

# The Key Challenges of Implementing E-Learning in Engineering Training Programs

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Developing an effective e-learning program is a great challenge since there are several tools, technologies and approaches to be considered. Industry pioneers mainly agree that e-learning will continue to become a driving force in the business sector; but apart from the many issues in designing and developing such a program, the industry is also faced with the challenges in overcoming other problems which will be discussed in this article.

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Aside from adding a new dimension to engineering training courses, e-learning has also increased the possibilities of delivering knowledge and information at an accelerated pace. Developing effective e-learning programs, however, poses a great challenge to the various parties involved. There are tools, technologies and approaches which must be incorporated to design and develop e-learning programs. But at the same time, industry pioneers mainly agree that e-learning will continue to become a driving force in the business sector. Hence, they are constantly on the lookout for more cost-effective ways to deliver training to their engineer(s) and technician(s). Admittedly, e-learning is seen as less expensive than traditional instructor-led training; but apart from the many issues in designing & developing a program, the industry is also faced with the challenges in overcoming various problems which shall be discussed in this article.

E-learning is defined by Rosenberg & Foshay (2002) as “the use of internet technologies to deliver a broad array of solutions that enhance knowledge and performance”; while Clark and Mayer (2016) define e-learning as “instruction delivered on a digital device that is intended to support learning”. In addition, Longmire (2001) states that e-learning “covers a wide set of application and processes such as computer-based learning systems, web-based learning systems, virtual classrooms and digital collaborative learning GroupWare packages”. It should also be noted that e-learning content is mainly delivered via internet, intranet/extranet, audiotape and videotape, satellite broadcast, interactive TV, DVD and CD-ROM and the soon-to-emerge wireless application protocols (WAP). Based on these definitions, e-learning can be summed up as a method to utilize the digital technology as a medium for imparting knowledge which is more interactive and accessible in any location so long as there is an internet connection.

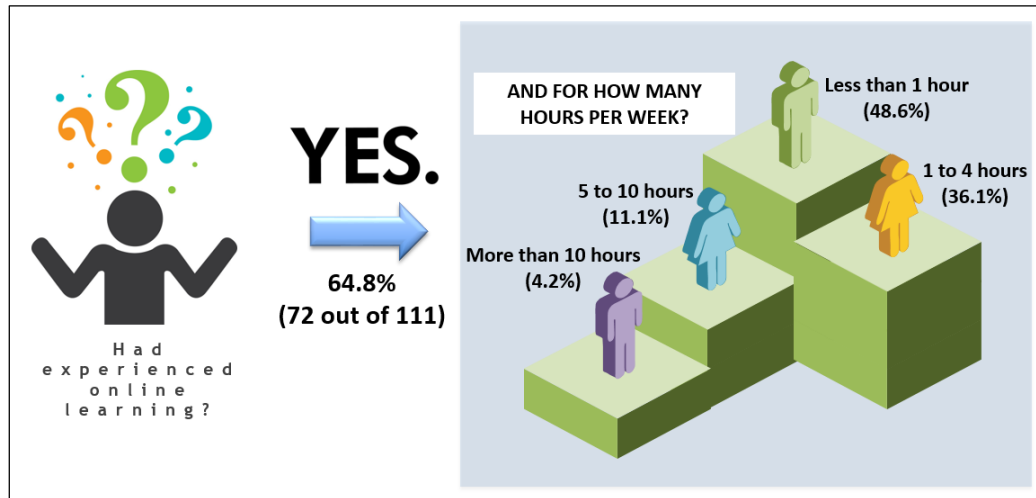
According to the World Economic Forum (2015), it is predicted that 90 percent of the world population will own at least one smartphone with access to the Internet by the year 2025. Therefore, based on such a prediction, the field of engineering in Malaysia must not be left behind in turning toward online or e-learning as a pedagogical learning tool, which could guarantee more efficient, interesting and also cost-effective delivery of knowledge. In view of the above scenario, the objective of this study is to identify the challenges in implementing e-learning in engineer training program, regardless of the specific area or discipline.

It is without doubt that e-learning presents both advantages as well as disadvantages. These pros and cons include flexibility, accessibility, convenience, low delivery costs and ease of update. Nevertheless, there are many challenges that need to be overcome in order to increase the level of acceptance toward e-learning and also to enhance the effectiveness of e-learning, especially in regard to engineer training in Malaysia. Among the key challenges are as follows:

#### *Awareness*

A study was conducted by the author in an engineering company to ascertain the learners' behavioural intention to use technology-enhanced learning tools including e-learning (Yahaya & Alias, 2018). A total of 111 respondents comprising engineers and technicians were involved in the study. Based on the results, it was found that 83.8% of the respondents were willing to use their personal internet connection quota for learning as prescribed by the employer, but only 23.6% understood the meaning of “blended learning”. It should be noted that the phrase “blended learning” is used increasingly to describe a program that combines

both e-learning and traditional instructor-led training. On the other hand, the respondents' experience of online learning is illustrated in the following Figure 1.



**Figure 1:** A study on e-learning – experience and hours spent per week (Yahaya & Alias, 2018)

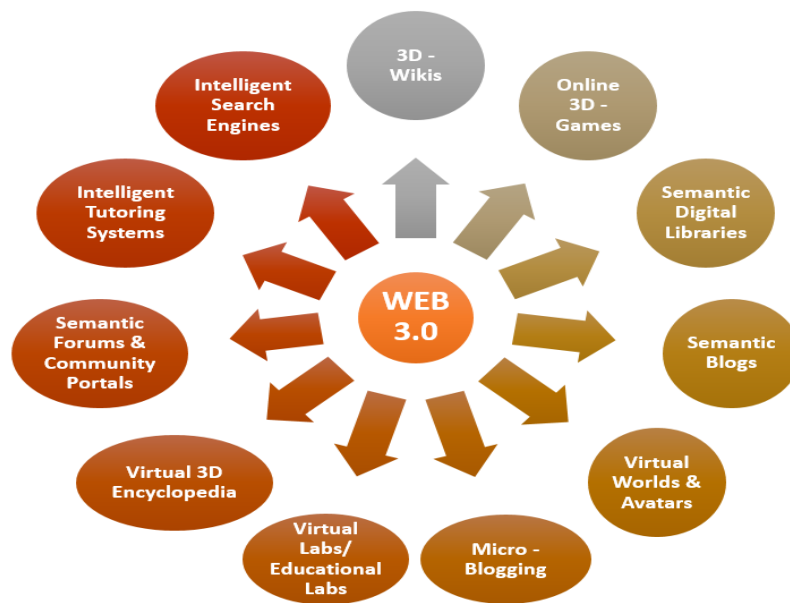
Based on the findings, it was concluded that the engineers and technicians involved were able to accept e-learning and willing to use their own personal internet data for such a purpose, but were mostly unclear as to what e-learning actually meant. This may be due to insufficient understanding and awareness of e-learning, with a majority of the respondents still believing that learning must take place in the classroom and via face-to-face interaction.

#### *E-Content*

It is also argued that some e-contents are not attractive and unable to trigger interest among learners. This may be partly due the inexperience of developers in creating or designing e-content for engineer training purposes. As such, learners' experience of e-learning was negatively affected, especially in the case of first time learners comprising both engineers and technicians.

Additionally, some companies which have only begun developing contents for e-learning was found to be lacking in clear or proper process; beginning from the designing stage up to publishing the e-contents. In engineer training, aside from the learning which encompasses the cognitive elements, it is important to also deal with the psychomotor elements. This is because such a training program aims to not only produce knowledgeable engineers and technicians in the theoretical aspects, but also competent workers who can skilfully perform their duties.

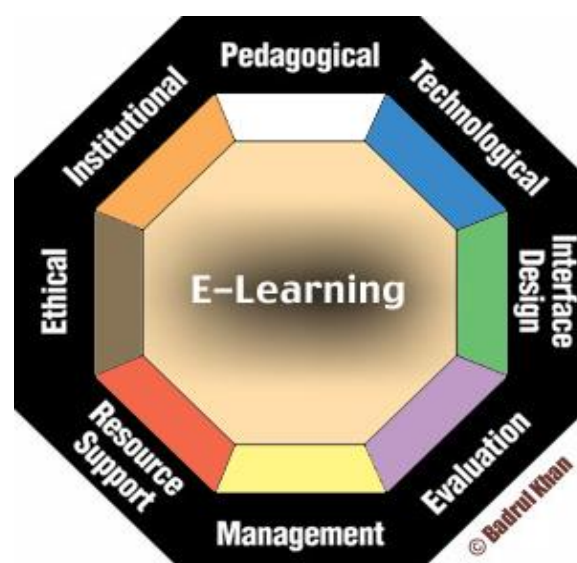
Hemant Rana et al. (2014) stated that interaction, cooperation and community all play an important role to support the e-learning environment. The development in the area of e-learning environments provides new forms of interaction for learning experience. Therefore, in developing e-learning contents, users' needs are of utmost importance and must be greatly considered. As technology evolves day by day, e-learning is also being rapidly developed. Experts in the field of learning believe that some of the most promising features of modern e-learning platforms will be the Web with intelligence. Basically, this refers to a new version of World Wide Web called Web 3.0 (Rajiv & Manohar Lal, 2011), as shown in Figure 2.



**Figure 2:** Web 3.0 tools & services

### *Eco-system*

In order to ensure the success of e-learning, one important element that must not be taken for granted is the e-content which should be interactive and interesting. As a whole, the e-learning ecosystem plays a significant role; and this has been clearly emphasized in Badrul Khan's E-Learning framework (Khan, 2001). Khan's framework serves as a guide to plan, develop, deliver, manage, and evaluate e-learning programs (Figure 3). In addition, organizations exploring strategies for effective learning and performance have to consider a variety of issues to ensure effective delivery of learning which will thus guarantee a high return on investment (ROI).



**Figure 3:** Khan's E-Learning Framework

### *Moving Forward*

In today's internet age, it is undeniable that everything we do is revolving around the digital technology. Further, it has also become a necessity to harness the ability of such a technology in imparting knowledge in various disciplines, including engineering. Nevertheless, this paper has looked at the issues and challenges that are faced in providing engineer training. Among the key challenges which have been explained here include awareness of e-learning, which results in a majority of learners still believing that learning must take place in the classroom and via face-to-face interaction. In addition, some e-content is not attractive and unable to trigger interest among learners, partly as a result of the inexperience of developers in creating or designing e-content for engineering training purposes. Finally, organizations exploring strategies for effective learning and performance have to consider a variety of issues including planning, developing, delivering, managing, and evaluating e-learning programs to ensure a high return on investment (ROI).

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