Virtual Classroom Simulation using Agent Technology

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Abstract—A recent approach in developing distant learning environments advocates the ideology of facilitating the social context of learning. Collaboration is an important essence of quality learning. The benefits reaped by engaging in a meaningful dialog with a peer is often greater than learning in isolation and also have the potential to impact positively on the learner's cognitive ability. Development in the area of agent technology have enabled embedding intelligent agents as co-learning counterparts or tutors, with a potential of increasing learner interactivity in a motivational learning environment. This project explores the benefits of incorporating co-learning peers to initiate a meaningful dialog between the learner and the co-learner agents, and also the positives of introducing a tutor agent who monitors the progression of the learner and provide feedback. The system is designed in a way that enables the intelligent agents to exist as independent components and the learner can obtain hints by calling on them. The Jade framework is used as the middleware to implement the agents. Furthermore, a tutor agent is present who evaluates the learner's progression and provide feedback. An expert system shell is used to improve the accuracy of the feedback provided. This distant learning environment is aimed at developing a higher mental process by facilitating the social context of learning.

Keywords- e-learning systems, collaborative learning, agent technology, social context of learning, agent based learning syste)

I. INTRODUCTION

With the advancements in the IT industry, e-learning tools and technologies have evolved in leaps and bounds. According to Laohajaratsang's (2004) observation, current e-learning methods have revolutionized the process of learning with its ability to provide a wide range of learning techniques with flexibility. It provided the learner the liberty of learning at a pace that best suits him. E-learning, has grown from merely being a method of accessing a set of online materials to a lively and indulging learning experience that is provided by prevailing tools [6].

Using agents to assist learning has become increasingly popular and many researchers have explored using agents in an e-learning environment. As Xin Bai and others (2009) remark, there are many researches that describes the advantages of using intelligent agents within Intelligent Tutoring System (ITS) to reinforce the learning process. Intelligent agents replacing human beings in the learning environments can play several roles, such as domain experts,

learning colleague or an instructor. The agents aim is to assist the learner based on his/her learning and cognitive needs [1]. This research emphasizes the significance agent technology can add to an e-learning environment.

Learning in isolation is seldom encouraging or interesting. Especially in a computer based learning environment where supervision is minimal, it is important to capture the concentration of the learner at all times. Such issues can be overcome by using agents to collaborate with the learner. As Omicin and Nardini (2009) note, collaborative learning where a group of learners work together as a group while the teacher is a mere guide, provides more benefits to the learner rather than conventional learning methods. It helps the learner take ownership of his work and helps preserve the gathered knowledge [9]. Furthermore, Hietala and Niemirpo (1998) in their research remarks that, collaboration is generally reflected as an important essence of quality learning and allege that it should be incorporated in computer based learning systems. Agent technology can be used to facilitate the social perspective of learning within computer based learning tool [5].

These studies illustrate the benefits of using agents to create a collaborative environment with e-learning frameworks. Although it is at its infancy, many researches show positive results of incorporating intelligent agents within e-learning to act as humans and thus encourage and involve the learner to interact more enthusiastically with the tools and also reap benefits such as improve critical thinking and evaluation skills and acquiring a deeper level of understanding of the particular domain.

This paper explores the benefits of incorporating collaboration within an e-learning environment as well as the impact on providing a qualitative feedback to the learner on his overall performance.

II. LITERATURE SURVEY

A. Conception of e-learning

In an era where science and technology is evolving by the day, we usually tend to assume that the concept of electronic learning is a recent invention. But according to Ravenscroft (2001), the trails of e-learning run as far as to the 1950s, and indicate that the idea of e-learning being a recent advancement is a profound delusion. He also asserts that the researchers of the present should be aware and acknowledge the steps taken throughout the years to develop