

# Chapter 4

## Review and Proposal for Intelligent Distance Education

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### **ABSTRACT**

*Information and communication technologies have led to new developments in education. Time and place independent education has emerged. Furthermore, different characteristics and huge numbers of individuals have made the use of new technological methods inevitable. In this context, distance education has become a popular education method to meet the emerging needs, increasing satisfaction, and learning performance of students. Mobile technology, intelligent systems, and Three Dimensional (3D) animations also provide enhancements in this field. In addition, distance education systems should be selected and developed properly for target students and environments. For this purpose, the assessment of prominent studies provides a road map for new research. In this sense, this chapter evaluates intelligent distance education studies in literature. Furthermore, it proposes a novel Artificial Neural Network (ANN)-based distance education system for Mehmet Akif Ersoy University. This ANN-based system can be implemented on Mehmet Akif Ersoy University infrastructure with agent. The proposed system consists of a learning management system, Web conferencing system, and an ANN agent. The agent's inputs that are already stored in Mehmet Akif Ersoy University's distance education databases can be easily retrieved. This agent provides reusability of course content and Web conferencing records.*

### **INTRODUCTION**

Distance education has become the most popular way to enhance learning performance, to increase satisfaction and independence of students. It also diverts and changes education methodology. Moreover, it pays attention to the students' requirements. Due to the great variety of user requirements in distance education, numerous methods and technologies have emerged to meet these requirements. In addition, differentiations between users, low success rate also force instructional designers to find new ways. In

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this basis, innovative ways should be used. For instance, three dimensional (3D) animations provide interactivity and mobile technology, and ensure ease of use, time and place independence. Besides, adaptive agents modify distance education systems, in other words, making adjustments in accordance with the students' profile. Thus, adaptation and personalization of distance education systems are provided with these innovative ways.

Three dimensional materials are used in traditional and web based distance education. These contents are generally use virtual and augmented reality. These contents allow enhancements in distance education. Furthermore, they provide effective learning through interactivity and visualization of multimedia content (Liarokapis et al., 2004). It assists teaching of students. For instance, remote physics experiments (Ozvoldova et al., 2006), simulation control testing (Su et al., 2006), simulation of surgery (Perez et al., 2008), and virtual laboratories (Safigianni, et al., 2008; Bell, & Fogler, 2004). Okutsu and colleagues' study shows that 3D virtual environments are feasible platform to teach engineering students (Okutsu et al., 2013). In this context, 3DWebEPL Project is accomplished. 3D models of intensive care unit equipments are used to the train the biomedical technicians in this project. This project provides easy learning environment (Cetin, 2010). The 3D model also allows the visual simulation of the different types of study (Sampaio et al., 2010).

Mobile learning meets learners' needs such as flexibility, easy data accession to enable independent from time and place (Korucu, & Alkan, 2011; Cavus, & Al-Momani, 2010). In Cavus's study, students express their enjoyment with mobile devices and its LMS integration (Cavus, 2010a). Motiwalla claims that mobile learning will soon be an important component of distance education in a short time. However, this transition will not come into exist in one night (Motiwalla, 2007). As in all fields, there is a transition to mobile learning. It transforms from traditional to intelligent based structure. The intelligent mobile distance education system is able to fulfill the different individuals' requirements. It provides effective educational environment with variety of services. It contributes the learners to learn effectively (Chen et al., 2010). Simkova and colleagues' study also engage in the use of mobile technologies for supporting the education. It is concluded that using mobile device in teaching is effective. It also realizes new possibilities for education (Simkova et al., 2012).

Instead of fuzzy logic, artificial neural network is used as an intelligent algorithm in the proposed system. Moreover, input and output parameters of artificial neural network are innovative parameters which distinguish the system. There is not any distance education system in the literature and in our country that uses the same input and output parameters. The lack of literature in the field has been effective in the preparation of the system. Using statistical methods, performance values of developed system can be measured through the sensitivity, accuracy, and the regression parameters. Developed synchronous distance education system retrieves values such as duration of course content monitoring, the number of correctly answered questions in mid-term by the user. Afterwards, it provides re-monitoring of course content or virtual classroom session. By this way, students are guided in distance education through the artificial neural network algorithm. Instead of a one-way, bi-directional running system will be achieved. By this way, it is tried to increase the success and satisfaction of student.

## **Synchronous and Asynchronous Distance Education**

Synchronous (simultaneous) and asynchronous (asynchronous) education alternatives are available in distance education. Asynchronous educational software is designed for the students and instructors to initiate and finish the training within desired time. This feature makes a fundamental change in the role

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