

# Experiences in Social Innovation: A Platform for Ethics Through a School of Engineering Studies

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## ABSTRACT

*Convergence is an opportunity to determine the possibility to train students in social skills, assuming that our universities provide valuable training in specific technical and professional skills. This study presents the strategy followed in the Mines and Energy Engineering School of the Polytechnic University of Madrid (UPM from its name in Spanish) to enhance social learning through a program based on the assembly of training practices on Mentoring, Service Learning and social consciousness (Ethics and values in engineering). In this article we discuss about social motivation through social collaboration with qualified entities in the Spanish social landscape such as Tomillo Foundation, Congregation Mary Immaculate as well as looking to a future collaboration with the Ana Bella Foundation.*

*Keywords: Engineering Education, Mentoring, Service Learning, Social Innovation, Social Skills, Specific Skills*

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## INTRODUCTION

In 2006, thanks to a truly innovative initiative within the Spanish university, the Directorate of the School of Mines and Energy (ETSIME) of the Polytechnic University of Madrid (UPM), decides to introduce a supplemental education in order to promote discussion and debate on the ethics and values that should integrate technical and professional education across the engineering curricula taught at ETSIME.

The Unit for Social Entrepreneurship, Ethics and Values in Engineering (UESEVI from

its name in Spanish), introduced the methodology of learning service in an effort to fulfill the purposes for which the university was created for: to grow and transform the man by science and knowledge, in order to prepare a technical, scientific and human professional. The underlying assumption was that to get involved in technical content, the critical understanding of reality is required. Critical intelligence involves the perception of its reason for being.

In the Spanish context, the university in the field of engineering, projects a very technical applied learning, which should integrate

ethics to get more complete and desirable results. In an engineering school in which results and practical solutions are looked for, ethics and values must follow the same path.

Service learning is a tool to combine the three aspects of teaching and practical humanistic theoretical concepts such as ethics, values and those derived from them.

Since then, this new process has been interesting, full of aspects and following various initiatives (subjects, external projects and mentoring). Not without difficulties, but with a positive evolutionary development that has shaped the thematic agenda of the training courses. In 2011 this process has been analyzed and summarized (Muñoz, Flor, García Laso & Martín, 2011, in a collective publication: *Participation and Scientific Culture in an international context* (Díaz & Muñoz, 2011).

In the following the social project of the Mines and Energy Engineering School of the Polytechnic University of Madrid is presented through the development of each one of the branches into which is divided. This project has been recognized with 6 European Credit Transfer and Accumulation System (ECTS) credits for educational activities.

Since specific skills are set out in the curricula designed and verified by “Agencia Nacional de Evaluación de la Calidad y Acreditación (ANECA)” – the Spanish National Agency involve in the quality evaluation of university curricula-, we considered that these 6 credits could overcome the difficulty of incorporating social skills in the teaching of engineering. We assume that those social skills go beyond the topics integrating the degree or the specific branch studies, and therefore we were trying to train students in a range of skills and values that could enable them to act as citizens committed to the others, and that they would project into the common scenario of their professions (Environment and Society).

The design allows students to participate in a continuous or discontinuous manner in the process as we have designed it to facilitate their incorporation to one part or to the whole of the process. As the first step the students are

integrated into the mentor project as mentees, arising the possibility that they can act as mentors from the second year on as mentors and obtain recognition of 2 credits ECTS (Mentor Project).

On the other hand, the students can take the training activity on Ethics in Science and Engineering for any year, activity that is recognized with 2 ECTS credits. It is advisable to have the Mentor Project completed. Finally, the students have the possibility to conduct formative activity included within the general catalog of the UPM: “Towards Social Entrepreneurship: Practice Learning Service” where they can develop the practice of this type of abilities. The advisable path would be to study the activity after have taken Ethics in Science. The latter activity also give the recognition of 2 ECTS credits.

## CONTEXT

The main objective of this project is to provide engineering students with training in applied ethical criteria. This implies a complete training in the values that would transmit to them the need to adhere to ethical and good practice codes in all their activities, and that includes the creation of social values inherent to any of their actions.

The factors that emerge as determinants of this positive evolution are as follows:

1. Introduction of an intergenerational component in the management team that has remained reduced in size but significantly motivated for the successful development of the project.
2. Students’ collective mobilization, from direct personal action of the youngest members of the management team (employees or fellows). This mobilization has been translated into an increase in enrollment.
3. Two strategic decisions made by the School Management at a critical time for the survival of the project. These decisions were made in close collaboration with the teaching team responsible for the subjects.

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