Enhancing On-Line Learning through Pedagogical Agent

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Abstract

The on-line learning which transcends the time and space requirement of a traditional class may be very appealing to a well motivated independent learner. For novice learner, they may be frustrating because of lack of interactivity, difficult to get feedback and time consuming for both learner and instructor. This problem might be solved by using pedagogical agent which will provide immediate feedback and interactive explanations. The purpose of using pedagogical agent is to improve the on-line learning effectiveness, increase learner’s interest and learner’s satisfaction. The agents can be the shape of a cartoon character and animated character. It offers help, give hints, demonstrate and show examples to help the learning process. The agents offers low pressure learning environment and also improve one-to-one tutoring which can significantly improve learner performance.

Keywords
Pedagogical agent, On-line learning, One-to-one tutoring

Introduction

On-line education can be defined as teaching and learning enabled by electronic media [5]. The on-line teaching which transcends the time and space requirement of a traditional class may be very appealing to a well motivated independent learner. Teaching in the digital information age environment requires a shift to a new teaching model. In the "digital age" teaching model, the teacher acts as the guide or multi-resource person to students actively engaged in independent learning from many rich sources of information now readily accessible electronically [1]. In addition, the overall quality of these interactions is increased because there is more time for thought and reflection to make appropriate response.

Teachers can provide powerful learning opportunities through ICT when student are responsible for their own learning and are active learners defining their learning needs, finding information, assessing its value, building on their own knowledge base and communicating their discoveries. These on-line activities need to be carefully designed, giving thought to the different learning styles of students and the way in which students learn. In the information age, the implications of a move from teacher-centered to learner-centered education are that it is important for students to be able to analyze and synthesize enormous amounts of information, thus
determining what should be learned, how it will be learned and when it will be learned [7].

The potential of ICT for changing the way education is delivered and the way people learn is tremendous. Teaching in the traditional classroom is readily understandable by most teachers. In online learning, teacher must explore the capabilities of tying geographically distributed people together, facilitating learning with different modalities, permitting time and place shifting, rapid feedback, on-line simulations and laboratories and a host.

In order to compete in today’s marketplace, an institutions of higher education must expand their services to meet the clients need. Pedagogical agent is a new paradigm for learning environments. It has capabilities within learning environments to support various learning styles and enhance pedagogical effectiveness.

On-Line Learning Environments

On-line learning environment includes the use of multimedia, Internet and computer-mediated communication to support learning. Mayer, Jeung and Lester (1997) found that students learning from multimedia presented with animation and narration consistently did better than those who learn from animation and text-based materials.

The communication in on-line learning can be divided into two form:-

a) Asynchronous communication such as e-mail and web based discussion board for any time discussion

b) Synchronous communication such as on-line tutorial where students can participate in real time class discussion with classmate and teacher.

A variety of learning methods have been applied such as course web notes, on-line tutorial, e-mail and Bulletin Board. The learning methods discussed in this paper refer to the methods used in the virtual environment at Universiti Tun Abdul Razak (UNITAR). All of the methods mentioned can be accessed through the UNITAR Virtual On-Line Support System (VOISS).

Course Web Notes

Students have been exposed to the asynchronous or self-paced learning which uses multimedia content in the form of Course Web notes. Course web notes is the module which allows students to view notes for the course they are enrolled in from anywhere, at anytime and at their own pace with Internet connection. Web-based notes delivery may offer many advantages such as developing more independent learners and there also information handling skills which students must acquire. This method will increase the learning of the participating students by making more effective use of time they spend studying examples and solving problems.

On-line Tutorial

On-line tutorial allows teacher and students to communicate in synchronous mode of teaching. The students can attend a class anywhere during the time stated in the schedule. This tutorial is to promote deep learning through activities, by encouraging students to contribute
their ideas, ask questions and formulate arguments.

Learning in traditional environments is often spontaneous and free flowing, means that for student to participate, they have to respond almost immediately or synchronous. Sometimes they may feel nervous to give an idea or answer if they are not sure because they can see each other. However, in on-line learning environment, students like to participate and confidence to give an idea. The teacher needs to know how to encourage student participation, to start and stop discussion and to deal with the shy, the dominating, the aggressive and the just-plain-awkward. This requires more attention to learner questions and continuous guiding the learners.

By referring to the UNITAR on-line tutorial class, teacher should prepare the teaching material and the flow of their class in advance. The teaching materials called agenda consists of power point slide, application share, web safari, exercise questions, quiz and whiteboard. During the session, students can hear the teacher and see the teaching materials on their computer screen. Students can raise their hand (by pressing hand button) to ask question or typing using the text chat tool. The teacher can also sort the students name by hand raise. If the student unable to attend the class, they were able to download the recording session which were helpful and the students had the psychological boost of not feeling they had missed out entirely.

**Bulletin Board**

This feature allows the teacher to post the topics and be discussed among the students and teacher. Basically, the most difficult problem or unsolved problem in tutorial class will be discussed in this section. Here, the teacher should monitor the discussion, participate in a facilitator role and enable the communications to be as student centered as possible. Technology alone will not solve the problem of teacher control over the discussion process.

The bulletin board is asynchronous, which allowing students more time to consider their responses. This may encourage students to participate more freely. However, the effectiveness of these features depends on how the teachers facilitate and guide the student discussion.

**Pedagogical Agent**

Nowadays, pedagogical agent is widely used to help guide the learners to achieve the level of knowledge required. An educational system that has learning strategies and that is formed by intelligent agent is called Pedagogical Agent. A pedagogical agent is an autonomous agent that acts as a guide of instructor for education and training purposes. This agent could serve as virtual tutors. It gives one-to-one tutoring to improve learner performance and at the same time entertain and motivate the learner.

They will interact with the user in ways that will facilitate learning. It’s offer a low pressure learning environment that allow users to gain knowledge. An agent has ability to monitors the progress and current knowledge of the student in each lesson. It has knowledge that are needed for the lesson as a human expert will demonstrate them. It then compares this knowledge with the student’s performance of the same skill.
According to Slater [6] an interactive animated pedagogical agent can:-

- **Adapt** – A pedagogical agent evaluates the learner's understanding throughout the interaction, just as a human teacher would, and adapts the lesson plan accordingly. Pedagogical agents will not move on to more sophisticated concepts until it is clear that the learner has a good understanding of the basics. If learners continue to have difficulty, the agent can provide additional instructions.

- **Motivate** – Pedagogical agents can prompt students to interact by asking questions, offering encouragement and giving feedback.

- **Engage** – Pedagogical agents have colorful personalities, interesting life histories and specific areas of expertise.

- **Evolve** – Pedagogical agents can be revised and updated as frequently as necessary to keep learners current in a rapidly accelerating culture.

### Agent Structure

All agents consist of some type of knowledge base and an inference engine. The knowledge base may be structured in a variety of ways but consists of data structures that represent at least a portion of the entities, relationship, object, actions and laws applicable to its environment. Figure 1 shows the agent structure [2].

**Figure 1: Agent Structure**

### Benefits of learning using pedagogical Agent

Pedagogical Agent provides several benefits to students which are:-

- More effective interaction with the learners.
- The agent care about a learner’s progress and it may encourage the learner to care more about her own progress.
- The agent emotion that is some way sensitive to the learner’s progress, may intervene when they becomes frustrated.
- The agent with an interesting personality may make learning more fun.
- The learners that interact with a pedagogical agent may have positive perception.
- The learner like to spend more time in the learning environment
- The agent can guide and answer the learner questions at anywhere and anytime.
Conclusion
As a conclusion, pedagogical agent provides a quick and easy help for students. The greatest strength is the ability to generate highly detailed feedback. By introducing pedagogical agent, it was hoped that it will provide support for the student, increase their learning rate and enhance the quality of learning.

References


