A CREATION OF VIRTUAL CLASSROOM FOR TEACHING AND LEARNING MANAGEMENT WITH e-Learning

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ABSTRACT

The purposes of this research are 1. to create virtual classroom for teaching and learning management with e-Learning for radio graphic testing inspection subject, 2. finding the quality of the created virtual classroom from e-Learning lesson and 3. making an experiment for finding learning effectiveness from one who study in this virtual classroom.

The ideas of this research are 1. using computer graphics to create the model, 2. create a virtual classroom, 3. analyze and design this virtual classroom to be an information system of education which consistency and suitably for the process of knowledge management. For the creation process, first the virtual classroom was created by using virtual reality technique. Next create e-Learning lessons and compose together. Last it was tested with samplers which are the fourth year students of King Mongkut’s university of Technology Thonburi, faculty of engineering, department of production engineer. The hypotheses of this research is the e-Learning from this virtual classroom for radio graphic testing subject has a quality and suitable for the new idea of knowledge management process and the achievement is better than 60\% and save learning time not less than 30\%.

Keywords
Virtual Classroom, Radio graphic testing, Learning management, e-Learning

1) INTRODUCTION

At present, internet and computer has more roles in everybody's life and way of living. All educational institutes are interested in information technology. Application of technology in education, therefore, is important. Current instruction has changed quite dramatically. Students and instructors use network in their classroom. Information technology is the cause of the age of information in which there are a lot of contents to learn without end. Connecting information through the largest network can be done on the internet. People can broaden their learning and knowledge at all levels because internet collects all bodies of knowledge in the form of hypertext documents, normally it is called WWW or World Wide Web. This can be considered as virtual library of the world. Moreover, internet is a tool to communicate easily to every person from all parts of the world. As a result, internet is used in instruction and learning to supplement classroom and it can be used as a tool for online teaching/learning. This is a form of distance learning for a whole course or a whole curriculum. Trends in internet technology are also progressing rapidly. That is to say, learning via electronic media or e-Learning is becoming
more and more important. Students have a role to search for and share knowledge. They will learn to communicate in a fast manner, learn to choose the content to enhance their understanding, and learn according to their demands because they can access to all information in the world. It is widely known that web is an important service on the internet which drives e-Learning and makes it gain more attention from the general public. Web has an important role in education and learning in an open system and decentralization. This makes a new dimension of learning with no limit in time and place. Learning can be made both in classroom and external world. In developed countries, e-Learning has spread inside conventional education, human development in organizations and individual learning. However, in Thailand, learning via electronic media is very new and it has not gained much application. In the course of this changing world, the impact of globalization, free trade in economics along with development in science and technology will push Thailand to make sure that the population is ready for the changes in the future. Therefore, e-Learning is an alternative which is suitable for the development of human resource in order to compete in the modern world.

e-Learning is a kind of distance learning which applies electronic media through World Wide Web where learners and instructors can communicate. Learners can access many resources of information without boundaries. Learners can participate in activities and trainings online by facilities in WWW. Online learning, therefore, is widely popular at present because there is no limit in distance, time and place. Moreover, it supports the potentials and the capabilities of learners.

e-Learning instruction is a kind of Technology-Based Learning which covers various forms of learning like Computer-Based Learning, Web-Based Learning, Virtual Classrooms, and Digital Collaboration, for example. Learners can learn via all kinds of electronic media such as internet, intranet, extranet, satellite broadcast, audio/video tape, interactive TV and CD-ROM.

e-Learning instruction via Virtual Classrooms is a kind of instruction through network which uses the efficiency of technology in communication and internet. Instruction needs to connect learners’ computer to the instruction network computer. Learners use computers to surf on the website of virtual classrooms and participate in the activities designed by the instructors. This kind of virtual classroom is called real virtual classroom. Access to this virtual classroom on the first page which is called ‘homepage’ will describe the title of the course, the name of the instructor and short texts concerning the main topics in the course. This homepage is beautifully designed along with photos, graphics, fonts and colors to gain attention from the learners. The short texts in the homepage will link to webpage where subtopics and details can be found. The contents in each part are arranged in the order of importance. Learners can click mouse to select the topics according to their interests, for example, announcement webpage, comprehension webpage, content webpage, opinion webpage, conclusion webpage, answer webpage, learning resource webpage, evaluation webpage and other designed webpage.

The course ‘Radiographic Testing’ is a course in the curriculum of Industrial Engineering, Faculty of Engineering, King Mongkut’s University of Technology Thonburi. Radiographic testing is a specialized field and it is normally open to private organizations in the industry. The contents contain both theories and practice. In order to participate in practice, the learners must pass the standard criteria of the theories first. If the learners do not have enough knowledge, practice might hurt the learners. To illustrate, dangers from radiation can cause damages and wounds. Such course is not only for students in King Mongkut’s University of Technology Thonburi but also for industries. At present, the course ‘Radiographic Testing’ is done through e-Learning which complies with the National Education Act of B.E. 2542. This is in accord with the current information technology in that:

1. Learners can learn according to their preference
2. This is a development of e-Learning media
3. This is distance learning e-Learning lessons of such course mainly contain theories and the contents essential before practice. The
learners must pass the standard measurement and evaluation first in order to be able to get inside the workshop of the Department of Industrial Engineering.

According to the above-mentioned principles, theories, and reasons, the researchers developed virtual classrooms for e-Learning instruction on the course ‘Radiographic Testing’. The virtual classrooms are divided into 3 rooms as follows:

1. Theories Room contains the video clips of the instructors along with slides to accompany the lecture in theories and practice.
2. Library connects the network system to the e-Learning lessons on radiographic testing by current existing radiation.
3. Workshop is intended for practice which simulates virtual practice before real practice. These rooms were created using the principles in virtual computer graphic technology.

2) Research Objectives

This research has the following objectives:

1. To develop virtual classrooms for e-Learning instruction on the course ‘Radiographic Testing’
2. To evaluate the quality of virtual classrooms for e-Learning instruction on the course ‘Radiographic Testing’
3. To find out the learning achievements of the learners who used the virtual classrooms for e-Learning instruction on the course ‘Radiographic Testing’
4. To find out the opinions of the learners towards the virtual classrooms for e-Learning instruction on the course ‘Radiographic Testing’

3) EXPECTED OUTCOME

In this research, it was expected that the developed virtual classrooms for e-Learning instruction on the course ‘Radiographic Testing’ would have quality and be appropriate for the new learning management procedure. The learning achievement should be over 60% and it takes 30% less time to learn.

4) ASSUMPTIONS

This research has the following assumptions:

1. The quality of the third virtual classroom for e-Learning instruction about practice in Radiographic Testing was examined.
2. The learning achievement of the learners from the third virtual classroom about practice in Radiographic Testing was measured.

5) RESEARCH METHODOLOGY

The researchers set the following methodology:

Tools used in this research

1. Virtual classrooms for e-Learning instruction
2. e-Learning lessons on radiographic testing
3. Quality evaluation form for virtual classrooms
4. Learning achievement test for the learners of virtual classrooms for e-Learning instructors
5. Questionnaire concerning the learners’ opinion towards virtual classrooms for e-Learning instruction on the course ‘Radiographic Testing’

The steps in developing virtual classrooms for e-Learning instruction

1. Virtual classrooms were analyzed and designed to become a system for educational information which was suitable for knowledge management according to e-Learning instruction.
2. Computer graphic technology was used to create 3 dimensional simulations for the practical virtual classroom so that the instruction on the course ‘Radiographic Testing’ in the form of e-Learning was similar to real practice in simulation.
3. Virtual classrooms were developed using virtual image technology.
4. The quality of virtual classrooms for e-Learning instruction on the course ‘Radiographic Testing’ was examined.
5. The learning achievement of learners towards the e-Learning lesson on radiographic testing was measured through virtual classrooms.

The steps in developing learning Achievement test

1. The test was developed according to the behavioral objectives by analyzing the numbers of the real questions by experts. The
method by Rovinelli and Hambleton was used. 120 items with the average score over or equal to 0.5 which was accurate in the contents were chosen out of 180 ones. They were tested with the sampling group.

2. The test was analyzed by specifying the weight of sub-behaviors from the behavioral objectives in order to make questions. The behaviors used in the measurement were about cognitive domain in 6 aspects as follows: memory, understanding, application, analysis, synthesis and evaluation.

3. Testing Management System or TMS was designed. The tests in this research consisted of pre-test, tests at the end of each learning unit, and post-test.

4. The quality of the test was measured by using the test with the sampling group or the students at the Department of Industrial Engineering, Faculty of Engineering, King Mongkut’s University of Technology Thonburi. The results from the test were analyzed to find out the quality of the test which contained power score (difficulty), discrimination and reliability of the test.

5. The test was used in the experiment to find out the efficiency of virtual classrooms and the learning achievement. The steps in developing quality evaluation form for virtual classrooms for e-Learning instruction

The quality evaluation form for virtual classrooms was a questionnaire with Likert’s rating scale. The criteria for the questionnaire in terms of multimedia quality consisted of 5 levels: Level 5 means the best quality; Level 4 means good quality; Level 3 means moderate quality; Level 2 means unsatisfactory quality and Level 1 means ‘it needs revision’.

The steps in developing the questionnaire about the learners’ opinion towards the e-Learning instruction was done by setting the questionnaire with 5 Likert’s rating scales: Level 5 means ‘agree the most’; Level 4 means ‘highly agree’; Level 3 means ‘uncertain’; Level 2 means ‘disagree’ and Level 1 means ‘disagree the most’.

6) CONCLUSIONS

After the experiment in the practice of the course ‘Radiographic Testing’ in the third classroom by practice with e-Learning instruction, it was found that:

1. The overall quality of the virtual classrooms with virtual image technology was at the best level. The efficiency of instruction was higher than the criteria set at 80/80.

2. The learning achievement of the learners for the course ‘Radiographic Testing’ in terms of practice after e-Learning instruction with virtual classrooms showed that the learners passed the standard set at 65%, as expected and the learning time took 35% less, higher than expected.

3. The learners showed the overall opinion towards the virtual classrooms that it was suitable for e-Learning instruction at high level.

Table 1 summarizes the quality evaluation results of virtual classrooms for e-Learning instruction on the course ‘Radiographic Testing’ by experts

<table>
<thead>
<tr>
<th>Evaluated Items</th>
<th>Mean</th>
<th>Quality Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Virtual classrooms through internet network are more interesting than instruction in classrooms.</td>
<td>4.67</td>
<td>the best quality</td>
</tr>
<tr>
<td>2. Virtual classrooms through internet network help learners understand the contents better than in classrooms.</td>
<td>4.67</td>
<td>the best quality</td>
</tr>
<tr>
<td>3. Academic contents about radiographic testing in virtual classrooms are presented in an interesting way.</td>
<td>4.00</td>
<td>good quality</td>
</tr>
<tr>
<td>4. Learners need not study additional contents from instructors after virtual classrooms.</td>
<td>4.33</td>
<td>good quality</td>
</tr>
<tr>
<td>5. Images and texts are in a suitable and neat layout.</td>
<td>4.67</td>
<td>the best quality</td>
</tr>
<tr>
<td>6. The lessons have suitable and neat layout.</td>
<td>4.00</td>
<td>good quality</td>
</tr>
</tbody>
</table>
Table 2 summarizes the opinions of the learners towards e-Learning instruction on the course ‘Radiographic Testing’.

<table>
<thead>
<tr>
<th>Evaluated Items</th>
<th>Mean</th>
<th>Opinion Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Virtual classrooms through internet network are more interesting than instruction in classrooms.</td>
<td>4.42</td>
<td>Highly agree</td>
</tr>
<tr>
<td>2. Virtual classrooms through internet network help learners understand the</td>
<td>4.33</td>
<td>Highly agree</td>
</tr>
<tr>
<td>3. Academic contents about radiographic testing in virtual classrooms are</td>
<td>4.19</td>
<td>Highly agree</td>
</tr>
<tr>
<td>4. Learners need not study additional contents from instructors after</td>
<td>4.17</td>
<td>Highly agree</td>
</tr>
<tr>
<td>5. Images and texts are in a suitable and neat layout.</td>
<td>4.00</td>
<td>Highly agree</td>
</tr>
<tr>
<td>6. The lessons have suitable and neat images and texts.</td>
<td>4.14</td>
<td>Highly agree</td>
</tr>
<tr>
<td>7. Colors used in virtual classrooms are suitable.</td>
<td>4.42</td>
<td>Highly agree</td>
</tr>
<tr>
<td>8. The size of texts and images is suitable.</td>
<td>4.33</td>
<td>Highly agree</td>
</tr>
<tr>
<td>9. Virtual classrooms through internet network can link to other appropriate</td>
<td>4.27</td>
<td>Highly agree</td>
</tr>
<tr>
<td>10. Learners can learn in virtual classrooms by themselves.</td>
<td>4.85</td>
<td>Highly agree</td>
</tr>
<tr>
<td>11. Learners can practice in virtual classrooms by themselves.</td>
<td>4.62</td>
<td>Highly agree</td>
</tr>
<tr>
<td>12. Learners can learn radiographic testing by themselves.</td>
<td>4.47</td>
<td>Highly agree</td>
</tr>
<tr>
<td>13. Virtual classrooms are interesting; Learners are more enthusiastic</td>
<td>4.65</td>
<td>Highly agree</td>
</tr>
<tr>
<td>14. Virtual classrooms have simulated images, 3 dimensional simulation, and</td>
<td>4.76</td>
<td>Agree the most</td>
</tr>
<tr>
<td>15. Virtual classrooms through internet network can link to other appropriate learning resources.</td>
<td>4.50</td>
<td>High</td>
</tr>
</tbody>
</table>
REFERENCES

http://board.dserver.org/w/webinternet/00000002.html
http://www.thaicai.com/articles/e-learning.html
http://www.thaicai.com/articles/elearning2.html
http://www.ku.ac.th/magazine_online/elearning.html
http://www.srithai.com/viewer.htm
http://www.learn.in.th/articles/tawanwong/tawanwong01.html
http://www.pvinter.com/pdirect/01/article/e-learning.htm
http://www.siamcom.co.th/e-learning
http://www.thaicai.com/articles/e-learning.html
http://edu.chandra.ac.th/programtechno/programtechno/elerntechno/SlidePae/virtualroom.htm
http://www.kmutt.ac.th/rippc/best43.htm