The Synthesis of an Online Project-based Learning Model with a Knowledge Management System by Analyzing Student's Multiple Intelligence

Sumalee Siksen, Monchai Tiantong

King Mongkut's University of Technology North Bangkok, Thailand

0110

The Asian Conference on Technology in the Classroom 2013

Official Conference Proceedings 2013

Abstract

The objective of this research were as follows : 1) to synthesize an Online Project-based Learning Model with a knowledge management system by analyzing student's multiple intelligence, and 2) to evaluate the synthesized model. The research methodology consisted of 2 steps as follows : 1) synthesis of an Online Project-based Learning Model with a knowledge management system using focus group discussion from 10 experts, and 2) empirical evaluation of the synthesized model by 5 experts using purposive sampling. The data was analyzed by mean and standard deviation.
The research results revealed as follows : 1. an Online Project-based Learning Model with a knowledge management system by analyzing student's multiple intelligence from focus group discussion that consisted of 6 modules as : 1) Multiple Intelligence Testing Module, 2) Multiple Intelligence Classification Module, 3) PjBL & KM Module, 4) Online Learning Module, 5) Teacher and Examiner Module, and 6) Rubric Evaluation Module, and 2. the results of the synthesized model on empirical evaluation by experts showed that they accepted the model at a very good level ($\overline{X}$ = 4.64, SD. = 0.48). In conclusion, this can be used with synthesized models successfully.
Keyword: *Learning Model Synthesize, Project-based Learning, Multiple Intelligence*

1. Introduction

It is necessary for teaching systems to help students gain new skills in both learning and using new technology. Therefore, those involved in education are required to study and find out the best ways to stimulate students to have creativity and enjoy studying (Office of the National Education Commission, 2000). However, it is found that the current teaching systems emphasize knowledge or ability in terms of improvements, focusing on learning by heart, rather than thinking skills, e.g. analytical thinking, synthetic thinking and critical thinking. The above thinking skills will be helpful for the students when they begin to work. So, students should mainly be taken into account when considering any teaching system. The students should be encouraged to use various tools so that they would be more interested in learning. Besides, the need, the interest and the differences of any individual should be well satisfied. Thereby, the teachers are acting as advisors who suggest to the students how to use the tools as efficiently as possible (Kidanun, 2000).
Teaching via the internet helps support "Community of Learner" (Anderson, 2007), allowing the students to study and receive knowledge by themselves and by means of Learner Interaction (Kahler, 2000). The characteristics of the said teaching method, therefore, are appropriate to Project-based Learning because 1) the Project-based Learning is originated from philosophy of education emphasizing Learner Center, 2) the Project-based Learning supports cooperative learning through communication, exchange of information, knowledge and opinions among learners, and 3) the Project-based Learning enables the students to create concrete products, showing that the students have successfully gained knowledge (Hargis, 2005).

The instructors used the projects as guidelines to enhance the performance of learners according to Multiple Intelligence of Howard Gardner (Sakchai, 2009), who proposed nine items of intelligence as follow: 1) Kinesthetic Intelligence 2) Existential Intelligence 3) Interpersonal Intelligence 4) Intrapersonal 5) Linguistic Intelligence 6) Logical and Mathematic Intelligence 7) Musical Intelligence 8) Naturalistic Intelligence and 9) Spatial Intelligence. Once understanding the strength and weakness of their learners, the instructors can help them meet with successes. This is because his project based activity requires systematic and step-by-step operation in which the learners has to practically study and figure out what they want to know by their own.

From the above educational innovation, the author has an idea to incorporate Multiple Intelligence into the system. What is added herein will act as Learner Guidance System, allowing the learners to do projects based on analysis of Multiple Intelligence. The system is expected to replace the class instructors by synthesizing a new learning model. Then, the said synthesized model will be applied by developing an Online Project-based Learning and recommendation for learners based on analysis of Multiple Intelligence. This will support differences among individuals and provide them with utmost benefits.

2. Objectives of the research

2.1 To synthesize an Online Project-based Learning Model with a knowledge management system, then analyze student's multiple intelligence by using focus group discussions from experts.

2.2 To evaluate the synthesized Online Project-based Learning Model with a knowledge management system.

3. Scope of research

3.1 Population includes experts in terms of Teaching Design, Project-based Learning, Multiple Intelligence, and Information Technology.

3.2 The subjects include 10 experts in terms of Teaching Design, Project-based Learning, Multiple Intelligence, and Information Technology, who were chosen by means of purposive sampling. The said subjects were qualified as follow: 1) working as instructors in the fields of computer, Education Technology, Education Psychology, or related fields, 2) graduated from Doctorate degree, and 3) having over 5 years of experiences. The subjects were divided into 2 groups as below.

3.2.1 Ten subjects for synthesizing learning model by means of focus group discussion.

3.2.2 Five subjects for evaluation of the said synthesized learning model.

3.3 Research variables

3.3.1 Independent variable is the Online Project-based Learning Model with a knowledge management system by analyzing student's multiple intelligence.

3.3.2 Dependent variable is the evaluation of the above model.

4. Methodology

This research consists of 2 stages.

Stage 1 is the synthesis of an Online Project-based Learning Model with a knowledge management system to analyze student's multiple intelligence by using focus group discussions from experts.

1. Studying the articles, documents and researches about educational innovation, Project-based Learning, cooperative learning, social network, tools and software used to develop relevant systems and theories.
2. Drafting the primary learning model based on the data derived from the study of relevant articles, documents and researches in item 1; whereby the author set up 4 issues: 1) Project-based Learning, 2) Analysis of student's Multiple Intelligence, 3) Objectives and functions of learning model, and 4) Measurement and evaluation, expecting mainly to satisfy the personal differences among the students.
3. Presenting the learning model to the advisors for consideration and revision.
4. Synthesizing the Online Project-based Learning Model with a knowledge management system to analyze student's multiple intelligence by using focus group discussions from 10 experts.
5. Creating tools to evaluate the suitability of the above synthesized learning model.

Stage 2 is evaluation of the synthesized Online Project-based Learning Model with a knowledge management system to analyze student's multiple intelligence.

1. Having the stated synthesized learning model evaluated referring to suitability by 5 experts.
2. Improving the stated model according to the experts' suggestions.
3. Presenting the model in the form of a diagram and report.

4. Analyzing results of the learning model evaluation by mean ($\overline{X}$) and standard deviation (S.D.) consisting of 5 criteria for evaluation according to the idea of Likert.

5. Summary of research

The presentation of this research was divided into 2 stages as below.

Stage 1 The synthesis of the Online Project-based Learning Model with a knowledge management system to analyze student's multiple intelligence by using focus group discussions, including 6 modules as in figure 1.

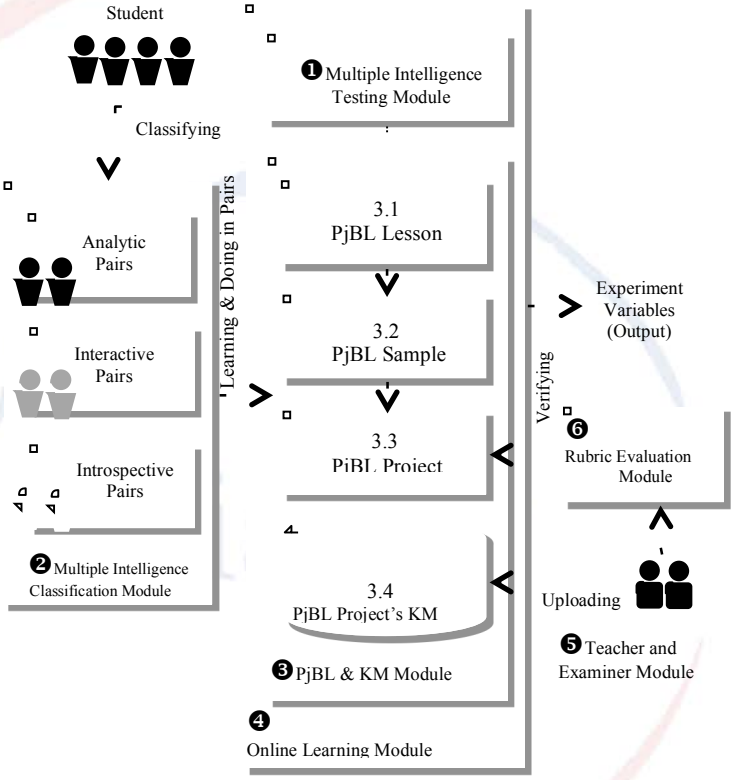

Figure 1 Online Project-based Learning Model with a knowledge management system.
(OPjMI Learning Model)

1. The Multiple Intelligence Testing Module is for classifying the learners into 3 multiple intelligence groups; that is, Analytic, Interactive and Introspective. Upon the enrollment of learners, the system will have them input basic information and take a multiple intelligence test of Howard Gardner (90 items).

2. Multiple Intelligence Classification Module is for categorizing the learners, by means of Think-Pair-Share, in mixed groups based on the results that the instructors derived from the multiple intelligence analysis of 3 student groups.

3. PjBL & KM Module is a guideline to carry out different projects as to the results of multiple intelligence analysis of the students; and to accumulate the works evaluated by the instructors and the experts in order to create knowledge; the said module is composed of the following 4 elements.

1) PjBL Lesson - guiding steps of the projects such as step-by-step suggestions, media, materials, publication, evaluation or other recommendation via website.

2) PjBL Sample - showing samples of each project that the instructors prepared in accordance with multiple intelligence of the students; i.e., Analytic (projects on exploration), Interactive (projects on experiment), and Introspective (projects on research), all of which are in the form of web database.

3) PjBL Project - accumulating the projects of learners, according to their categories, in the form of web database, waiting for evaluation by the instructors or the experts.

4) PjBL Project's KM - collecting and presenting the learners' projects already evaluated by the instructors or the experts, which then are uploaded onto the system to create a project database, in which the amount of data will increase and be a deep source of knowledge via the internet about projects in the future.

4. Online Learning Module is for combining the functions of module 1 and module 3 to be online or website based learning. The online tools for communication between learners and learners or between instructors and learners include webboard, e-mail, facebook and search engine, all of which are appropriate according to the researches and experts.

5. Teacher and Examiner Module is for the instructors to evaluate the learners' projects, and then upload them onto the online system in order to create database of projects, classified as to students' multiple intelligence. The said database is also a channel for the instructors to keep track of students' learning activity and to inform the students about the results of evaluation as well as further suggestions.

6. Rubric Evaluation Module is for creating a system of evaluating the projects of the students who have been learning online by means of rubric. In this research, the author applied analytic rubric assessment to define scoring criteria of 3 rating scales, dividing evaluation into 3 parts: work plan, work process, results and presentation.

Stage 2 Evaluation results of the synthesized Online Project-based Learning Model with a knowledge management system to analyze student's multiple intelligence.

The said model was evaluated by 5 experts in terms of module elements, objectives, functions, and proper application; and the results are as below.

Table 1 Results of the model evaluation in terms of module elements

Evaluation	Results		Level
	$\bar{X}$	S.D.	
1. Multiple Intelligence Testing Module	4.60	0.55	Very good
2. Multiple Intelligence Classification Module	4.60	0.55	Very good
3. PjBL & KM Module	4.60	0.55	Very good
4. Online Learning Module	4.60	0.55	Very good
5. Teacher and Examiner	5.00	0.00	Very good
6. Rubric Evaluation	4.40	0.55	Good
7. Overview of the model	4.40	0.55	Good
In terms of module elements	**4.60**	**0.50**	**Very good**

Referring to Table 1, it is found that the experts accepted the suitability of the model in terms of module elements at a very good level ($\overline{X}$ = 4.60, S.D. = 0.50)

Table 2 Results of model evaluation in terms of objectives and functions

Evaluation	Results		Level
	$\overline{X}$	S.D.	
1. Multiple Intelligence Testing Module	4.80	0.45	Very good
2. Multiple Intelligence Classification Module	4.80	0.45	Very good
3. PjBL & KM Module	4.60	0.55	Very good
4. PjBL Lesson	4.60	0.55	Very good
5. PjBL Sample	4.60	0.50	Very good
6. PjBL Project	4.60	0.55	Very good
7. PjBL Project'KM	4.60	0.55	Very good
8. Online Learning Module	4.60	0.55	Very good
9. Teacher and Examiner Module	4.80	0.45	Very good
10. Rubric Evaluation Module	4.80	0.45	Very good
11. In terms of coordination among modules	4.60	0.55	Very good
In terms of objectives and functions	**4.67**	**0.47**	**Very good**
In terms of application	**4.64**	**0.48**	**Very good**

Referring to Table 2, it is found that the experts accepted the suitability of the model in terms of objectives and functions at a very good level ($\overline{X}$ = 4.67, S.D. = 0.47), and in terms of application also at a very good level ($\overline{X}$ = 4.64, S.D. = 0.48)

6. Summary

The objective of this research were as follows : 1. to synthesize an Online Project-based Learning Model with a knowledge management system by analyzing student's multiple intelligence using focus group discussions from experts , and 2. to evaluate the Online Project-based Learning Model with a knowledge management system by analyzing student's multiple intelligence synthesized by the experts. Synthesis of the model using focus group discussions from 10 experts resulted in OPjMI Learning Model, which includes 6 modules: 1) Multiple Intelligence Testing Module, 2) Multiple Intelligence Classification Module, 3) PjBL & KM Module, 4) Online Learning Module, 5) Teacher and Examiner Module, and 6) Rubric Evaluation Module. Then, the synthesized model was evaluated by 5 experts, and it was found that the experts accepted the model at a very good level ($\overline{X}$ = 4.64, S.D. = 0.48). In conclusion, the synthesized model can be used successfully.

7. Suggestions

7.1 Suggestions for this research

The educational institutes that will apply this learning model should prepare instructors for the Project-based Learning as to the student's multiple intelligence in order to support differences among individuals.

7.2 Suggestions for next research

The learning model synthesized from this research will be developed as an Online Project-based Learning system with a knowledge management system by analyzing student's multiple intelligence so that it would be most helpful to the students.

8. Reference

[1] Anderson, L., "E-Learning at Augsburg College," Retrieved May 18, 2007. *From http://www.augsburg.edu/eteam/report.pdf*

[2] Hargis, J.W., "Collaboration, Community and Project-Based Learning-Does It Still Work Online," *Instruction Media,* Vol.32, No. 2, 2005.

[3] Kahler, H., "Constructive interaction and collaborative work," *Introducing a Method for Testing Collaborative Systems. Interactions*, Vol. 7, No. 3, pp. 27-34, 2000.

[4] Kidanun Malitong, "Education Technology and Innovation" *Chulalongkorn University Press, Bangkok,* 2000.

[5] Office of the National Education Commission, "Education Reform by the Student is Important" *Office of the National Education Commission, Bangkok,* 2000.

[6] Sakchai Tangwannawit, "Learning Activities Model in e-Learning Environment With the Development of Different Multiple Intelligences Learners" *Ph.D. thesis (Computer Education)*, *King Mongkut's University of Technology North Bangkok,* 2009.

iafor

iafor