Project-Based Learning Using Discussion and Lesson-Learned Methods via Social Media Model for Enhancing Problem Solving Skills

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Abstract

This research aims to 1) develop the project-based learning using discussion and lesson-learned methods via social media model (PBL-DLL SoMe Model) used for enhancing problem solving skills of undergraduate in education student, and 2) evaluate the PBL-DLL SoMe Model used for enhancing problem solving skills of undergraduate in education student. The samples groups are 9 specialists in education, enhancement of problem solving skills, educational technology, and computer and communication technology selected by purposive sampling. Thereafter, researcher analyses the data statistically by examining the mean ($\bar{x}$) and the standard deviation (S.D.).

The research result shows that (1) the PBL-DLL SoMe Model used for enhancing problem solving skills of undergraduate in education student, consists of 4 components which are 1) the analysis of the readiness of the input factors, 2) the process of the PBL-DLL SoMe Model, 3) the evaluation of the achievement of learning and problem solving skills (Output), and 4) the evaluation of the result between evaluating and feedback. (2) The evaluation result of this research project on the PBL-DLL SoMe Model for enhancing problem solving skills of undergraduate in education student shows that 1) the mean ($\bar{x}$) of the results of evaluated input factor readiness is valued at 4.50. The The standard deviation (S.D.) is equal to 0.80. 2) The mean ($\bar{x}$) of the process PBL-DLL SoMe Model is valued at 4.52. The standard deviation (S.D.) is equal to 0.62. 3) The mean ($\bar{x}$) of the evaluation of the achievement of learning and problem solving skill (Output) is valued at 4.62. The standard deviation (S.D.) is equal to 0.72. 4) The mean ($\bar{x}$) of the evaluation between process and feedback is valued at 4.71. The standard deviation (S.D.) is equal to 0.48. 5) The mean ($\bar{x}$) of the overall evaluation of the developed learning model is valued at 4.53. The standard deviation (S.D.) is equal to 0.75. Therefore, the developed learning model is rated as most appropriate in terms of quality.

Keywords: project-based learning, discussion, lesson-learned, social media, problem solving skill, undergraduate in education student

1. Introduction

National Education Act 1999 and amendments 2002, Article 9 (Office of the Basic Education Commission of Thailand, 2002) supports the creation of innovation and the application of technology in education for the maximum benefit.

At present, social media is very popular and has an interactive use that users can access to any social media comfortably and rapidly. Users can come to share their knowledge, information, and news to each other freely, and can comment each other immediately. This will not make you miss any piece of communication from the progress of social media online which is very beneficial for education (Pisek, 2012).

In the context of education, there should be a designed model of project-based learning which is an instruction management emphasizing students by encouraging experience-building, self-learning for developing or strengthening any skills or toughening the process of learning (Bell, 2010). Under this based-learning project, student will find any information and knowledge to make a successful collaborative project. The process of collaborative project is to help each other to solve occurred problem within group by practical way to learn how to solve a problem for enhancing problem solving skills (Trakulsalid, n.d.). Learning by using learning discussion method is a technique that supports students participating in classroom by looking at how they express through commendation that reflects students' thought (Kamemanee, 2004). Moreover, learning by using lesson-learned method is to review and summarize work experiences in the past in every aspect in order to see the details of both internal and external factors that lead to either success or failure at present (Panmuk, 2009).

Therefore, this research will enhance and evaluate the PBL-DLL SoMe Model for enhancing problem solving skills of undergraduate in education student for the development of instruction for undergraduate in education.

2. Objectives

1) To develop the PBL-DLL SoMe Model for enhancing problem solving skills of undergraduate in education student.

2) To evaluate the PBL-DLL SoMe Model for enhancing problem solving skills of undergraduate in education student.

3. Method

3.1 Scope of the Research

This research aims to develop the PBL-DLL SoMe Model for enhancing problem solving skills of undergraduate in education student by having the scope of the research as follows:

The samples in this research are 9 specialists in education, enhancement of problem solving skills, educational technology, and computer and communication technology selected by purposive sampling since they are specialists related to the context of this research.

3.2 Variables in the Research

Independent variable is the PBL-DLL SoMe Model for enhancing problem solving skills of undergraduate in education student.

Dependent variable is the result of the evaluation of the PBL-DLL SoMe Model for enhancing problem solving skills of undergraduate in education student.

3.3 Research Methodology

The research is divided into 2 stages which are:

Stage 1. The development of the PBL-DLL SoMe Model for enhancing problem solving skills of undergraduate in education student consists of steps as follows:

1) Study and analyze research document.

2) Develop the research model in which the researcher has taken the concept of ADDIE Model to develop the PBL-DLL SoMe Model for enhancing problem solving skills of undergraduate in education student.

Stage 2. The evaluation of the PBL-DLL SoMe Model for enhancing problem solving skills of undergraduate in education student consists of steps as follows:

1) The developed learning model is evaluated by 9 specialists.

2) Analyze the result of evaluation by using appropriateness criteria (Kannasud, 1999).

4. Result

4.1 Developed Model

The model of PBL-DLL SoMe Model for enhancing problem solving skills of undergraduate in education student is shown in Figure 1.
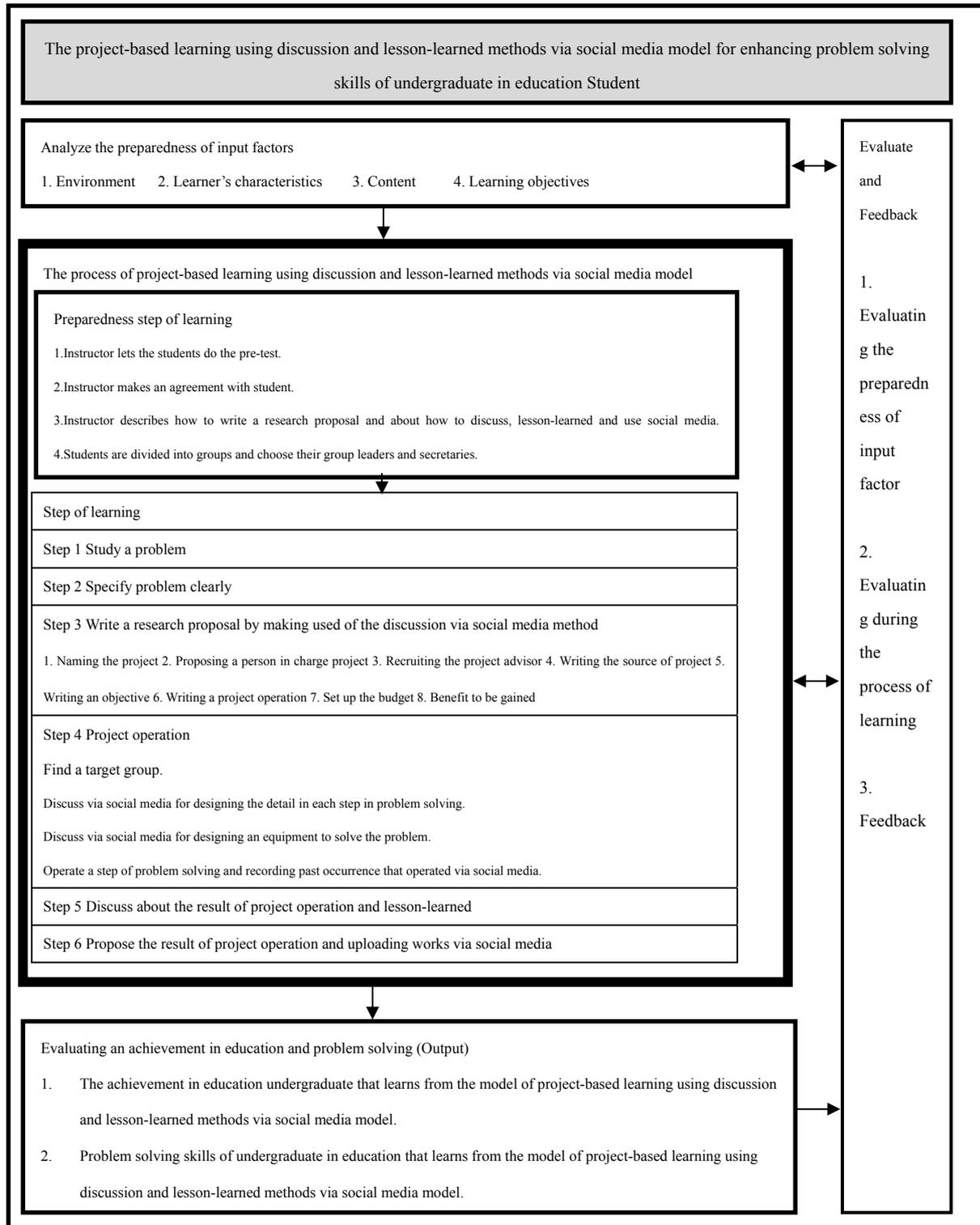
The project-based learning using discussion and lesson-learned methods via social media model for enhancing problem solving skills of undergraduate in education Student

Analyze the preparedness of input factors

1. Environment   2. Learner's characteristics   3. Content   4. Learning objectives

The process of project-based learning using discussion and lesson-learned methods via social media model

Preparedness step of learning

1.Instructor lets the students do the pre-test.

2.Instructor makes an agreement with student.

3.Instructor describes how to write a research proposal and about how to discuss, lesson-learned and use social media.

4.Students are divided into groups and choose their group leaders and secretaries.

Step of learning

Step 1 Study a problem

Step 2 Specify problem clearly

Step 3 Write a research proposal by making used of the discussion via social media method

1. Naming the project 2. Proposing a person in charge project 3. Recruiting the project advisor 4. Writing the source of project 5. Writing an objective 6. Writing a project operation 7. Set up the budget 8. Benefit to be gained

Step 4 Project operation

Find a target group.

Discuss via social media for designing the detail in each step in problem solving.

Discuss via social media for designing an equipment to solve the problem.

Operate a step of problem solving and recording past occurrence that operated via social media.

Step 5 Discuss about the result of project operation and lesson-learned

Step 6 Propose the result of project operation and uploading works via social media

Evaluating an achievement in education and problem solving (Output)

1.   The achievement in education undergraduate that learns from the model of project-based learning using discussion and lesson-learned methods via social media model.

2.   Problem solving skills of undergraduate in education that learns from the model of project-based learning using discussion and lesson-learned methods via social media model.

Evaluate and Feedback

1. Evaluating the preparedness of input factor

2. Evaluating during the process of learning

3. Feedback

Figure 1. Project-based learning using discussion and lesson-learned methods via social media model for enhancing problem solving skills of undergraduate in education student (PBL-DLL SoMe Model)

The PBL-DLL SoMe Model for enhancing problem solving skills of undergraduate in education student is a developed model that consists of 4 components as below:

Analyzing readiness of input factor is a step that instructor will prepare before attend to a process of learning that

has 4 sub-component. 1) Analyzing environment is a responsibility of instructor to provide classroom that has group seat. Each of group has computer that can connect to internet for using social media. 2) Analyzing students' characteristics is a responsibility of instructor that should analyze characteristics of students based on the standard. This means students should be undergraduates in education that have basic knowledge in using information and communication technology and in using computer measured by the criteria on basic knowledge in using information and communication technology and basic using computer of Information Technology Centre, Suan Sunandha Rajabhat University. 3) Analyzing content. Instructor has analyzed content for discussion in step of learning readiness. 4) Learning objective. Instructor is a learning objective designer by separating the objectives into 2 fields which are learning achievement and problem solving skills.

The process of PBL-DLL SoMe Model in this step is divided into 2 parts. The first part is the step of learning preparation. Instructor should create learning activities as follows: 1) Instructor let students do the pre-test. 2) Instructor makes a basic agreement with students as a basic rule before instructing. Moreover, that rule should be accepted by both students and instructors. 3) Instructor describes how to write a research proposal and about how to discuss, lesson-learned, and use social media which are topics of discussion derived from content analysis that students should know the steps and operation of learning activities. 4) Students are divided into groups and choose their group leaders and secretaries to prepare learners to join an activity in the stage of learning afterwards. For the second part, the process of learning consists of 6 stages as follows.

Stage 1. Studying problem has activities as follows: 1) instructor specifies problem situation in education. 2) Students make a study visit for researching about the problem. 3) Instructor evaluates learners based on their actual conditions.

Stage 2. Specifying problem clearly has activities as follows: 1) Students discuss together for better understanding about the problem and specifying topics clearly. 2) Instructor evaluates learners based on their actual conditions.

Stage 3. Writing a research proposal by making use of discussion via social media method has activities as follows: 1) Students discuss together for planning about writing the research project by looking at the topics as follows: name of the project, name of the person who is in charge of the project, name of the advisor of the project, the source of project, objectives, hypothesis, operation of project, budget and benefits to be gained based on the model. 2) Instructor evaluates

Stage 4. Project Implementation by having activities as follows: 1) Find a target group. 2) Discuss via social media for designing the details in each step for problem solving. 3) Discuss via social media for designing an equipment to solve the problem. 4) Operate problem solving process and record past occurrence that was operated via social media.

Stage 5. Discussion of the result of project operation and lesson-learned has activities as follows: 1) When complete the problem solving process after the 6 weeks, instructor provides place, computer, amplifier microphone for each activity to let learners discuss about the result of project operation. 2) Instructor uses activities to let learners practice lesson-learned by using review-after-practicing technique and knowledge derived from lesson-learned via social media online. 3) Instructor evaluates learners.

Stage 6. Proposing the result of project operation and uploading works via social media has activities as follows: 1) Student proposes their works from the project for propagating and uploading proposed files, research files, knowledge files by lesson-learned method via social media. 2) Instructor evaluates learners.

Evaluate the achievement in education and problem solving skills (Output). 1) The achievement in education of undergraduate in education that is studied in the research project on the PBL-DLL SoMe Model is come from the evaluation of pre-test and post-test. 2) Problem solving skills of undergraduate in education that is studied in the research project on the PBL-DLL SoMe Model is come from the evaluation of the process of PBL-DLL SoMe Model assessed under the actual conditions.

Evaluate the relationship between process and feedback by 1) evaluating the readiness of the input factors, 2) evaluate during the process of learning, and 3) feedback.

4.2 The Result of the Evaluation of the Developed Learning Model Is Based on Table 1-5 as Below

The researcher proposes the developed model to the specialists for evaluation. The result is concluded as follows:

Table 1. Analysis of the readiness of the input factors

Details	$\bar{x}$	S.D	The quality level
1. Environment	4.44	0.53	Very appropriate
2. Learners' characteristics	4.56	0.53	Most appropriate
3. Content	4.11	1.27	Very appropriate
4. Learning objectives			
4.1 The achievement in education			
4.1.1 Student can describe the operation of the project	4.44	0.73	Very appropriate
4.1.2 Student can describe the process of discussion	4.44	0.88	Very appropriate
4.1.3 Student can describe the process of lesson-learned	4.44	0.88	Very appropriate
4.1.4 Student can describe the method of using social media online	4.46	0.88	Very appropriate
4.1.5 Student can write a research proposal	4.67	0.71	Most appropriate
4.2 Problem solving skills			
4.2.1 Student can analyze the cause of problem	4.78	0.44	Most appropriate
4.2.2 Student can classify the components of problem	4.78	0.44	Most appropriate
4.2.3 Student can implement a project for solving a problem	4.22	1.40	Very appropriate
4.2.4 Student can design a method for solving a problem	4.78	0.44	Most appropriate
4.2.5 Student can operate project for solving a problem	4.44	1.33	Very appropriate
Average	4.50	0.80	Most appropriate

Note. Table 1 shows the result of the evaluation of input factors' readiness. The average results are as follows: the mean ($\bar{x}$) is valued at 4.50. The standard deviation (S.D.) is equal to 0.80. The quality level is rated as most appropriate.

Table 2. The Process of project-based learning using discussion and lesson-learned methods via social media

Details	$\bar{x}$	S.D	The quality level
1. Learning Preparation Stage	4.78	0.44	Most appropriate
2. Study a problem	4.44	0.73	Very appropriate
3. Specify a problem clearly	4.67	0.71	Most appropriate
4. Write a research proposal by making use of discussion via social media method			
4.1 Naming the project	4.67	0.50	Most appropriate
4.2 Proposing a person who will be in charge of the project	4.56	0.53	Most appropriate
4.3 Searching for an advisor for the project	4.44	0.53	Very appropriate
4.4 Identifying a source of project	4.56	0.53	Most appropriate
4.5 Identifying an objective	4.56	0.53	Most appropriate
4.6 Describing the project's methodology	4.56	0.53	Most appropriate

	$\bar{x}$	S.D	The quality level
4.7 Setting up the budget	4.22	0.83	Very appropriate
4.8 Benefits to be gained	4.56	0.53	Most appropriate
5. Project Implementation			Very appropriate
5.1 Find a target group	4.67	0.50	Most appropriate
5.2 Discuss via social media for designing the details in each step of problem solving	4.56	0.73	Most appropriate
5.3 Discuss via social media for designing an equipment to solve such problem	4.44	0.73	Very appropriate
5.4 Operate the process of problem solving and record the past occurrence that was operated via social media	4.67	0.50	Most appropriate
6. Discuss about the result of project operation and lesson-learned	4.11	0.93	Very appropriate
7. Propose works of project and upload works via social media	4.44	0.73	Very appropriate
Average	4.52	0.62	Most appropriate

Note. Table 2 shows the evaluated result of the process of project-based learning using discussion and lesson-learned methods via social media. The result's average values are as follows: the mean ($\bar{x}$) is valued at 4.52. The standard deviation (S.D.) is equal to 0.62. The quality level is rated as most appropriate.

Table 3. Evaluation of the achievement in education and problem solving skills (output)

Details	$\bar{x}$	S.D	The quality level
1. The achievement in education of undergraduate in education who learn with the project-based learning using discussion and lesson-learned methods via social media	4.56	0.73	Most appropriate
2. Problem solving skills of undergraduate in education who learn with the project-based learning using discussion and lesson-learned methods via social media	4.67	0.71	Most appropriate
Average	4.62	0.72	Most appropriate

Note. Table 3 shows the result of the evaluation of the achievement in education and problem solving skills (Output). The result's average values are as follows: the mean ($\bar{x}$) is valued at 4.62. The standard deviation (S.D.) is equal to 0.72. The quality level is rated as most appropriate.

Table 4. Evaluation of the relationship between process and feedback

Details	$\bar{x}$	S.D	The quality level
1. Evaluate the readiness of the input factors	4.67	0.50	Most appropriate
2. Evaluate during the process of learning	4.78	0.44	Most appropriate
3. Feedback	4.67	0.50	Most appropriate
Average	4.71	0.48	Most appropriate

Note. Table 4 shows the result of the evaluation of the relationship between process and feedback. The result's average values are as follows: the mean ($\bar{x}$) is valued at 4.71. The standard deviation (S.D.) is equal to 0.48. The quality level is rated as most appropriate.

Table 5. Overall evaluation of the developed learning model

Details	$\bar{x}$	S.D	The quality level
1. Analyze the readiness of the input factors	4.56	0.53	Most appropriate
2. The process of Project-based learning using discussion and lesson-learned methods via social media model	4.44	1.01	Very appropriate
3. Evaluate the achievement and problem solving skills (Output)	4.56	0.73	Most appropriate
4. Evaluate the result between process and feedback	4.56	0.73	Most appropriate
Average	4.53	0.75	Most appropriate

Note. Table 5 shows the result of the overall evaluation of the developed learning model. The result's average values are as follows: the mean ($\bar{x}$) is valued at 4.53. The standard deviation (S.D.) is equal to 0.75. The quality level is rated as most appropriate.

5. Conclusion

- The PBL-DLL SoMe model has 4 components: 1) analysis of the readiness of the input factors 2) the process of project-based learning using discussion and lesson-learned methods via social media. 3) Evaluation of the achievement of learning and problem-solving skills (output) 4) evaluation of the result between evaluating and feedback as shown in Figure 1.

- In terms of the result of the evaluation of the developed project-based learning, the specialists have evaluated the appropriateness of the model and found that the mean ($\bar{x}$) of the PBL-DLL SoMe Model for enhancing problem solving skills of undergraduate in education student is valued at 4.53. The standard deviation (S.D.) is equal to 0.75. The quality level is rated as most appropriate.

6. Discussion

This research develops and evaluates the PBL-DLL SoMe Model for enhancing problem solving skills of undergraduate in education student based on the documentary research to be able to develop into learning model. The mean ($\bar{x}$) of overall evaluation of the developed learning model is valued at 4.53. The standard deviation (S.D.) is equal to 0.75. Therefore, the developed learning model is appropriate since the quality in overall is rated as most appropriate. To develop the PBL-DLL SoMe Model for enhancing problem solving skills of undergraduate in education student will use design instruction principle based on the concept of ADDIE Model and develop the learning model have steps as follows: 1) Analyze the readiness of the input factors. 2) The process of PBL-DLL SoMe Model. 3) Evaluate the achievement in education and problem solving skills (Output). And 4) evaluate the relationship between process and feedback that are consistent to the research of (Phromsila, 2011). According to the paper, managing the process of instruction by using ADDIE Model consists of 5 stages, including evaluating the needs and analyzing, designing, developing, testing, and evaluating the result for maintaining it based on the objective that has been set. According to this concept, there are also the evaluation and feedback between the processes as same as the developed learning method. The goal is to create the efficient learning and this is consistent to the research of (Krajcik et al., 2007) called "Learning-Goals-Driven Design Model: Developing Curriculum Materials That Align with National Standards and Incorporate Project-Based Pedagogy". The research result shows that learning model base on the research will support teachers in educating students by using the concept based on science and participation of learners and this is consistent to the research of (Wannapirun, 2011) called "The Research on the Development Integrating Learning Model by Using an Intellectual Equipment for Developing Critical Thinking" which is the research emphasizing components, process, and systematic procedure, and showing mutual relation based on the concept of ADDIE Model.

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