

## Chapter 7

# Project-Based Learning Application in Higher Education: Student Experiences and Perspectives

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### ABSTRACT

*Learning methodologies that are active and centred on the student are concepts that accentuate the learning process instead of the teaching process. In this way, the following chapter aims to present the application of project-based learning in higher education and the different impact it might have on the students, as well as the experience and perspective from the students' point of view on this kind of teaching approach. To be able to collect data, the authors used initially a qualitative approach to comprehend and understand the research subjects' perspectives and points of view, followed by the focus group method as a method for collecting qualitative data. Throughout the students' experience, the development of transversal competences is mentioned several times as a great aspect related to this kind of methodology. However, the need for effective management of conflicts between members and the mandatory integration of some subjects' contents are also mentioned as some less-positive aspects.*

DOI: 10.4018/978-1-7998-8816-1.ch007

## **INTRODUCTION**

The constant changes in technology and the globalization of markets requires skills, attitudes, and different learning behaviours from all the students in higher education. To prepare the students for the challenges that lie ahead of them in today's world, universities confront them with real-life problems and assessments during their studies. When the students are confronted with real-life problems, they can seek help from their teachers to develop their knowledge or skills, but mostly, students only need to believe that they can solve the proposed assessments, even the most complicated ones.

Furthermore, with this approach to better prepare the students, they can also learn how to split their time between the task that they are supposed to perform and their personal life. However, it should be noted that this kind of task should be aligned with the knowledge and ability of the workgroup as a very difficult task could be impossible to solve due to the lack of specific knowledge, even when the will and effort, from the workgroup, to solve the problem is remarkable.

In this way, this chapter reports the experience of a group of fourth-year students of the Industrial Engineering and Management Master's Degree, who experienced the application of Project-Based Learning (PBL) methodology in the execution of projects throughout their learning process.

The chapter is structured in five main sections. After a brief introduction, it is presented the active methodology PBL through a literature review. Then, it is explained the Focus Group methodology used for collecting the data. Finally, the students' point of view related to the PBL experiences, including the difficulties, feelings experienced, and skills learned. In the discussion section, it is discussed how these aspects influenced personal development and will impact their professional role as future engineers. Finally, the conclusion section presents some final concluding remarks.

## **LITERATURE REVIEW**

Learning methodologies that are active and centered on the student are concepts that accentuate the learning process instead of the teaching process. Active learning is defined by Bonwell & Eison (1991) as "instructional activities involving students in doing things and thinking about what they are doing". These types of activities create excitement in the classroom to make learning something natural for the students (Alves *et al.*, 2018). Several authors, in particular Vygotsky (1986), defend the theory of social constructivism, where the ground idea is that concepts and the construction of meaning are learned by students interacting together. On the other hand, Kolmos (1996) also argues that learning is an active process of investigation, and is an outcome of the interest, curiosity, and experience of the learner (Alves *et al.*, 2019).

PBL is an example of this kind of methodology. PBL is a methodology that has been used for years. It has its roots in learning-by-doing ideas that were developed in the first half of the 20th century, initially by Kilpatrick in 1918 and Dewey in 1996 (Lima *et al.*, 2012). According to Dewey, learn from experience means "to make backward and forward connections between what we do to things and what we enjoy or suffer from things in consequence. Under such conditions, doing becomes trying; and experiment with the world to find out what it is like; the undergoing becomes instruction-discovery of the connection of things" (Dewey, 1916).

Another definition for PBL was given by Adderley in (1975). According to them, PBL has five different phases/aspects: (i) resolution of a problem that can be proposed by the students themselves,

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