# Demanded competences in the agricultural engineering sector in Spain

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An engineering education should prepare students, i.e., emerging engineers, to use problem-solving processes that combine creativity and imagination with rigour and discipline. The emphasis on training engineers may be best placed on answering the needs of industry; indeed, many proposals are now being made to try to reduce the gap between the educational and industrial communities.

Training in the use of certain skills or competences may be one way of better preparing engineering undergraduates for eventual employment in industry. However, industry's needs in this respect must first be known. The aim of this work was to determine which skills are used by practising agricultural engineers with the aim of incorporating training in their use into our department's teaching curriculum.

Three surveys were undertaken to determine which skills are demanded by agricultural engineers in their professional activities in Spain. Surveys were carried out by the Department of Rural Engineering, Technical University of Madrid (Spain), analysing two related degrees (agricultural engineer with a duration of the study plan of three and five years, respectively) during the courses 2006/07 and 2007/08.

The first survey determined the competences acquired by the students along their academic studies (371 students interviewed). The second survey determined the skills demanded by the enterprises of the agricultural sector (50 enterprises interviewed). The third survey determined the skills demanded by the agricultural engineers working in the sector (70 engineers interviewed), specifically asking about the computer programs used by practising agricultural engineers.

Surveys showed important differences between the competences demanded by the enterprises and the competences acquired by the students at the university. Enterprises mainly demanded general competences (team working, time organizing, and skills with computer programs) and were less interested in specific technical skills (engineering, economy, biological competences). These differences suggest it might be a good idea to increase the amount of time devoted to the skills demanded by the enterprises. The software packages most commonly used by practising engineers were Microsoft Office / Excel (used by 79% of respondents) and CAD (56%), as well as budgeting (27%), statistical (21%), engineering (15%) and GIS (13%) programs. As a result of this survey our university department opened an additional computer suite in order to provide students practical experience in the use of the demanded competences. The results of this survey underline the importance of competence training in this and perhaps other fields of engineering.