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## Tutorial 2.0 on Technical Drawing 3D and Visualization

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### Abstract

This article shows the experience of applying technologies based on web 2.0 in an environment of learning at university level. Students are more and more familiar with such tools and learning at the University should be sensitive to this evolution. This tutorial 2.0 is based on two virtual environments that support and improve communication in the teaching-learning process: Moodle as an "institutional adapted" platform, and Site Google as an open platform. The temporary planning has been done with the design of a timeline. The implementation of the tutorial 2.0 has been highly accepted by the students. With respect to the teaching staff, they need permanent updates and the adaptation of web 2.0 tools in the development of the subject's guide.

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### 1. Introduction

In recent years, the continuous incorporation of new technologies in the learning process has been an important factor in the educational process [1]. The Technical University of Madrid (UPM) promotes educational innovation processes and develops projects related to the improvement of the education quality.

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The experience that we present fits into the Educational Innovation Project (EIP) of the E.U. of Agricultural Engineering of Madrid. One of the main objectives of the EIP is to "Take advantage of the new opportunities offered by the Learning and Knowledge Technologies in order to enrich the educational processes and teaching management" [2].

Our research group Geovisualization of Special Areas and Heritage (GESyP) works to progress in the introduction of the knowledge and skills specific to the Technical Drawing and Display with accessible electronic formats, in order to facilitate the acquisition of general and specific skills [3].

The subject of Technical Drawing 3D and Visualization (Rg3V) has a workload of 4 ECTS (European Credit Transfer and Accumulation System). This area is part of the specific technology module for Horticulture, Gardening and Landscaping. It responds to the professional and occupational profile of the Cartographic Engineering, Geodesics and Photogrammetry in the scope of its application to agricultural engineering. It is mandatory and is included in the UPM Program (2010) for the Degree of Agricultural Engineering (DAE) by the UPM, see Fig 1.

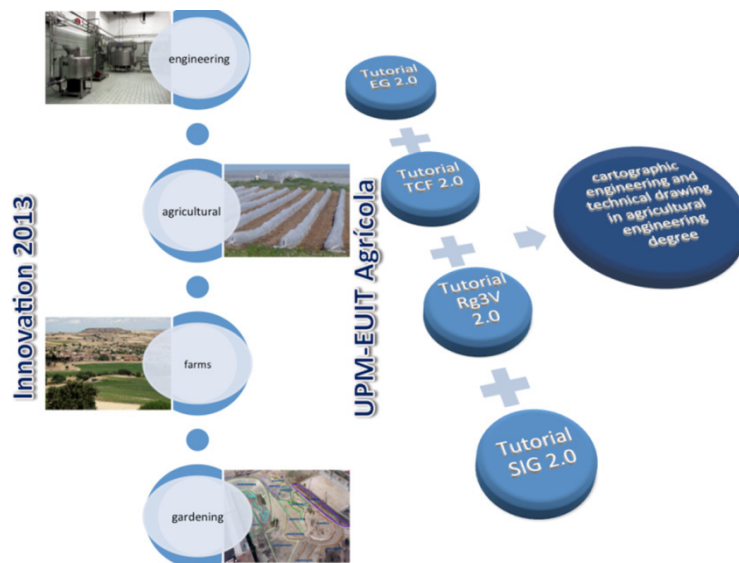


Fig. 1. Formative Rg3V context of the tutorial 2.0

The Tutorial 2.0 objectives are as follows:

- To encourage the student to study and apply the Rg3V in the area of agricultural engineering.
- To integrate the student's Rg3V training and evaluation in cross-disciplinary skills, by introducing active learning techniques in order to develop and evaluate generic and specific competences.
- To guide the student in the area of Cartographic Engineering, Geodesy and Photogrammetry, as well as its close relationship with Science and Related Techniques for its potential development and application in this engineering area.
- To design an interactive graphic material that can support teaching Rg3V subject, as well as self-learning in the virtual platform Moodle and other educational virtual environments 2.0 [4].

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