

Web-Based Instruction Using Computer Assisted Intelligent Network for Software Engineering Course

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ABSTRACT

This research aims to compare achievement between pre- and post-test on the course of Software Engineering of students who studied the web-based instruction by assistant intelligent network. The web-based instruction were proposed by 3 modes. The first mode was the content of schooling, the second mode was the design of graphical user interface and activity learning was the third one. There were 4 web-based instructions: Lesson 1-Gathering User Requirement, Lesson 2-Testing Principle, Lesson 3-Project Management and Software Estimation and Lesson 4-Risk Management. The sampling data were 32 students; Results were analyzed statistically, with mean (\bar{x}), standard deviation (S.D.) and t-test. The results show that topic no. 4 of satisfied value on the content of ranked the highest level to 7 topics. The overall value of the first mode had the highest mean ($= 4.61$ and S.D. $= 0.24$). A topic no. 1 (Color and font size are readable and interesting) of the second mode ranked the highest level and an overall mean ($= 4.54$, S.D. $= 0.27$). Topic no. 4 of the third mode also ranked the highest level and the overall value mean ($= 4.70$, S.D. $= 0.28$). In comparison the achievement to pre- and post-test different at a significant level of 0.001.

1. Introduction

The use of intelligent computer –assisted instruction (ICAI) or intelligent tutoring system (ITS) is one method which has been widely employed in order to serve the student individual need and to improve the effectiveness of teaching and learning (Beck et al., 1996 : 1). The key element of ICAI or ITS is to flexibly comfort the teaching and learning zone for both teacher and students. Teacher and students are able to cooperatively learn, analyse and simulate the knowledge and concept of learning. This method can be used to indicate what students may know or may not know. There are evidences that students prefer to use ICAI or ITS rather than traditional teaching method (Dumrongwong 1997:9). This method also assisted teachers to understand students' cognitive (Dumrongwong 1997:10). ICAI or ITS is well known as the system which can be serve the student individual needs (Thomas, 1997). This is also recognized as Artificial Intelligent (AI). As far as the technology is concerned, there is the difference between ICAI and CAI or Computer-based teaching (CBT) which more likely presented the linear information. In 1993, McArthur et al. recognized the potential of using ICAI in classroom as the use of Knowledge Base (KB) by expert to analyze the competence of learners (McArthur et al., 1993:1).

Based on the Software engineering instruction in Thailand, the use of ICAI in teaching and learning is not widely employed in order to provide the variety of activities for the learners. Moreover, there are a lot of students in each classroom which may cause problems in teaching and learning process. To provide the alternative way of learning for students, the researcher would like to implement the intelligent computer – assisted instruction through network learning in the course of 05-041-404 Software engineering. This research aims to

develop the teaching and learning through ICAI and develop the curriculum.

2. Literature Review

2.1 Intelligent Computer Assisted Instruction

The intelligent CAI or the intelligent tutoring system has been developed by using expert system which is one of artificial intelligent (AI)(Dumrongwong,1997) and applied to analyze the level of learners' knowledge by asking student questions or testing them. This can serve the students' needs. Furthermore, ICAI is easily to manage in variety of contents (McArthur et al., 1993).

2.2 Agents

There are several definitions of intelligent and software agents. The aims of agents are defined in term of their tasks which are to assist the user with computer applications and networks. Some definitions of agents has been defined as follows:

Franklin and Graesser (1996: 4) defined an agents as anything that can be viewed as perceiving its environment through sensors and acting upon that environment through effectors. Croft (1997: 1) mentioned that an agents is authorized to act as human. There are 3 main characters that agents can be acts on behalf of human being: Delegation,

Competency, and Amenability. Green et al. (1997: 1) stated that agents perform certain activities automatically. Agents should have ability to plan for the intended purpose in accordance with the objective settings as follows: Pro – Activity, Re - Activeness Learning, Cooperation, and Mobility.

Pothipruk(2004:47) defined the agents as the persistent software entity that inhabit somecomplex dynamic environment, sense and act automatically in this environment. Agents is the software working instead of human being. They have their own ideas which are able to perceive and change of the environment and react to the changes automatically.

Croft (1997:1) have extended the characteristics of agents as the software dedicated to a specific purpose so that the development of agents are in 2 methods: non-intelligent and intelligent. Agents which does not focus on intelligence is Process control system and software daemon. These agents have a system of knowledge and are able to constantly interact. For instance, these agents perform as the assistant who has their routines Pakornpong: 2001: 48). Another agent which mainly based on intelligence is an agent that uses artificial intelligence (AI) to apply in their operation like human being. (Croft, 1997: 3)

Intelligent agent is a computer system that is capable of flexible autonomous action in order to meet its design objectives and provide an appropriate working and communicating. (Pothipruk, 2001: 48). In 1998, Jennings and Wooldridge stated that intelligent agent is a flexible agent to operate autonomously. According to the flexible agent features, there must be:

- 1) Responsive : An agent is capable to perceive its environment and able to interact appropriately in time.
- 2) Proactive: Agent should be able to exhibit opportunistic, goal-directed behaviour and take initiative where appropriate.
- 3) Social: Agent is able to interact with other agents in order to complete their own problems solving and to help others with their activities.
- 4) Autonomy Agent is capable to exercise control over their internal state and behavior or they can act on their own.

Franklin and Graesser (1996: 5) classified features of agents as follows:

- 1) Reactive is an agent that responds in a timely fashion to change in the environment.
- 2) Autonomous is an agent that exercises control, over its own actions
- 3) Goal – Oriented, this agent does not simply act in response to environment but attempt to accomplish the goal setting.
- 4) Temporally Continuous is a continuously running process.
- 5) Communicative is an agent with ability to exchange information with other entities (agents, humans, objects, their environment.
- 6) Learning is to change its behaviour based on its previous experience.
- 7) Mobile is an agent with ability to move from one location to another while preserving their internal state.
- 8) Flexible is an agent that can act without script.

This research aims to employ Agent 3: Goal-oriented to investigate the participation and the communication content that students used in communication.

3. The Methodology and Model

3.1 The Analysis of Web-Based Learning

10 lessons are developed by 3 experts. The lesson contents have been uploaded. 4 lessons can be downloaded; the user requirement, principle of testing, project management and software estimation, and risk management

3.2 System Design

The system design is the components of the conceptual framework activities and the design of learning tools composed of standard screen design, relevant to students, and document standard. This design is considered in accordance with the relevant information, content design, teaching methods, measurement methods, and related

3.3 The Development system is designed according to the learning activities, students' Satisfaction questionnaires towards learning activities, testing and quizzing in Figure 2.

3.4 Accessibility

This experiment is to trial the learning activities. The samples of the study are purposively selected of 32 of 4th year of Information system student, Business administration Department, Faculty of Industry and Technology, Rajamangala University of Technology Isan, Sakonn Nakhon Campus in Semester 1 Academic year 2017 (Tientong, 2002).

3.5 Assessment

The assessment of the web-based instruction using computer assisted intelligent network for 05-041-404 Software Engineering course is conducted to analysed the data from the questionnaires, the effectiveness of the lessons, the mean score of pre and posttest, the mean score of pre and post satisfaction assessment, S.D., the significant differences of the samples by t-test Independent Samples (Roger, 1999)

4. The Findings

4.1 In order to access to the web-based instruction using computer assisted intelligent network, the students have to registered and log-in before doing the pre-test. Then, they have to finish the activities given and do the post test.

4.2 The students' satisfaction on web-based instruction using computer assisted intelligent network for 05-041-404 Software engineering course.

Table 1 The students' satisfaction on contents on web-based instruction using computer assisted intelligent network for 05-041-404 Software engineering course

	Satisfaction	Mean	S.D.	Satisfy
1	Content	4.61	0.24	highest
2	Design	4.54	0.27	highest
3	Activity	4.7	0.28	highest
	Average	4.54	0.26	highest

In Table 1, the finding has shown that the most students' satisfaction on web-based instruction using computer assisted intelligent network is activity, then content, and design respectively (Mean = 4.54, S.D. = 0.26).

4.3 The result of web-based instruction using computer assisted intelligent network for 05-041-404 Software engineering course

Table 2 Pre and Post Test of Experiment Group

Group	Sample	Pre-test Post-test		df	t	Sig
		Score	Score			
Experimental (E)	32	16.09	29.16	62	17.923	0.001

** sig. $\alpha = .01$

Table 2 has shown that the result of pre and posttest of the experiment group is significant at level 0.001. It reveals that the result of experiment group learning by using web-based instruction using computer assisted intelligent network is higher and more effective.

5. Summary and Conclusions

The research on web-based instruction using computer assisted intelligent network for 05- 041-404 Software

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engineering course with 4 lessons is feasible for the students. It benefits students. Moreover, the students found that the contents can be downloaded and it is easy for them to access anywhere, anytime, anyplace. The comparison of the pre and posttest score on web-based instruction using computer assisted intelligent network has been analysed by using statistic t-test Dependent Sampling and found that the significant difference is at level .001. It means that the effectiveness of experiment group is higher than pretest which is related to Kongmanus's study(2011). He has employed web-based instruction using intelligent network to his study to provide consultancy on classroom action research by using multi-stage random sampling and found that the ability on consultancy in classroom action research is higher. The students' satisfaction has shown that they are most satisfied on the content which is managed enough for them to study at the highest level (Mean = 4.61, S.D. = 0.24). For the activity, it reveals that the activity provided is acceptable at the highest (Mean = 4.54, S.D. = 0.27). They found that the activity provided is applicable. The design is at the highest level (Mean = 4.54, S.D. = 0.27)

Endnotes

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