPV), and supported by the strategic plan UPV2015-2020 in several of its strategic challenges, developed the institutional project of incorporating transverse skills in the curriculum of graduates of the UPV (2015). The fundamental objective of this action is that the students acquire and can accredit the achievement of these transversal skills.

Based on guidelines and national and international standards, specialized publications and taking into account the regulations or recommendations of some degree programs, the UPV

defined 13 transversal competences that should be exercised in all curricula (Table 1). Most of these skills were already worked on a regular basis, but in most cases were not evaluated.

Table 1. Transversal skills in all degrees of the UPV.

	Transversal Skill
CT-01	Comprehension and integration
CT-02	Application and practical thinking
CT-03	Analysis and resolution of problems
CT-04	Innovation, creativity and entrepreneurship
CT-05	Design and project
CT-06	Teamwork and leadership
CT-07	Ethical, environmental and professional responsibility
CT-08	Effective Communication
CT-09	Critical thinking
CT-10	Knowledge of contemporary problems
CT-11	Life-long learning
CT-12	Planning and time management
CT-13	Specific instruments

To evaluate the acquisition of these transversal skills, the UPV Institute of Education Sciences (ICE), in collaboration with teachers of different degrees, developed several rubrics with some levels of skill acquisition (which had to be achieved in different courses).

As a result of this project, the Civil Engineering School of UPV redefined the transversal skills that should be included in their degree program and how to assess the achievement of the skill using the rubrics. To do this, regardless of the number of subjects that work in this skills, several subjects are stablished as a checkpoint to evaluate the acquisition of the transversal skills in different courses of the degree program, with different levels of acquisition.

According to this organization, the subject "Construction Materials" in the second year of the degree of Civil Engineering would be a checkpoint of transverse skill seven (CT-07) "ethical, environmental and professional responsibility" with the first level of acquisition.

2 OBJECTIVES

The purpose of this communication is to show a way of working the transversal skill "Ethical, environmental and professional responsibility" in the classroom, and how to evaluate it. The reasons for choosing this method of work and the main advantages and difficulties encountered in its implementation will be explained.

3 DEVELOPMENT OF INNOVATION

Since the implementation of the current degree in civil engineering of the UPV, the teachers of the subject "Construction Materials" have taken into account the need to incorporate into their specific teaching, contents related to transversal skills.

3.1 Previous Experience

As a result of the concern for the introduction of transverse skills in the student's curriculum, a project of innovation and educational improvement (PIME) was elaborated. The PIME tittle was "The introduction of professional responsibility in the curriculum of Civil Engineering degree" and it was developed in the course 2013-14. This project involved different subjects from

different courses of the degree program, and it was previous to the strategic plan UPV2015-2020 mentioned above. From this moment we were carried out in the classroom actions collected in the mentioned project and that basically were two.

The first action consisted of raising students' awareness of the professional responsibility that they will assume when graduating, throughout the development of the subjects involved in the project. This is the most usual way for Spanish undergraduates to become aware of the responsibility of their profession. There have always been teachers who describe in the classroom real experiences and decisions taken in the professional field, which undoubtedly influences the training of students and transmit the responsibility that goes hand in hand with their professional work.

The second action was to approach two practical classes throughout the course. In these classes moral dilemmas (Boni and Lozano 2005) were raised and the students had to discuss in small groups and then, there was a general debate. There were several problems in this type of classes. One of the main problems was that for many students it was the first time they faced a moral dilemma, so they did not know very well how to solve it, and could not take into account all the factors that affected the problem. On the other hand, it was prioritized that the moral dilemmas were related to the subjects in whom they were taught, and for this reason did not have an evolutionary character (it was the case that the younger students had to solve the more complicated dilemmas). In addition some teachers expressed doubts about their ability to perform this type of work. To work well the moral dilemmas, you must have knowledge of codes of ethics, and justify in an argued way the final solution. And another of the problems detected with this methodology is that only the transversal skill "ethical, environmental and professional responsibility" was specifically worked on, in the two classes of the course in which the moral dilemmas were raised. It was not a skill present in each of the course classes.

Despite the problems identified, the experience was positive because it allowed designing a rubric to evaluate the students' work and we got to know the students´ knowledge of this skill.

At this moment, from ICE (2015) were published several rubrics related with different levels of skill acquisition. When reviewing the rubrics, we were considered that a level of transversal skill, that we demand, was being too high for students of second course of the degree. And from all the work developed, it was thought of a new activity to bring the classroom daily, this transversal skill, with the right level.

3.2 Description of the Activity

With the experience acquired in previous courses, and with the conviction that the "ethical, environmental and professional responsibility" that our students must have is fundamental to achieve its professional excellence, was designed an activity to work and evaluated this transversal skill in all classroom sessions.

The activity is planned taking into account that it will be carried out in the second course of the degree and that it will get to acquire the first level of dominion in this skill. Also it is taken into account the schedule in which the subject "Construction Materials" is taught. This is 180 minutes classroom sessions with an intermediate rest of 15 minutes.

In order to facilitate the evaluation of the activity, the rubric (Figure 1) designed by the ICE working group has been used, whose purpose is to test whether the student has reached the level required for this skill. In this case the level required is defined as: "the student will be able to question reality and be aware of the concepts and values from which it is built".

The activity consists of preparing individually or in small groups a presentation, of at most five minutes, to expose in the classroom published news, in the press or any media, where there is

an inappropriate behavior by individuals or companies. These inappropriate behaviors may be cases of corruption, poor professional practices, poor use of resources, ecological damage, etc.

INDICATORS	DESCRIPTORS			
	D-Unreached	C-Under Development	B-Good	A-Excellent
Become aware of another way of seeing and perceiving things	They have difficulty understanding that there is a plurality of ideas and people that consider and value reality in a different way	Accepts without question the judgments of other people	Explicitly and reasonably assumes the differences	Incorporate ideas from others into your own reasoning and judgment
Accept critically new perspectives	It only takes into account the perspective of those who are most involved in the course of an action and eludes the point of view of third parties	They maintain critically what has to be preserved in a dialogical positioning In a reasonable positioning	They capture and show sensitivity to the needs and interests of others, their Feelings, values, opinions and reasons	They dialogue constructively with the aim of contributing to the understanding and the solution of problems, respecting and recognizing the pretensions of validity of the other pinions
Difference facts and opinions or interpretations in the arguments of others	They do not differentiate opinions or subjective facts judgments	They question judgments or decisions based on opinions, assessments, etc.	They can difference, objective facts of opinions and evaluations	They can analyze justifiably judgments or decisions based on opinions, evaluations, etc.
Reflect on the consequences and effects that decisions and proposals have on open	There is no evidence that they are aware of the effects of the proposed decisions	They provide for the practical implications of decisions and proposals	They analyze advantages or disadvantages of the effects of the proposed decisions.	Provides ideas for improvement
Recognized the ethical and deontological concepts of the profession	Thinks that ethics belongs to the personal sphere	Expresses basic moral opinions	Expresses moral opinions about the correctness or incorrectness of an activity or action	It is able to elaborate arguments where principles and moral judgments come into play Linked to the profession

Figure 1. Rubric UPV-CT-07. Ethical, environmental, and professional responsibility.

Preferably the matter will be related to civil engineering, but it is not essential. The presentation will present the facts and comment on at least the following aspects:

- Agents involved in the case
- Identification of inappropriate action
- Identification of motivation to perform inappropriate action (economic enrichment, professional promotion, fear of reprisals, etc.)

The presentation will be followed by a discussion of all the students. And from what happened in the classroom, and with the support of the rubric shown in Figure 1, the teacher will evaluate students. In case of group work, all members of the group will obtain the same grade for the presentation, but depending on the degree of participation in the debate, this grade may vary.

As mentioned previously the classroom sessions of this subject is 180 minutes, so "put on hold" for 15 minutes the specific knowledge of the subject to discuss a topic related to ethical, environmental and professional responsibility, is a change of subject which students appreciate.

In many degrees taught at UPV, students have specific subjects related to professional ethics. Undoubtedly, it is a matter with enough importance to work at different times of the training of students. In our opinion that would be the most appropriate; have specific subjects related to ethics, environmental and professional responsibility and strengthen throughout the curriculum with transversal contents.

4 RESULTS

The activity presented has been carried out during the last two courses, in the subject "Construction Materials". Despite the little experience gained, it can be said that the result is being satisfactory. This type of activity has advantages over previous activities, including:

- Transversal skill is present in all classroom sessions, which guarantees its presence throughout the course.
- When making presentations and oral discussion, the teacher present in the classroom, can to carry out the evaluation in a fast, agile and direct way with the help of the rubric. This avoids lengthy corrective writing assignment.
- The evidences of the evaluation are the news, presented by the students in any format (.pdf, .ppt, etc.)
- The students are active during the debate incorporating diverse points of view and enriching the activity
- The debate should be used by the teacher to ensure the acquisition of the expected learning outcome.

So far all the students present in the classroom during the presentations of the works are obtaining a positive assessment in the acquisition of the expected skill level.

5 CONCLUSIONS

It has been presented a way of working and evaluating the transversal competence "Ethical, environmental and professional responsibility" valid for the level of domain required and that allows to acquire the expected learning result. The activity described allows introducing in each classroom session such skill while implying a simple and quick way to evaluate the students with the help of a rubric and with the acquisition of learning evidences.

But nevertheless, the authors believe that include specific courses, in terms of ethics and responsibility, in the curriculum is the most appropriate way to guarantee that certain skills are acquired in university studies. Only in this case would the importance be given to: "A society demonstrates that a subject seems essential for the formation of a professional when it explicitly includes it in its curriculum" (Cortina 2013).

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