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Design of Collaborative Learning with Creative Problem-Solving Process Learning Activities in a Ubiquitous Learning Environment to Develop Creative Thinking Skills

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Abstract

The purposes of this research study were: 1) to design a Collaborative Learning with Creative Problem-Solving Process Learning Activities in a Ubiquitous Learning Environment to Develop Creative Thinking Skills; 2) to evaluate U-CCPS learning activities. The research procedures were divided into two phases. The first phase was to develop U-CCPS learning activities, and the second phase was to evaluate U-CCPS learning activities. The sample group in this study consisted of five experts in instructional design, information technology, U-Learning, and creative thinking skills using purposive sampling. Data were analyzed by arithmetic mean and standard deviation. The research findings were as follows: The U-CCPS learning activities consisted of three components as follows: 1) studying the contents, 2) arranging the Collaborative Learning Process by means of a Creative Problem-Solving Process, and 3) summary. The process of Collaborative Learning with Creative Problem-Solving Process consisted of five stages: 1) identify tasks/problem issues, 2) plan for the project/job, 3) create the project/job 4) present the project, and 5) an evaluation of the project. The objective of the model is to develop creative thinking skills. 2. The experts agreed that U-CCPS Learning Activities were appropriate.

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Keywords: Collaborative Learning, Creative Problem-Solving Process, U-Learning, Creative Thinking Skills.

1. Introduction

Thailand has seen the significance of the National Education Act (B.E. 2542) and the amendment (2) (B.E. 2545), which encourage learners to rely on themselves, possess creativity, study hard and learn on their own in order to solve all problems in any circumstance of daily life and as such has tried to develop creativity so as to deal with the changes which originate from globalization.

Thailand has also implemented the National Policy Framework (B.E. 2554-2563 (ICT 2020), Strategy 6), for developing and applying ICT to reduce economic and social inequality, especially the fundamental ICT services necessary for a pleasant and healthy life, e.g., the education and healthcare service. There has been encouragement to develop and apply digital innovation and media in all levels of education and to promote the creation and publication of electronic media or lessons at all levels. The said policy framework places an emphasis on the application of information technology and communication in educational management. The U-Learning method was developed on the basis of ubiquitous technology, creating different modes of learning in various environments, according to the contexts of learners. This enables the learners to learn anywhere and anytime through a portable device. In addition, this technology provides flexibility and quick access to the information. U-Learning can be applied with the Constructivism Learning Theory; thus, the use of the learning theory to design any type of education will help to create links between learners' knowledge and their environments. The author is interested in Collaborative Learning, which encourages the learners to willingly work in a group setting with other members who have different abilities. The learners will study and find

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out what their similar interests are, and then present the derived knowledge in the form of a project (Garlach, 1994; Junqi, Wu., Yumei, Liu. & Zhibin, Liu., 2010; Yahya, 2010))

Creativity is an indispensable skill according to the National Education Act (B.E. 2542) and the amendment (2) (B.E. 2545). Therefore, a great number of educators have been doing research to find out the strategies and educational management guidelines in order to enhance the learners' creativity. Hence, the techniques of Creative Problem-Solving Process have been increasingly popular. Educators from many institutes have applied this Creative Problem-Solving Process in general education, both for youths and adults. This is because the said techniques are simple to use in our daily life; they are easy to learn and to understand, applicable to all age groups, all situations, and all cultures. Besides this, the techniques are actually practical; that is, they can really solve any problems in daily life. Particularly, the said techniques are created to develop creativity (Isaksan, 1994; Treffinger, 2003; Maraviglia, 2006).

It is necessary to develop learning activities by means of information technology so that the learners will have creative thinking skills. So, the author is interested in developing a model of Collaborative Learning through electronic media with Creative Problem-Solving Process in a U-learning environment to let the learners enhance their creative thinking skills. A conceptual framework of a teaching model will be synthesized, and the suitability of learning activity by experts will be examined. The objective, therefore, is to obtain a conceptual framework of this learning model, which can actually be applied efficiently.

2. Purpose of the study

The purposes of this study were;

- 2.1. To design a Collaborative Learning with Creative Problem-Solving Process Learning Activities in a Ubiquitous Learning Environment to develop Creative Thinking Skills
- 2.2. To evaluate a Collaborative Learning with Creative Problem-Solving Process Learning Activities in a Ubiquitous Learning Environment to develop Creative Thinking Skills.

3. Scope of the study

- 3.1. The study population was experts in instructional design, U-Learning, information technology and creative thinking.
- 3.2. The sample groups of study were five experts in instructional design, U-Learning, information technology and creative thinking by purposive sampling.
- 3.3. Variables of the study:
 - 3.3.1. An independent variable was Collaborative Learning with Creative Problem-Solving Process Learning Activities in a Ubiquitous Learning Environment.
 - 3.3.2. A dependent variable was evaluation of the proposed activity.

4. Conceptual Framework

The conceptual framework of this study is shown in Figure 1. Four components were used for creating a U-CCPS model which theoretically affected the Ubiquitous Learning environment, Collaborative Learning, Creative Problem-Solving Process and creative thinking skill of the learner.

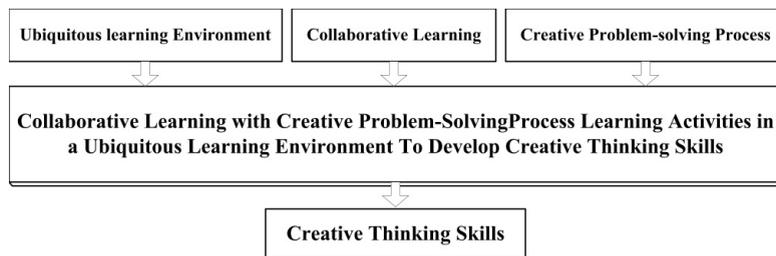


Figure 1. conceptual framework

5. Methodology

5.1. *The first phase*

The first phase was to develop Collaborative Learning with Creative Problem-Solving Process Learning Activities in a Ubiquitous Learning Environment to develop Creative Thinking Skills with the following method:

5.1.1. To study, analyze and synthesize documents and former research relevant to the elements of U-learning activities, Collaborative Learning and Creative Problem-Solving Process. Then, the results thereof were used to set up a conceptual framework in order to develop a model of Collaborative Learning.

5.1.2. To study information about learning management by interviewing the instructors in order to synthesize the data of learning activity and by interviewing the students about their ability to use information technology and communication for learning, their learning style, and their cognitive style.

5.1.3. The development of the model of Collaborative Learning activity in this phase was derived by analyzing the principles of Collaborative Learning and Creative Problem-Solving Process. Then, the results of the study were used to identify Collaborative Learning activity based on the following steps: 1) studying the contents, 2) arranging Collaborative Learning Process by means of Creative Problem-Solving Process, and 3) summary.

5.1.4. To present the Collaborative Learning activity to the advisors for consideration and revision.

5.1.5. To present the Collaborative Learning activity to the experts for consideration by means of in-depth interview.

5.1.6. To create the tools for evaluating the suitability of the model of Collaborative Learning activity.

5.2. *The second phase*

The second phase of the project was an evaluation of Collaborative Learning with Creative Problem-Solving Process Learning Activities in a Ubiquitous Learning Environment to develop Creative Thinking Skills, with a method as follows:

5.2.1. To present the developed activity to the five experts from the fields of learning design, U-learning, information technology and creativity, for suitability evaluation.

5.2.2. To improve the model of Collaborative Learning activity according to the suggestions of the experts.

5.2.3. To present the model of Collaborative Learning activity in the form of a diagram with report.

5.2.4. To analyze the results of evaluation of the model by mean (\bar{X}) and standard deviation (S.D.) consisting of five criteria for evaluation, according to the ideas of Likert; that is, very good, good, moderate, bad and very bad.

6. Result

6.1. *The Collaborative Learning with Creative Problem-Solving Process Learning Activities in a Ubiquitous Learning Environment to develop Creative Thinking Skills(U-CCPS)*

The U-CCPS consisted of three components as follows: 1) studying the contents, 2) arranging the Collaborative Learning Process by means of Creative Problem-Solving Process, and 3) summary.

6.1.1. *Studying the contents*

This step began with the sign up into the U-LMS system, which provided the learners with various contents. Thereby, the learners were able to share their own knowledge with others within the group. During this step, the learners could also check their course of study via U-LMS.

6.1.2. *Arranging the Collaborative Learning Process by means of Creative Problem-Solving Process*

The author inserted the Creative Problem-Solving Process within the steps of Collaborative Learning, including the Collaborative Learning Process by means of Creative Problem-Solving Process and learning activity to develop creativity. The activity included both class learning and U-Learning (Blended Learning) with the following five steps:

6.1.2.1. *Identify tasks/problem issues*

The author inserted the Creative Problem-Solving Process within the steps of Collaborative Learning, including identifying topics for personnel, time limits for mutual project research/job, in which the learners had to understand the tasks/problem issues, frame the problems (understanding the problems), then find out the various solutions to the said problems (generating ideas).

6.1.2.2. *Plan for the project/job*

This stage included brain storming to plan the project by limiting the scope of contents. The learners helped one another to find out the relevant information (exploring data), and then plan for the project/job (planning for action). The learners might

discuss with friends to review the working process and consider supporting factors or obstacles. Then, the plan was adapted to be as appropriate as possible before taking action (solution and acceptance finding).

6.1.2.3. Create the project/job

The project was created under the collaboration of the members so that the members could interact with one another as much as possible. In this step, the learners applied Creative Problem-Solving Process to the problems while working.

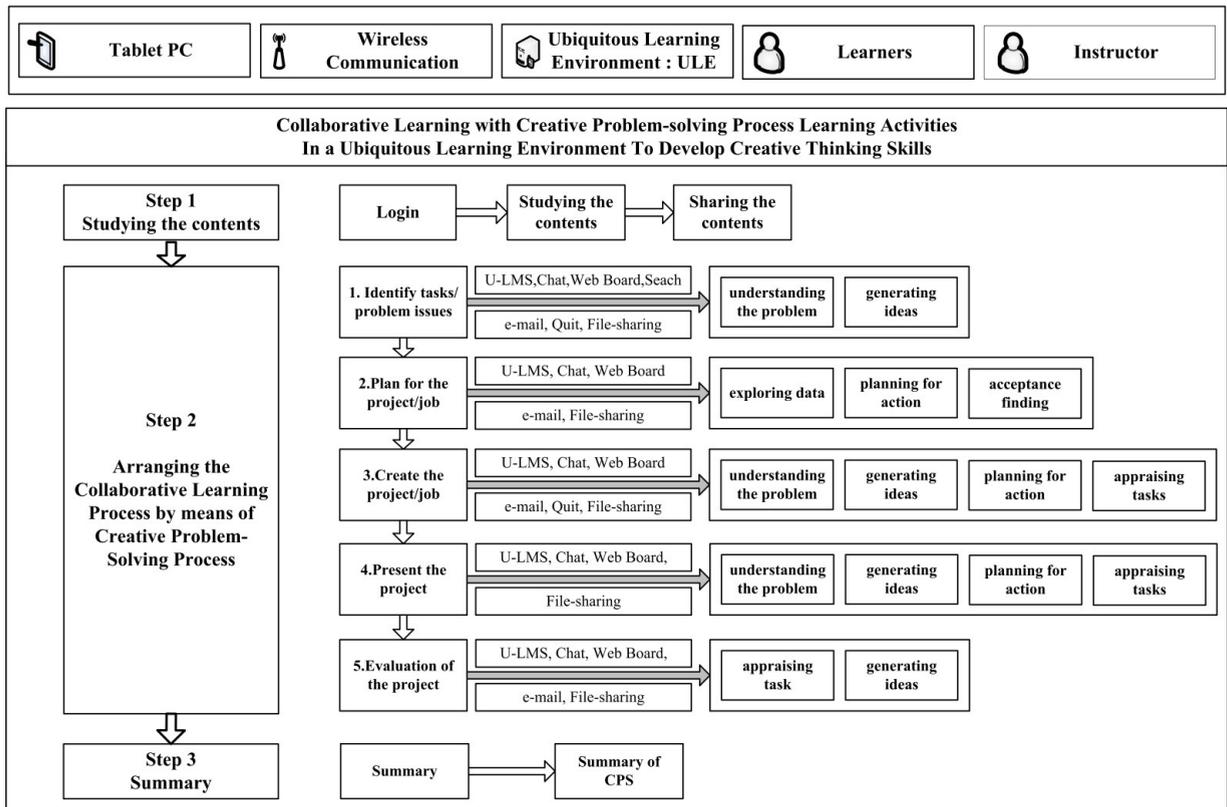


Figure 2. Collaborative Learning with Creative Problem-Solving Process Learning Activities in a Ubiquitous Learning Environment To Develop Creative Thinking Skills (U-CCPS)

6.1.2.4. Present the project

This stage consisted of presenting the project to other groups for comments and sharing opinions. The learners applied Creative Problem-Solving Process to design the methods of presentation, which were new, interesting and clear.

6.1.2.5. Evaluation of the project

In this stage the group project was evaluated on their own, by other groups and by the experts. The learners evaluated the projects together to see how successful they were and whether the designed methods could really solve the problems (appraising tasks). After evaluating other groups' projects, the learners would generate the ideas that they could apply in their own tasks in the future (generating ideas).

6.1.3. Summary

When the learners have taken all the steps, there will be a summary of learning results, principles and concepts from education in the model of Collaborative Learning. Then, there will be discussions and brain storming to conclude the learning principles. After that, the results of the aforementioned summary will be examined.

6.2. The evaluation results of the U-CCPS Learning Activities

Table 1 shows that the experts agreed that U-CCPS Learning Activities was appropriate in a good level. (\bar{x} = 4.45, S.D. = 0.55)

Table 1: The Evaluation Results of U-CCPS Learning Activities

Evaluation Lists	Results		Level of Quality
	\bar{x}	S.D.	
1 Studying the contents	4.60	0.55	Very Good
2. Arranging Collaborative Learning Process by means of Creative Problem-Solving Process	4.36	0.64	Good
2.1 Identify tasks/problem issues	4.60	0.55	Very Good
2.2 Plan for the project/job	4.40	0.55	Good
2.3 Create the project/job	4.20	0.84	Good
2.4 Present the project	4.60	0.55	Very Good
2.5 Evaluation of the project	4.00	0.71	Good
3. Summary	4.40	0.55	Good
Summary	4.45	0.55	Good

7. Conclusion

The U-CCPS learning activities consisted of studies of content, Collaborative Learning with Creative Problem-Solving Process and conclusion. The process of Collaborative Learning with Creative Problem-Solving Process consisted of five stages: 1) identify tasks/problem issues, 2) plan for the project/job, 3) create the project/job, 4) present the project, and 5) evaluation of the project.

The findings from this study appear to provide strong support for the premise that a collaborative learning and teaching approach delivered using a ubiquitous learning environment could provide strong support for developing undergraduate students' creative thinking skills because students can share knowledge and interact with their friends.

The U-CCPS learning activities are an appropriate technique for use in education and can help undergraduate students to develop knowledge and skills in information and communication technology.

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