

Chapter 17

Influence of E–Learning and Project–Based Learning on Engineering Education

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ABSTRACT

Imparting quality technical education and training can be expected to be the vision of most engineering institutions globally to build a healthy society. The major stakeholders who contribute to this are students, teachers, industrialists, researchers, and institutes. The current scenario of rapid technological advancements demands engineering students to be dynamic and novel. Considering the heterogeneous intellectual ability of students, institutions frame time-restricted curriculums. Students who want to outperform have a challenge that they cannot be completely dependent on their academic curriculum. The objective of this chapter is to motivate and bring awareness among engineering students to adapt self-learning to excel in their professions. E-learning and project-based learning are identified as the two significant tools that could help students to self-learn. The influence of these tools on engineering students has been proved in this chapter with a case study, surveys, and feedback from students.

INTRODUCTION

The education system has to move towards igniting curiosity, critical thinking, problem-solving, and learning ability, qualities that can be inculcated ‘only by good quality teachers’-N.R. Narayana Murthy

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You can't teach people everything they need to know. The best you can do is position them where they can find what they need to know when they need to know it- Seymour Papert.

Engineering is the branch of study which aids in the design and development of efficient products, structures, or systems that could serve mankind by applying scientific and mathematical principles (Lucas, 2014).

Gone are the days when students were trained only using the method of chalk and talk. Digital media is the preferred tool of every student today as it keeps them active and makes learning faster. Any engineering program conducted globally exhibits time-restricted curriculums. The period in between the two phases, the welcome phase, and farewell phase is very critical for an engineering student. As the current technology is rapidly changing and becoming challenging day by day, engineering education requires the students to update their knowledge in their professional life in a continuous manner in the required domain. The students need to gain knowledge, experience, and confidence, to apply their learnings in their careers and become successful engineers professionally.

Self-Learning can be defined as the activity where the students develop the characteristics of learning without depending on another person to acquire knowledge. They become autonomous and active receivers of information from different sources. Teachers play a vital role in motivating the students to develop an affinity towards Self-Learning (SL) with such prevailing challenges (Reyes, 2019).

The institutes and universities that are seen globally finalize the curriculum of every course by considering the heterogeneous intellectual ability of students. Despite students being given autonomy to choose their streams and courses to some extent, SL is a significant tool that influences the successful completion of their courses. SL helps students with a low intellectual ability to cope with the challenges during their course of study and gain better knowledge. SL encourages students with a high intellectual ability by giving them the confidence to learn beyond such a bounded curriculum and exhibit their potential in their domains.

The current era of education experiences that internet/electronic (online) resources act as the friendly, first-hand reference tool for most of the students to clear their queries as against the earlier method of referring to textbooks which are followed by very few students today. The reason being that these resources act as hubs providing the requested information from various web servers distributed globally in a handful of pages.

E-Learning (EL) and Project-Based Learning (PBL) are identified as key techniques for discussions by the authors of this chapter as these two major tools help the students to take off in their sub-areas of interest. These make extensive use of such e-resources that initiate the students to self-learn and apply their learning in real-time implementations through projects. These two tools – EL and PBL are briefly introduced in this section.

The education system at all levels has incorporated a digital transformation in the teaching-learning process which is called E-Learning. EL can be defined as a hybrid of two streams -electronic technology and learning which were independent earlier. Some of the terms that are used to refer to EL are online learning, technology-enhanced learning, and computer-assisted learning (Andrews, 2007).

The different categories identified for learning include online, distance, virtual, MOOC, etc. The characteristics observed in EL are that it is student-centric, learning support can be crowd-driven, updating knowledge with emerging technology, and distributed multi-disciplinary learning. EL helps students in laying a strong foundation by analyzing and designing new processes or products and grow further in their stream of study. EL uses the computerized approach to enable and facilitate the learning process.

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