



## **An integrator final exam at the end of the engineering degrees to evaluate the acquired competences**

A. Perdigones (1), E. Sánchez (2), V. Valiño (3), and A.M. Tarquis (4)

(1) Dpto. Ingeniería Rural - EUIT Agrícola, Universidad Politécnica de Madrid, Spain (alicia.perdigones@upm.es), (2) Dpto. Ciencia y Tecnologías Aplicadas a la Ingeniería Técnica Agrícola – EUIT Agrícola, Universidad Politécnica de Madrid, Spain (elvira.sanchez.espinosa@upm.es), (3) Dpto. Ingeniería Rural - ETSI Agrónomos, Universidad Politécnica de Madrid, Spain, (4) Dpto. Matemática Aplicada a la Ingeniería Agronómica - ETSI Agrónomos, Universidad Politécnica de Madrid, Spain (anamaria.tarquis@upm.es)

In the last decade strong changes in the design of university degrees have occurred in Spain, affecting real competences acquired by graduates. The new degrees often provide students greater freedom in shaping their curriculum which results in many cases in a problem for their training. In engineering degrees of Spain, the final project, that allows to know the integrated skills of the students in engineering subjects, is not compulsory anymore; it can be substituted for other specific types of work that often do not involve skills valued by the companies of the industrial sector. This situation may create doubts about the real competences of the graduates.

In the present study, a final exam (voluntary) has been carried out during three years to assess competences in engineering students in the last course of the degree in agricultural engineering (diploma of five years) and agricultural technical engineering (diploma of three years) at the Polytechnic University of Madrid (Spain). They took part 132 students in the years 2006, 2007 and 2008. The exam had a common format, with three parts assessing skills in construction, machinery and electrical installations.

The results showed the evolution in the training of students, and the relationship between skills acquired and late differences in the learning process. The most important conclusions were that the attainment levels was lower than expected, but generally consistent with the training received by each group of students.

In particular, the low number of hours of subjects in electrical installations in certain groups of students was evident when evaluating the skills acquired. The results indicated that they aim to increase the number of hours in certain subjects and groups of students, if a graduate is to get qualified. The authors recommend an examination similar to the raised, integrator type, in all programs that do not have any overall final assessment in order to conduct a quality control of graduates; this approach has the advantage that graduates may also obtain an additional final certificate with their level of competences towards their future professional work.