Chapter 7
A Novel Framework for Developing Digital Platforms for Engineering Students

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ABSTRACT

This chapter presents a novel framework for the design and development of digital platforms using mature rapid e-learning tools for teaching and learning purposes, specifically in engineering programs. A good number of recent works have been summarized and then the foundation for the chapter is provided. The development process for a simple rapid e-learning tool is outlined, and a 3-tier architecture for a simple digital platform is also presented. Then, the chapter presents a novel framework that uses rapid e-learning tools in the design and development process of digital platforms. Challenges associated with developing digital platforms and important steps in the strategic deployment of the suggested framework are illustrated.

INTRODUCTION

Universities and Higher Educational Institutions (HEI) across the world continue to design new range of learning mechanisms to support student learning processes. Particularly, post Covid-19 use of digital platforms has gained more prominence as due to the restrictions imposed in physical meetings and/or gatherings. Training requirements and standards to the students vary from faculty to faculty. Hands-on training is critical in the professional fields such as engineering and medicine. In other words, the core operations towards training future graduates involve using various methods of developing the content for learning, hands-on training, skills development, content delivery, formative and summative assessment etc.

Typically, teachers in engineering programs use various teaching methodologies in the traditional face-to-face classroom setting. Such approaches also include the regular classroom engagement followed by a well-structured laboratory training to provide hands-on training to the students. Due to technological advancements, restrictions imposed by pandemics such as Covid-19, demands of the contemporary operating conditions in reaching out to the students etc., digital life in the HEI operations is now occupying more space than before (Wang et.al, 2020). In the modern era, student learning is supported through several strategies and concepts such as using escape rooms, digital platforms and rapid e-learning etc. Several authors point to the need of adopting digital platforms in HEIs due to changing needs and times (Bo, 2011; Renée and Maria, 2022; Wang et.al, 2020; Lene et.al., 2020; Alice et.al 2021). Since these are relatively newer concepts, their definitions and usage patterns are not very well described yet. Though many distinct and/or combinational philosophies exist, the scope of discussion in this chapter is restricted to the treatment of digital platforms that can be developed using rapid e-learning tools for providing much required hands-on training to the engineering students. However, the benefits of escape rooms and rapid e-learning cannot be ignored, when they are used on a standalone basis. This warrants an appropriate treatment of these concepts to take advantage in developing digital platforms to the purpose. Literature is very clear about the ambiguity in defining these terms and their end-usage. Lene et.al.(2020) and Alice et.al (2020) have reviewed this aspect of ambiguity besides various aspects related to escape rooms based learning and assessment. The following paragraphs explain these three chosen concepts to provide proper background to this chapter.

Escape rooms are something that require students to participate in a game like environment on their own, without the teacher; and then understand a specific problem, resources, conditions and various possible paths to the solution – all entirely on their own (Alice et al, 2021). They are generally intended to remove the boredom in the learning; however modern day definitions and expectations of escape rooms vary widely (Lene et al., 2020).

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