Value of Adaptation of Methodologies between Different Knowledge Areas in the Context of Project Based Learning:
A Case in Industrial Design Engineering University Degree

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ABSTRACT

Project Based Learning (PBL) is a powerful tool for teaching that helps students to get the best out of their effort in terms of the learning results obtained, even more in studies like university degree studies in engineering. A way of getting even more of this is by means of the adaptation of methodologies from different knowledge areas, because this allows the launch of innovative ways of working with certain guarantees of success from the very first moment, and at the same time to integrate skills from different fields within a shared context. Besides, it helps to put to practice some transversal competences. Here a case is shown of the successful adaptation of the methodology of Systems of Layouts, as used in Graphic Design, to a University Degree of Engineering in Industrial Design and Product Development.

Keywords: Design Methodologies, Industrial Design, Layouts, Learning Innovation, PBL

INTRODUCTION

Since the launching of the European Higher Education Area (EHEA), the Project Based Learning (PBL) methodologies experienced a noticeable development in the context of university studies, replacing significantly the traditional master class.

A more common use of learning methodologies based on the principles of "learning by making", or "learning through experience", together with the increase of papers and

publications oriented to communicate the obtained results, is helping to continue the realization of different and innovative teaching experiences, that put this techniques into value, and at the same time make grow its potential; as well as the results of the students in terms of the ratio effort/achievements.

Nevertheless, the success of the students implied in the first-time application of a new methodology can be affected or delayed by the need of certain adjustments, required to make the technique fully develop its potential. For this reason it seems convenient to show experiences where the development terms had been reduced and the speed increased to obtain the expected, good results.

The organization of a series of teaching activities by means of the modular coordination of a group of subjects from different knowledge areas is an example of this. These modules can help the student to achieve a number of global learning objectives and competencies through the reach of partial objectives for each subject, allowing improved academic outcomes and reducing neglection.

The objectives sought by working with modules of subjects are to ensure learning outcomes, complementing subjects without overlapping content, make sense of all subjects regardless of their area of expertise and optimize the resources and efforts of the student. The achievement is through a series of activities planned by the teachers involved in the module in which best practices are introduced, as continuous and group assessment, or learning based on a common project for all areas of knowledge, what approaches the student to the reality of professional work.

This strategy has been broadly developed in the context of the Engineering Degree in Industrial Design and Product Development of the University of Zaragoza (Spain), providing not only good results for students, but other important achievements.

One of these achievements is the opening of new and active communication ways between teachers from very different expertise fields, which finally improves the overall work frame and helps to create goodwill among all members of the university community involved in the degree. Thus, one of the most noticeable benefits is a high level of interchange of knowledge between teachers of different areas, and the discussion of the interest of certain methodologies and theory principles not only on a learning environment but also in the different professional fields or disciplines (Manchado & López, 2012).

It makes sense in this context to think about the interest and potential of the adaptation of professional methodologies used as learning resource in some knowledge area, to some other areas where (regardless of their degree of theoretical affinity), some kind of analogies could be found. In fact, the identification of analogies between elements apparently not so related is a powerful tool broadly used in different fields to generate creative and highly feasible solutions (Gordon, 1963).

More specifically, the adaptation to a specific subject, of methodologies commonly applied in a different knowledge field, means an opportunity to launch learning processes that are highly innovative and alternative to this subject, but based on the experience, writings and guidance of colleagues from the disciplines of origin. This helps to reduce the development and adjustment terms and allows certain guarantees of success from the very first moment of its use with the students.

This paper is structured as follows: first, referring to a main context; second, presenting an overall description of the theoretical basis of the case; third, a detailed description of the methodology to be applied; to finally describe specific results of the experience and to quote conclusions.

CONTEXT

Learning by making proves to be a powerful tool to reach teaching objectives, especially in very practical fields such as engineering and design. Project Based Learning is natural to design schools and implies some difficul-