Chapter 5
A Scrum-Based Classroom Model for Learning Project Management

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ABSTRACT

Brazilian higher education uses traditional learning methods centered on the professor and lectures. However, active learning methodologies have recently been gaining ground, especially in courses in the health area, due to legal guidelines for their implementation in Brazil. At the same time, the use of active methodologies in engineering education to optimize learning results is already widespread in several countries. In this sense, this chapter aims to propose a structure that addresses the interface between the agile Scrum framework applied to education, known as EduScrum, and the active learning methodologies to develop a more applied and results-focused approach. Thus, the scope of this work includes a review of the literature and the structuring, application, and evaluation of a hybrid method adequate for training engineering students for modern technological advancements. Finally, the results obtained, as well as a roadmap, are presented to guide the application of the model in other learning contexts.

INTRODUCTION

After the publication of the book "Scrum, The Art of Doing Twice the Work in Half the Time" (Sutherland, 2014), Scrum became known worldwide as an exponent of agile methods of project management applied to the development of new technologies and knowledge. Initially proposed in the context of software development, the method became widely disseminated by the possibility of its application to other services and industries, such as education.

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At the same time, in recent years, there has been a growing demand from the market and the students themselves for more dynamic, applied and participatory classes that would lead to the development of skills and competencies necessary for future engineering professionals. Thus, active learning has become the focus of discussions around the world (Aquere, 2017; Crawley et al., 2007; Filho et al., 2019; Kon, 2010; Lima et al., 2017; Prince & Felder, 2006; Vybornov et al., 2014).

Along this line, there is a synergy between the Scrum proposal applied to education, eduScrum, and active learning methodologies involving the concepts of transparency, inspection and adaptability and adapting its procedures and artifacts to the teaching context, thus supporting student-centered approaches and the development of cross-cutting technical skills focusing on the reality of current and future engineering needs.

This chapter aims to structure a learning model that acts on this agile-active interface, optimizing the strengths of both approaches in courses that develop both the technical and behavioral content of engineering students and preparing them for new technological and professional demands. It will discuss and present how to structure a course to operationalize this model and how to conduct classes and activities, as well as identify the main difficulties in working with this proposed hybrid approach.

To this end, a course structure has been proposed, centered on eduScrum, built collaboratively and frequently updated according to its development so that the course itself becomes an individual project of each student. Thus, the objective was to make possible the application and learning of the competencies developed in the course both in terms of evaluations and extra activities, as well as in projects that go beyond the academic environment, applying techniques of time, knowledge and risk management.

Finally, following the agile proposal of completing cycles of a better product, the course seeks to optimize the results obtained by reviewing theoretical models or the structuring of artifacts and tools for the facilitation of this structure.

Therefore, the present chapter is expected to contribute to the teaching of engineering, providing a model that will contribute to the training of students in the current context of technological advances in different areas through learning with agile methodologies used in companies that incorporate theoretical and behavioral dimensions.

This chapter applies the model proposed for the teaching of project management subjects.

METHODOLOGY

The methodological approach proposed for the development and implementation of this model is action research, characterized by presenting activities in both the practice and research areas, in addition to being innovative, participatory, interventionist, problematizing, documented and deliberate, aspects that differentiate it from other investigative research approaches such as routine practice and scientific research (Tripp, 2005). Given this participatory and continually evolving approach, it is understood that action research approaches scientific research in a similar way to eduScrum, using iterative cycles in education to obtain results. In this sense, the development of work using the Scrum framework and its artifacts, as well as the teaching of scrum in the developed course, introduces a scientific methodological character to students, contributing to their developing good research practices as complementary skills.

The model proposed here was applied to the Project Management and Multidisciplinary Teams (GEPEM) course offered by the Department of Civil and Environmental Engineering of the University

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