Chapter 36
Design Principles for an Intelligent–Augmented–Reality–Based M–Learning Application to Improve Engineering Students' English Language Skills

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ABSTRACT

Introducing an intelligent augmented reality based M-learning application designed and developed for improving engineering students' English language skills, this chapter reports a work-in-progress that focuses on system design procedure. The application consists of Artificial Intelligence (AI) based functions to ensure an effective learning flow while taking advantages of game-based learning by providing a story board structure with a content tree. Four design principles "fair use, flexible use, fault tolerance, educational climate" by Elias in addition to Stockwell and Hubbard's principles for mobile supported language learning have been taken into account. Furthermore, the proposed system here employs an effective approach combining both real and virtual environments to achieve an Augmented Reality based learning experiences for students. After the introduction of the application, the chapter outlines how it will be processed in the future.

INTRODUCTION

Rapid developments and changes in technology have affected mostly the way of providing education. Since the introduction of computer technology and also Internet, especially educational research has gained a remarkable momentum and many different approaches, methods, and techniques on delivering educational processes thanks to computer and Internet environments were introduced to the associated literature. Today, e-learning is the most popular technology-oriented educational technique as an effective and efficient way of distance education approach. In time, e-learning has also gone through many developments and it is currently used in different forms according to environments, platforms, or devices over which teaching-learning is experienced.

It can be said that because there are many dynamic environmental factors affecting the whole M-Learning process, there will be always an effort on searching for better language education supported by mobile technologies. Furthermore, it is also a good way to adapt the literature of M-Learning with the latest technological improvements by taking the real-world based problems into consideration. Here, it is clear that supporting M-Learning based language teaching – learning processes with the latest technological components will take the effectiveness and efficiency of M-Learning one step away, by shaping also the future of this research area. In this context, two popular approaches: Augmented Reality and Artificial Intelligence are strong candidates to support M-Learning and so Mobile Assisted Language Learning studies.

Augmented Reality (AR) is an effective interaction oriented approach, which employs both virtual environment and real world in a common platform. Since its first introduction AR and its applications have become popular among different fields and employed in the context of especially multimedia based platforms to ensure highly interactive, effective using solutions for different fields like education, health, natural sciences, economy, military...etc (Chen, & Chung, 2007; Kose, 2015; Kose, Koc, & Yucesoy, 2013). Because AR provides interactive aspects and an adaptive working function interacting with the real time environments, there is a remarkable interest on performing scientific research studies in which practical, immediate solutions for real-world based problems are tried to be achieved (Kose, 2015; Kose et al., 2013). Because of its effectiveness on enabling people to interact with the real-world while still in contact with digital elements, AR has been a popular approach for educational studies.

Regarding to educational studies, Artificial Intelligence (AI) is another research approach, which is widely used. Because AI comes with a multidisciplinary approach by achieving a logical and mathematical way of enabling computer based systems to solve real-world problems, it employs a great potential for even future of research studies. So, adding some 'intelligent' working mechanisms to educational software systems has become a popular trend over the intersection of education and AI.

Associated with the explanations above, this chapter is based on an application combining some popular approaches to provide a better way of teaching – learning English. Introducing an intelligent Augmented Reality based M-Learning application designed and developed for improving engineering students' English language skills, this chapter reports a work-in-progress that focuses on system design procedure. The application consists of Artificial Intelligence based functions to ensure an effective learning flow while taking advantages of game-based learning by providing a story board structure with a content tree. Four design principles "fair use, flexible use, fault tolerance, educational climate" by Elias (2011) in addition to Stockwell and Hubbard's (2013) principles for Mobile Assisted Language Learning have been taken into account. Furthermore, the proposed system here employs an effective

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