

# A DESIGN AND DEVELOPMENT OF E-LEARNING CONTENT FOR MULTIMEDIA TECHNOLOGY USING MULTIMEDIA GAME

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## **ABSTRACT**

*This paper aims to develop e-learning contents for multimedia technology lesson with the purpose to assist students in learning the subject. The multimedia game was used to make the lesson more interesting and at the same time to provide students with real example of how multimedia works. The effectiveness of the developed contents was studied by comparing results of the same test from students taking conventional class-room lectures and those using the developed e-learning contents. We found that the latter performed better at the statistical significance level of 0.05.*

## **KEYWORDS**

*Index Term— e-learning; content; courseware; Game; multimedia.*

## **1. INTRODUCTION**

We have known that the world of communication without borders means unlimited communication, wherever in the world can be connected to each other. These advantages can be widely used as application, internet such as Web search and the most important is learning and teaching via the internet as distanced learning or e-learning which is very important now. The distance learning via network system [1] or a similar meaning is learning and teaching in any form by transferring the content through electronic media such as CD-ROM, internet, intranet or satellite TV, satellite, etc. This kind of learning has been introduced into Thailand market for a while. The computer-assisted instruction CD-ROMs, web-based learning, online learning, distance learning via satellite or online video, etc. [2] The definition of e-learning is widely covered the distance learning by using electronic media as the medium.

Today, the development of e-learning [3] is widely used, so that we have to find the method of managing and developing or creating e-learning to suit the changes and meet the needs of users. Even education and business field need to take these roles as well. But the problem in development of e-learning is contents are not interested. Learner does not want to learn or only take short period. Contents do not meet the needs of learners, as problem mentioned above, we have to figure out a way to solve the problem of creating more interesting for e-learning contents.

The content will be in the form of integrating multimedia with contents which will make contents more interesting. It is noticed that now, learners play game extensively. So, in order to provide e-learning more interesting for learner, e-learning should be integrated which creating the contents or operating by using game's story. When learners play game until the end, learners will be able to finish e-learning contents themselves.

## **2. PREVIOUS WORK**

The development of e-learning still has many problems, such as, the limitation of ability in learning management system (LMS) in order to manage learner's contents or evaluation system is not standard. There are some problems in the terms of learning material or contents, which is a very important. If learning materials are not attractive to learner, it will impact to the effectiveness of learning because learner does not want to learn. In the past, researchers have studied and solved mentioned problems as follows; [4] presented the research on the development of game computer enhancing the knowledge of agricultural research. From the research can be summarized as follows; the evaluation result of the knowledge in growing kales after playing games are higher than before at the level of .05. This is shown that game computer can help enhancing knowledge to learners. The satisfaction of playing game computer can increase the agricultural knowledge. From the sample after the trail, we found that overall satisfaction was good, but it still has limitation in the content presentation.

If the contents are sophisticated and hard to understand, learner might not have courage to use efficiency. In addition, [5] developed learning and teaching by e-learning for high school students determines and compare between the effectiveness of normal learning and teaching and e-learning. The result showed that learning and teaching by e-learning, students learning achievement have improved at level 3 and 2. They can understand contents more easily and be able to use learning resources effectively or be able to review contents by themselves at home or school. The contents development is not interesting enough for learner because contents are presented as text and stop motion slide only. For [6] [7] presented the research of the development of the multimedia courseware for deaf people.

This paper developed and tested the performance of the multimedia courseware to deaf people on Buddha history which met the needs and relied on the culture of deaf people. The research's process needed to analyze contents and determine the purpose of contents which can be applied in the sample of deaf people's classroom. Summary of the contents will analyze the quality of the design for creating multimedia contents.

## **3. BACKGROUND**

The definition of e-Learning has been described above which can be summarized that e-learning means learning through the electronic media, such as radio, television, video, CD-ROM, computer network. Now, e-learning means learning and teaching through the internet network. Learner and teacher can learn by using resources in the internet system for learning and teaching effectively.

*Game Tutorial:* Game tutorial means contents on the computer which help to teach learner, emphasis on the knowledge and fun. Including competition that challenges learner's abilities. [8]

[9] “Making learning is fun” is the concept. Creating the environment of learning to be enjoyable and motivate learner to feel that they would like to learn. [10] Using game for teaching can be used for acquiring new knowledge in the classroom as well as substitute teachers by variety of enjoyable for learners in the short period or unfavorable environmental condition, etc.

## 4. METHODOLOGY

The development of e-learning contents based on multimedia games is the experimental research. The research was conducted, according to the guidance of the software development life cycle system which divided into processes as follow; Step 1: Project planning, Step 2: System analyses, Step 3: System design, Step 4: Trial, Step 5: Improvement

### A. *Step 1 Project planning*

Problems and needs of the system as Contents had been developed in many different forms, such as the development of the text, images or video media. The development of contents in each lesson still has problem when using the content. When the content was no longer attractive to students as they should, such as, showing only texts and stop motion images, students are not focused and do not want to continue which is the important problem in the development of e-learning. So, the researchers had to figure out a way to develop e-learning to be interesting for students to study more contents. So, the researchers design the development of e-learning contents based on multimedia games and multimedia technology subject.

The presentation of the new system’s development by developing contents is in the form of multimedia games, because currently, students are in the period of education or youth. They will be interested in playing games for relaxing and fun. With these factors the researcher has developed the multimedia games. From the system of the past presented the development of the new work by developing a lesson in the form of multimedia games, because the students in his education or interested in gaming for relaxing and fun to play with these factors is the development of a multimedia game.

### B. *Step 2 System analyses*

Design of the e-learning Content based on multimedia games. Design of the multimedia games will be presented the contents in the form of Adventure games. Players will be able to choose a character and achieve the goal of the game. The adventure game will focus on the player to find a solution and use things for benefits during the adventure in each area. Players will play game until the end of the game which will complete the contents at the same time. Game’s design is consisted of;

- Able to choose three characters as needed for e-learning based on multimedia games and player can choose any character the needed.
- Providing a form of e-learning contents based on multimedia games to attract the interest of students by offering the contents based on multimedia games.
- The introduction of e-learning contents based on multimedia games will be introduced to players.

- Providing the purpose of the e-learning contents based on multimedia games, multimedia technology subject.
- Terms of learning, when plays all games of e-learning contents based on multimedia games, players will be completing all contents.
- There are 5 stages and each stage will provide the contents together with e-learning contents based on multimedia games. When finish every stages, player will finish all contents of multimedia technology subject.
- E-learning contents based on multimedia games, show the list of users which require typing the name of users before playing game and will be displayed.
- The scope of the contents of multimedia technology subject.

Chapter 1: Background and introduction to multimedia technology

Chapter 2: Components of multimedia

Chapter 3: Animation

Chapter 4: Sound

Chapter 5: Network streaming.

The scope of the test would provide a pretest to test the knowledge of students. The form of the test will be 5 multiple-choices. Each lesson will have a practice at the end of each lesson with 5 multiple-choices. A post-test of students' knowledge after finish lessons which will be 5 multiple-choices as well.

### *C. Step 3 System design*

Designs and the development of multimedia games used Adobe flash CS5 and the development in the form of 2D Animation which displayed two-dimensioned animation. The process of the multimedia games as follows;

The process begins when a player wants to play, select 4 characters and enter the name of the characters. The next step, choose a lesson which is divided into 5 lessons or 5 stages and then do a Pre-test before entering the lesson which is chosen by players. When finish the lesson will do the Post-test, and the system will check that players played all stages. If players skip the lesson, players have to repeat the stage until finish all lessons.

The result of the test score will be summarized the point pass or fail. If players fail, they can repeat the lesson as needed. The results of the research of e-learning contents based on multimedia games, multimedia technology subject will create a tool for learning and teaching with multimedia game which divided as follows; Screen of multimedia game



Figure. 2. Shows the title's screen of the multimedia games.

The title's screen of the multimedia games will be the main screen when the student login to the e-learning contents based on multimedia games. The GUI screen will be displayed in the Figure. 2.



Figure. 3. Choose the characters of multimedia game.

Choosing one character to access multimedia games and type username can be any name. After that select the submit button to the e-learning contents by following;

- Click on the character to choose the character.
- Type the character name in the text box.
- Click submit button to accept and enter into the contents screen (home)

## 5. EXPERIMENTAL

### A. Determine the population and samples selection

The population and Samples used in the experiment as follows;

- The experts evaluated the use of e-learning contents based on multimedia game with 5 people, including the experts in teaching and information technology.
- The students is the sample to take the course with e-learning contents based on multimedia game and evaluate the satisfaction for e-learning contents based on multimedia game. The students of information technology 3<sup>rd</sup> year, Thai Nichi Institute of technology who registered ITE-306, multimedia technology course in semester 1/2010 of two classes were chosen to get 1 class sample from 30 people.

*B. Process used.*

- Trial and Evaluation this trial process was One-Group Pretest-Posttest Design which aims to evaluate the knowledge gained from the experiment, including the satisfaction from the sample after the trial. The process is shown as follows;
- The experiment of e-learning Content based on multimedia games with a sample of 30 Bachelor degree students, 15 males and 15 females were conducted in the laboratory of Thai- Nichi Institute of Technology by providing 1 computer for 1 person with a headset for listening to the game.
- Before the introduction of a preliminary agreement with the experimental sample, then tested for 5 e-learning contents based on multimedia games and 4 multiple choices, 1 point for correction and 0 point for mistake. Then the samples played games that were produced without limit. The researcher observed the behavior of the sample.
- When finished the game, the samples tested 5 e-learning contents based on multimedia which is the same question before playing.
- After the test, the samples evaluated the satisfaction of playing the game by using the questionnaire. The scale of the Likert is rated in 3 levels to suit the sample of students in the bachelor degree and using open-ended questions for additional comments as below;  
*3: refers to the opinion with high satisfaction level.*  
*2: refers to the opinion with moderate satisfaction level.*  
*1: refers to the opinion with low satisfaction level.*  
And these criteria mean;  
*2.51 to 3.00: indicates high satisfaction level.*  
*1.51 to 2.50: indicates moderate satisfaction level.*  
*1.00 to 1.50: indicates low satisfaction level.*
- Taking the result from the samples to analyze for the t-test with independent formula to calculate Matched paired t-test. To determine the difference between scores from the know ledges from e-learning contents based on multimedia game and the average and the standard deviation can be determine the satisfaction level of the game.

*C. Analysis data and statistics.*

The statistics used in the analysis of scores.

- Average (Mean) is a measure of the average value of the data by using the formula as the equation 5-1.

$$\bar{X} = \frac{\sum X}{N} \tag{1}$$

When,  $\bar{X}$  = Average score  
 $\sum X$  = sum of all data  
 $N$  = number of data

- Standard Deviation: SD can determine the variability of the data used to evaluate by using the formula as the equation 5-2.
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$$S.D. = \sqrt{\frac{\sum(X-\bar{X})^2}{N-1}} \tag{2}$$

When, S.D. = Standard deviation  
 $X$  = score  
 $\bar{X}$  = average score  
 $N$  = sum of all members  
 The satisfaction of using the samples.

Table 1: shows the satisfaction results of e-learning content based on multimedia games from the samples.

Description	$\bar{X}$	S.D	Level
1. Easy to understand the system	2.90	0.30	High
2. The screen design of the system.	2.83	0.38	High
3. Easy to use the contents	2.50	0.64	High
4. The placement of the elements of the game	2.83	0.38	High
5. Attractive contents	2.60	0.57	High
6. Enjoyable to use	2.72	0.45	High
7. Easy to read texts' content.	2.93	0.25	High
8. Speed of use	2.47	0.63	Moderate
9. Colorful illustrations.	2.87	0.35	High
10. Overall satisfaction	2.87	0.35	High
Average (Mean)	2.74	0.43	High

Table 1 shows that the satisfaction of using e-learning contents based on multimedia games were in high level with an average of 2.74 which was considered and found that each point is in high level as well. Easy to understand the system and texts of e-learning content based on multimedia games are easy to read with the highest satisfaction at average of 2.93. The lowest satisfaction is the speed of use which is moderate satisfaction with an average 2.47. However, 30% of the samples comments that the speed of use depends on the speed of services' network of learning and teaching as e-learning.

The result of the effectiveness of e-learning contents based on multimedia games, multimedia technology subject which developed by using meguigans formula

The average score for all students from testing pretest 46.72

The average score for all students from testing posttest 98.56

The effectiveness of e-learning contents based on

$$\text{Multimedia games} = \frac{98.56}{46.72} = 2.10$$

The calculated value is greater than 1.50 which is concluded that e-learning Content based on multimedia games is effective by the standard of meguigans

*The test's score of knowledge for multimedia technology.*

Table 2: compares the test's score about knowledge of multimedia technology for the samples

Test's score	Lowest	Highest	X	D	S.D	t	p
Normal study	1	5	5.733	3.000	2.515	5.951	0.572
Multimedia games	3	8	6.633	3.000	3.213	4.488	0.655

Table 2 compares the test's score between normal learning in a normal classroom and learning by e-learning contents based on multimedia games, found that the test's score of learning by e-learning contents based on multimedia games is higher than normal learning in a normal classroom. Significant level of .05 ( $t=15.124$ ,  $p < .05$ ), indicates that the knowledge from learning by e-learning contents based on multimedia games is higher than normal learning in a normal classroom, significant level of .05

## 6. CONCLUSION

The paper on the development of e-learning content based on multimedia game, multimedia technology subject can be summarized as follows; The results from testing the knowledge about multimedia technology after playing game are higher than before, statistically significant at the .05 level, indicating that e-learning content based on multimedia, multimedia technology subject can be enhanced students knowledge based on the assumption. The satisfaction after playing game, e-learning content based on multimedia game, multimedia technology subject from the sample found that overall satisfaction is high with an average of 2.74 which are commented that playing this game can get more knowledge. Learning multimedia technology subject is not boring and need more time for playing game longer.

In this paper, the author presents the development of e-learning contents based on multimedia games. Learner plays game which will get contents at the same time. Learner will not get bored and be able to interest in playing game which means they are learning contents along with games.

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