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Learning Management System for Creative Thinking Skill Development with Collaborative Learning of the Graduate Students in Kasetsart University

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ABSTRACT

This research objectives were to: 1) develop the Learning Management System on Web-based instruction for creative thinking skill development by the collaborative learning of the graduate students, 2) investigate the students' behavior which using courseware on the learning management system in collaboration with the student project-based learning activities and the communication system through the Internet, and 3) evaluate the creative thinking of the students. The Learning Management System had been developed and used as an educational technology course in the educational communications and technology master program. The 27 graduate students had studied about courseware design and development techniques with collaborative learning. The courseware learning activities had been investigated and found that the learning management system of the courseware could maintain the students collaborative learning and most of them achieve on specific contents and collaborative practicing among them under the project-based learning. Moreover, they could perform the creative output at the high level.

Keywords: learning management systems, creative thinking, collaborative learning, project-based learning

INTRODUCTION

Because there were enormous growth of information and communication technologies, the technology was used to support eLearning with many kinds of digital media to enhance the ways of learning. The opportunities of learners to approach a lot of knowledge and information exchangeable online learning through internet. Because online learning became to be the educational media of the new world. It could be open the worldwide to the learners and the wisdom resources (Sompong et al, 2014). This would be congruence with the New Education Plan of Thai Government and Ministry of Education which had declared the new paradigm shift to Education 4.0 under Thailand 4.0 plan in 2016. This plan emphasizes to the learners who have to engage with the innovation creating of the country which was giving the opportunity of Thai students to lifelong learning, improving and change them to come across the information age and innovativeness. (Office of the National Education Commission, 2002).

In the same way, online learning requires different modes of learning to increase learning efficiency by using blended learning as the different platform. Blended learning allows organizations to gradually move learners from traditional classrooms to e-learning in small steps making change easier to accept. Working in a blended environment enabled instructors and instructional designers to develop the skills needed for e-learning in small increments (Driscoll, 2003). As well as Project-based Learning (PBL) is an innovative

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approach to learning that teaches a multitude of strategies critical for success in the twenty-first century. Students generally work in small, collaborative groups in the project-based learning model. They find sources, conduct research, and hold each other responsible for learning and the completion of tasks. Essentially, students must be "self-managers" in this approach to instruction. (Mergendoller & Thomas, 2000). The teacher possibly integrated using both collaborative learning and project-based learning for enhancing the competence of creative thinking skills by using the Learning Management Systems eLearning Courseware.

A taxonomy is provided for categorizing and understanding the creative skills that are often targeted for instruction, and include 5 category headings for organizing college-thinking skills: (1) verbal reasoning skills, (2) argument analysis skills, (3) skills in thinking as hypothesis testing, (4) using likelihood and uncertainty, and (5) decision making and problem solving skills (American Psychological Association, avialable at http://psycnet.apa.org/psycinfo/2003-02671-0080).

Creative achievements are the basis for progress in our world. Although creative achievement is influenced by many variables, the basis for creativity is held to lie in the generation of high-quality, original, and elegant solutions to complex, novel, defined problems. In the present effort, we examine the cognitive capacities that make creative problem-solving possible. (Mumford, Medeirod, & Partlow, 2012) Creative skills may require the real practicing together for team working under project-based learning process.

For these learning components, the researcher needed to study how we could bring about the online learning technology in terms of Learning Management Systems (LMS) to apply with collaborative learning in MOODLE (MLMS) courseware under the development of the Department of Educational Technology, Kasetsart University could be achieved on the student 's creative thinking skills development.

OBJECTIVES AND SCOPE OF THE STUDY

The objectives of this research aimed to: 1) develop the Learning Management System on Web-based instruction for creative thinking skill development by the collaborative learning of the graduate students, 2) investigate the students' behavior which using courseware on the learning management system in collaboration with the student project-based learning activities and the communication system through the Internet, and 3) evaluate on the creative thinking skills of the students.

Scope of the study composed of the development online learning on Learning Management Systems with Moodle courseware program of the Department of Educational Technology, Faculty of Education, Kasetsart University. The courseware development emphasize to the students' creative thinking skills by the collaborative with project-based learning activities. The sample was the master students who had enrollment the course of 01171521 Courseware Design and Development in Computer-based Instruction in first semester of the academic year 2016.

The definition of terms concerned of **blended learning** which means the learning system integration of classroom learning by face-to-face and online learning. These two learning modes would support and have the interrelationship with the appropriate ratio of face-to-face by online at 40:60 percentage. **Collaborative Learning** was the learning process that students would study together as a small group work (2-3 persons in a group). They might come to discuss neither in the class or online by using LMS or the special tools depend on their desire and convenient such as social media and offline communication. **Web-based Instruction** was the learning process by using the web potential for restore overall lessons and other facilities as the resource management systems. This would provide the textual knowledge and information including text, infographic, image, video and sound with other communication facilities on website.

RESEARCH METHODS

The research sample included the total of 27 students who registered the course of Courseware Design and Development for Computer-based Instruction (01171521) in first semester of the academic year 2016 at Department of Educational Technology, Kasetsart University in Bangkok, Thailand. They were all the first year graduate students in Educational Communications and Technology field.

RESEARCH INSTRUMENTS

The research instruments composed of the eLearning Courseware which was designed and developed on Moodle LMS application program Version 3.0 install on the Nontri Server at KU, following the conceptual

instructional design of the **ADDIE Model** which is a framework that lists generic processes that instructional designers use. This model represents a descriptive guideline for building effective learning and performance support tools in five phases. Analysis. Design. Development, Implementation, and Evaluation represent a dynamic, flexible guideline for building effective training and performance support tools. The evaluation composed the learning achievement pretest and posttest, a questionnaire for the student uses for evaluating of the courseware, creative thinking skills assessment forms for instructors and learners.

This research methodology composed of 3 steps. The first step, an eLearning courseware had been designed and developed following the course description of Courseware Design and Development for Computer-based Instruction (01171521). After that, this courseware had been used for teaching with blended and collaborative projected-based learning. The 27 graduate students who were the first year master students had participated the course for 1st semester academic year 2016. The Learning Management System had been used to serve as an educational technology course on the educational communications and technology master program. Lastly, eLearning courseware had evaluated by using the achievement test, questionnaire, observation and creative thinking skills rubic score assessment. ELearning courseware had designed and launched on Moodle Learning Management System (MLMS).

DATA COLLECTION

The creative thinking skills development had integrated cognitive leaning and practice on Web-based Instruction at URL: http://edtechelearning.edu.ku.ac.th/moodle/course/. On the other hand, pedagogical framework of Blended Learning in this study was applied face to face instruction was partly overlap by online learning with the proportion 40 by 60 percentage approximately. These learning methods were blended with two modes of learning to achieve the learning objectives. The face to face mode gave the sample study in Web-based Instruction and doing workshop in the computer laboratory. Meanwhile, project-based learning (PBL) was implemented to 7 groups of students (3-4 persons in each group) following the collaborative learning. There were 8 stages to hand-on practices in PBL (Sompong et al, 2016): 1) defined the problem, 2) planning the project, 3) searching and sharing, 4) collaborating, 5) presentation, 6) reflection, 7) application, and 8) evaluation. The learners were guided to use social networks to communicate each other in the groups. The students also participated eLearning courseware through **offline resources and materials** that had been used for active learning and relevant to the web-based instruction. The Learning outcome was assessed formative by using an evaluation form during the learning process and used achievement test as the summative assessment at the end of studying.

Edtech eLearning website was installed on KU Nontri Networks. Moodle Version 3.0 was used for Learning Management Systems (LMS) design on website URL: http://edtechelearning.edu.ku.ac.th/moodle/course/).

The courseware module composed of 10 Units as this follows:

- Course Description
- News and announcement
- Webbord and Chatroom
- Orientation and Introduction the Course

Unit 1 Meaning, Development and Usefulness of Courseware

Unit 2 Principal, Theory and Courseware Development

Unit 3 Learning Theory and Courseware Design

Unit 4 The Process of Design and Development Courseware

Unit 5 Courseware Evaluation and Case Study from Research Project

Unit 6 Courseware Design and Construction Technology

Unit 7 Project-based Learning in Courseware Design and Development

Unit 8 Project-based Presentation and Evaluation

Unit 9 Project-based Reflection

Unit 10 Conclusion and Utilization

Table 1. The testing hypothesis of pretest and posttest score

Achievement Tests	Total No. of Learners	$\bar{x}$	S.D.	t	Sig.
- Pretest	27	45.78	16.30	22.69	0.00
- Posttest	27	85.33	13.59		

* Significant level at .05

Table 2. The opinion of the learners toward the eLearning courseware

Evaluation Items	$\bar{x}$	S.D.	Level of Suitability
1. Course Description and Objectives	4.52	0.58	Highest
2 Learning suggestion of the courseware	4.37	0.56	High
3. Advisory for Website utility	4.33	0.62	High
4. Announcement and news	4.26	0.59	High
5. Clearly recommendation for study	4.22	0.58	High
6. Demonstration and case study of courseware	4.00	0.68	High

In each Unit, it composed of the objectives, contents, resource linkages, exercise, homework, Webboard and facebook of the lesson. Project-based Learning activities were used for motivating the students to searching, reading and participating the exercises and communication supports among the students peer and instructor.

FINDINGS

Learning Achievement of the Learners Compare by Pretest and Posttest

In **Table 1**, showed that learning achievement of posttest score ($\bar{x}$=85.33) was higher than pretest score ($\bar{x}$=45.78) at the significant level 0.5. It could refered that the elearning courseware with the creative thinking development on Web Courseware Design and Development in Computer-based Instruction could enhance learning acheivement of the students in creative thinking significantly at .05 level.

The Opinion of the Learners toward the eLearning Courseware

Table 2, the research found that the learner' s opinion toward the eLearning Courseware was evaluated at the highest level in Course description and objectives ($\bar{x}$=4.51). Learning suggestion of the courseware, announcement and news, demonstration and case study, clearly recommendation for study and advisory for Website utility were at the high level.

The Result of Collaborative Learning though the Project-base Activities

Table 3, the results revealed that project-based collaborative learning with MLMS eLearning Courseware was suitable at the highest level ($\bar{x}$=4.30) in case of the usefulness for self- learning and the process of project-based activity in MLMS. This table showed the mean of other opinions items of the students' opinion were almost high, especially the courseware could provide the student to work together as a partner, WBI could use very easy to understanding which came from the student active learning participation in the courseware.

Table 3. The result of collaborative learning though the project-base activities on MLMS

Evaluation Items	$\bar{x}$	S.D.	Level of Suitability
1.Project activities was useful for self- learning	4.30	0.67	Highest
2 The process of project-based on doing activity in MLMS	4.30	0.67	Highest
3. Activities on WBI was very easy to understanding	4.26	0.66	High
4. Working together with the partners suitable tools existing within the courseware	4.19	0.68	High
5. Project-based activities open for creating the new idea and new innovation	4.19	0.68	High
6. The times and scheduling was being use suitable for practice for courseware creation	4.11	0.64	High High
7. Learning contents on WBI was the basic knowledge in critical thinking	4.11	0.70	High
8. The lecturers and workshop assisted to stimulate for creation thinking in courseware design	4.07	0.73	High
9. The exercise and submission system was suitable	4.00	0.83	High
10. Learning project assignment activities was suitable both in frequency and times (quantitatively and frequently)	4.00	0.78	moderate

Table 4. The result of 4 Creativity Indexes though the project-base activities of the participants

Creativity Indexes	x	$\bar{x}$	Level
1. Fluency	29	4.14	Very High
2. Originally	30	4.28	High
3. Elaboration	28	4.00	High
4. Flexibility	28	4.00	High
Total	118	16.85	

The Result of 4 Creativity Indexes though the Project-base Activities of the Participants

Table 4, This table showed the mean score which came from the project output evaluation of the instructors by using Rubric score technique. The research results revealed that collaborative project-based learning were applied in the process of collaborative learning through MLMS. The result of 4 student' s creative skill indexes showed that **Fluency** of the students was very high creative skills level. However, **Originally, elaboration and flexibility** were at the high level.

CONCLUSIONS

This research results could be confirmed that the collaborative project based learning could be applying for MLMS eLearning Courseware design proficiency. The collaborative process by using project-based activities that composed of 8 steps, could be used in the online learning environment. MLMS eLearning Courseware integration were acceptable by the experiment program testing and the project outcome with the high proficientcy working together in the small group.

The result of this study could be confirmed that the graduate students in Faculty of Education should implement the collaborative project-base learning for creative thinking skills development of students by using the innovative devices online internet with the MLMS and application such as the smart phone and tablet with applications to learn and practice both online and offline modes, in and out of the classroom. Moodle could used for create the learning online program in the various purposes, and connection with social media utilizing for integration with DLMS. The special tools were workable within the application program to connect the social media such as video through **YouTube**, **Webbord** and **Chatroom**, and **Facebook** which could be applied to link Moodle program. **Blog** is anather program could be used for student participation and feedback via the LMS systems.

Project-based Learning (PBL) is the best activities to the online learning and participate the class in real practice. With these real situation so that the teachers could create the innovation with collaborative learning by using this teaching methods. The result reveal that this methods can help the students to learn actively. However, the basic supports in the network accessibility and the network stability is very high significant

factor to facilitate teachers and students in the process of learning to creative skills. At this point, PBL could be implement better under this factors.

Disclosure statement

No potential conflict of interest was reported by the authors.

Notes on contributors

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