


Chapter 15

Use of Online Technologies, Open Hardware, and Open- Software for Advanced Architecture Design

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ABSTRACT

The teaching of current technical disciplines poses a substantive change since the student moves from an activity focused on the acquisition of information to an acquisition of skills of various kinds. This learning requires that teaching objectives be set in terms of ability, in professional and existential situations, which are likely to manifest in real life. The project presented aims to develop coordination between three subjects in order to develop an educational experience through the execution of a real case. In the case presented, students will be able to immerse themselves in the complete process of providing intelligence to buildings through the use of low-cost and accessible micro-technologies for capturing information and transmitting data, using cloud databases and data exchange. With this project, it is proposed to implement new teaching methodologies that promote learning based on the acquisition of skills and cooperative work among students.

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INTRODUCTION

The acquisition of skills and competencies has been the cornerstone of the paradigm shift in the new learning models. This has created a major challenge for the educational community. Since the transformation of university education in Europe began in 1999 with the implementation of the “Bologna plan or Process” which led to the creation of the European Higher Education Area (hereafter EHEA), the academy must assess the acquisition by students of several types of skills such as specific to the subject being studied, interpersonal, instrumental, or systematic (Martínez, 2020).

In approach, the goal is not to focus on knowledge transmission to students, but to make them competent in the use of what they have already acquired (Álvarez, Pérez & Suárez, 2008). Furthermore, according to Garrote, Jiménez, and Serna (2018), the use of Information and Communication Techniques (hereinafter ICT) has meant an increase in opportunities in distance training, where they have begun to be used on platforms such as the virtual classroom, MOOC courses (Massive Online Open Courses), or OER (Open Educational Resources) (Bozkurt, et al, 2015).

After the global lockdown caused by the COVID-19 crisis that has given educators time to reconsider education, many teachers found themselves in a learning environment for which they were unprepared (Orakcı, & Gelişli, 2021). In this regard, most of the educational institutions around the world had to suddenly shift to distance education through digital technologies, demonstrating the training of students through ICT. Among other factors, the fact that online learning is vastly more scalable, adaptable, and easy is the main driver of the rapid acceptance and paradigm shift (Orakcı, 2020).

Furthermore, as cited by Tejedor, Cervi, Tusa, and Parola (2020) *‘The need for a transformation of traditional educational systems and the importance of having a virtual educational strategy based on flexibility or the use of methodologies and platforms adapted to screens, among others.’*

This project is committed to conducting a learning experience by immersing students in the application to actual cases to acquire professional skills in the discipline and to work cooperatively. Sessions of learning can be done both face-to-face and online. The project tries to replicate an introductory experience in learning technologies using free and low-cost software platforms, accessible throughout the class, allowing direct contact with the industry subject.

The technologies and ICT systems under study are also a key factor in the new generation of buildings and will be an important part of the future career. The experience focuses on a group of architecture degree students and proposes the development of a coordinated activity between three last-year subjects. The subjects match mathematics and Architectural Engineering departments in a common goal.

The general objectives (GO) of the project are:

- GO1: Develop a new teaching methodology beyond the confinement of individual subjects and departmental structure, fostering the development of a transversal activity between them, so that the skills provided by each of the subjects drives to achieve the learning objectives.
- GO2: Improving and promoting the acquisition of industry-needed skills, as well as fostering self-learning, adaptation, transversal work, and knowledge recycling capacities within a discipline subject to constant revision and evolution.
- GO3: Create a workflow with nuclear active participation of the students, as they will intervene in the creation of the contents of the training materials that will be shared through publication and discussion on the network. In addition, they will also participate in the development of the analysis

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