

## Chapter 32

# Development and Evaluation of Intelligent Agent– Based Teaching Assistant in E–Learning Portals

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### ABSTRACT

*Today, several educational portals established by organizations to enhance web E-learning. Intelligence agent's usage is necessary to improve the system's quality and cover limitations such as face-to-face relation. In this research, after finding two main approaches in this field that are fundamental use of intelligent agents in systems design and focusing on human-based agents, second method selected and is designed and implemented in a simple way as an educational assistant to answer the students frequently asked questions. Consequently the efficiency of this method is evaluated by Expectancy confirmation-Information technology model. By examining the results of the students interacted with designed agent through the learning management system of Mehralborz institute, and the conceptual model based on e-learning effectiveness, ease of use, user satisfaction, and usefulness variables gained the scores of 55, 58 and 57 percent that represents the overall effectiveness factor is medium. Some applicative suggestions for developing intelligent agents as educational assistants are provided for virtual universities and e-learning portals.*

### INTRODUCTION

Many researchers in different fields have done studies on the benefits of using information and communication technology in learning and education (TienTiena & Osmana, 2010). Students, who study using information and communication technology, benefit from an open environment for learning. They are

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responsible for their own learning, they are free to choose modules and courses that they want to learn and can step forward in their learning with desired pace (TienTiena & Osmana, 2010). However, studies have shown that students feel lack of proper metacognitive awareness and general observational skills (Hill & Hannafin, 2001). Furthermore, students cannot communicate with prior knowledge and daily experiences in a way that help to increase their learning (Land, 2000). Nevertheless, teaching agents, such as multimedia modules, in open learning environments are introduced as a solution. Teaching agents are placed in multimedia modules to enhance students' metacognitive awareness about what they know and what they should know about specified subject (Clarebout & Elen, 2009).

In other hand, while distance learning made accessibility to teachers and students very easy but made some limitations from communication and cooperation point of view (Jafari, 2002). In these kinds of systems, educational content is available for users online and they benefit from it. However, it is certain that just putting educational content will not lead to learning and this is one of significant shortages of these systems (Jafari, 2002). Online education systems must have ability to deal with each user considering its knowledge level, work style and other factors that are results of interaction between user and series of educational systems and subsystems in addition to providing the content. Mentioned points are included cases that can be done using intelligent agents. Due to increasing interest in virtual courses, number of virtual educational institutes are growing every day so with consideration of noted limitations and in order to be leading and even to stay at competition, it is obviously necessary to benefit from high quality educational portals in this field. The aim of our study is to implement an example of intelligent agents in electronic learning to analyze and assess its effectiveness and performance. The current research questions are as below:

**RQ1:** What are the characteristics of intelligent agent- based teaching assistant in educational portals?

**RQ1:** How much is the prototyped agent-based assistant, acceptance & effectiveness?

Our considered intelligent agent is a model-based, utility-based agent in the class of Human Interface-based agents which acts as a teaching assistant and solver in an educational course. Therefore, designing a kind of intelligent agent as a teacher assistant(TA) in a virtual university portal and analyzing its students and teachers' views about this designed agent and results evaluation and at the end, suggestions about designing a technical assistant are the most important objectives of this research.

## **2. BACKGROUND**

### **2.1. E-Learning**

Consistent with the interest that universities and organizations show to e-learning, a lot of academic research has been conducted on e-learning. E-learning is known as a kind of learning that content is conveyed via Internet, intranet, extranet, audio and video tape, satellite television and CD-ROM (Kaplan-Leiserson, 2004).

In the last decades researchers have studied different aspects of e-learning. Designing different strategies (Essalmi, Ayed, & Jemni, 2010), content presentation (Gamalel-Din, 2010), interaction and cooperation between learners and instructors (Dağ & Geçer, 2009), are the most important recent research areas. Personalization of learning strategy, accuracy of the content and its presentation, interaction manage-

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