

***The Effect of Project Based Learning to Enhance Problem Solving Ability in
Distance Learning Media Subject of Student Teachers***

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Abstract

The research aimed to study the effect of the Project Based Learning (PBL) which focused on enhancing problem solving ability of the student teachers who currently enrolled in 'Distance learning media' subject in 2016 academic year of Thepsatri Rajabhat University through instructional media service activities by using PBL for enhancing problem solving ability record sheet. The sample for this study were 40 student teachers in Social Education major. The procedures of the research were as follows; phase I: field study investigating the problem information about instruction media in local school, phase II: planning and designing their own project, Phase III: development regarding the instructional media as well as its implementation, Phase IV: writing the project report, Phase V: presenting the project and Phase VI: evaluating of instructional media project. The data were analyzed by using percentage, mean and standard deviation.

The results showed that the average of overall problem solving ability of the sampling student teachers before beginning the project was at a medium level (the average of overall was 2.15), however after using the project based learning, it was found that the problem solving ability of student teachers was higher at a high level (the average of overall was 3.09). As analyzing the point range, 37.50 percent of all students (15 students) were at the highest level, 50 percent of all students (20 students) were at a high level, and 12.50 percent of all students (5 students) were at a medium level.

Keywords: project based learning, problem solving ability, instructional media, student teachers

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Introduction

A main mission of qualifications framework for Thailand's higher education is to develop the Bachelor's degree students. Especially, the institutes should focus on the development of thinking skill, the knowledge of concerned theories, and the experience from practice. The student teachers should apply the skills and knowledges of their profession that were concerned with their majors (Paitoon, 2010). Therefore, the student teachers should have the knowledges and the practice abilities, including applying their knowledges and abilities into schools for the truly benefits.

Thepsatri Rajabhat University (TRU) is the one of higher education institutes in Thailand, whose target is to generate the quality graduates of teacher programs, who are professional teachers, to fulfill the needs of local and global communities, and to serve society. (Thepsatri Rajabhat University, 2016). The Project Based Learning is the method that can teach the students to apply their experiences and abilities into their work and to practice under their interested and aptitude, which can be the good attitude to work (Petchara, 2002).

However, many small schools in Lop Buri which have lacked instruction media or learning from television via satellite. The researcher realized the problem and initiated this research to apply the PBL to enhance the problem solving ability, in the Distance Learning Media Subject for student teachers in TRU. That is an opportunity for student teachers to invent their works under the project based methods, and transfer the knowledges from this methods to solve the problems of insufficiency to the schools in their communities. Eventually, it is the preparation of the student teachers to be the quality teachers in the future.

Objective

The objective of this research was to study the effect of the project based learning which focused on enhancing problem solving ability of the student teachers in TRU.

Sample Group

The sample group derived from purposive sampling technique included 40 student teachers in Social Education major, who were studying the distance learning media subject in the second semester of the 2016 academic year at TRU. The samples were separated into 8 groups, each groups consisted 5 students, who participated in activities of the instructional media created, tested and brought it into the classroom of schools in Lop Buri province.

Research Instruments

The instruments of this research were 1) the problem solving ability's assessment form, before and after study, and 2) The activities recording form of Project Based Learning for problem solving ability's development.

The first instrument comprised 4 parts, part 1 the problems identifying, part 2 the problems analysis, part 3 the problems solving suggestion, and part 4 the results verifying.

The second instrument consisted of 6 activities as follows: 1) the topic or problem choosing, 2) planning, 3) operation and implementation, 4) reporting, 5) results presentation, and 6) project assessment.

Research Methodology

This research was separated into 6 phases, the procedures were as follows;

Phase 1: Field study investigating the problem information.

The researcher explored the problems and needs to self-development in distance learning media subject. The result showed that the highest level of student teachers' needs were the problem solving ability

Phase 2: Planning and designing their own project.

The researcher and student teachers together clarified and understood of project based learning to enhance problem solving ability. Then the discussion about the ways to practice, the results from this activity, and the benefits that they gained after finishing the project based learning process were conducted.

Phase 3: Development regarding the instructional media.

The researcher created the regulations of project based learning, the basic rules, knowledges shared mission, and discussed about the effect of activity every week.

Phase 4: Writing the project report.

The researcher wrote the documents of project based learning to enhance problem solving ability, the effect of project based learning, the problems, and the solutions of student teachers in these activities.

Phase 5: Presenting the project.

The researcher monitored the activity recorded in each topic of project based learning to enhance problem solving ability, and the student teachers presented their project to classmate and the instructor.

Phase 6: Evaluating of instructional media project.

After finish the process, the researcher assessed their solving skills from the results of their solution in the school that they selected to practice.

Results

The researcher studied the effect of the project based learning which focused on enhancing problem solving ability of the student teachers, the result showed that;

The average of overall problem solving ability of the sampling student teachers before beginning the project was at a medium level ($\bar{x} = 2.15$, S.D. = 0.62), however after using the project based learning, it was found that the problem solving ability of student teachers was higher at a high level ($\bar{x} = 3.09$, S.D. = 0.76).

Table 1: The level of problem solving ability of student teachers, before and after beginning the project, classified by steps of problem solving ability.

Step of problem solving ability	Before process		Ability level	After process		Ability level
	\bar{x}	S.D.		\bar{x}	S.D.	
Problems identifying	2.23	0.53	medium	3.05	0.71	high
Problems analysis	2.00	0.68	medium	3.18	0.71	high
Problems solving suggestion	2.10	0.67	medium	2.98	0.89	high
Results verifying	2.28	0.55	medium	3.15	0.70	high
Overall	2.15	0.62	medium	3.09	0.76	high

Step 1: Problems identifying, the result of this step showed that the problems identifying's ability of student teachers before beginning the project was at a medium level ($\bar{x} = 2.23$, S.D. = 0.53), and after using the project based learning, it was found that was higher at a high level ($\bar{x} = 3.05$, S.D. = 0.71).

Step 2: Problems analysis, the result of this step showed that the problems analysis's ability of student teachers before beginning the project was at a medium level ($\bar{x} = 2.00$, S.D. = 0.68), and after using the project based learning, it was found that was higher at a high level ($\bar{x} = 3.18$, S.D. = 0.71).

Step 3: Problems solving suggestion, the result of this step showed that the problems solving suggestion's ability of student teachers before beginning the project was at a medium level ($\bar{x} = 2.10$, S.D. = 0.67), and after using the project based learning, it was found that was higher at a high level ($\bar{x} = 2.98$, S.D. = 0.89).

Step 4: Results verifying, the result of this step showed that the results verifying's ability of student teachers before beginning the project was at a medium level ($\bar{x} = 2.28$, S.D. = 0.55), and after using the project based learning, it was found that was higher at a high level ($\bar{x} = 3.15$, S.D. = 0.70).

The all results revealed that the problem solving ability of the student teachers was increased after using the project based learning.

Table 2: The numbers and percentage of students, when classified by problem solving ability's level, before and after the project based learning's process.

Point range	Numbers of students		Percentage		Interpretation
	Before process	After process	Before process	After process	
3.30 - 4.00	0	15	0	37.50	Highest
2.50 - 3.29	12	20	30.00	50.00	High
1.70 - 2.49	25	5	62.50	12.50	Medium
0.90 - 1.69	3	0	7.50	0	Low

This table, illustrated the problem solving ability's assessment form, provided by the 4 parts of questions (written answer). Each choice was the point level from 0 to 4, as the criteria is 5 points rubric, the results showed that;

After the process, 37.50 percent of all students (15 students) were at the highest level (point range from 3.30 to 4.00). 50 percent of all students (20 students) were at a high level (point range from 2.50 to 3.29), and 12.50 percent of all students (5 students) were at a medium level (point range from 1.70 to 2.49).

Conclusion and Discussion

The results of the studying revealed that the 87.5 percent of sample group had the problem solving ability in the high level, because the project based learning has the positive effects on their learning. They can select the way to conduct, working environment, and the opportunities to take the decision by themselves (Thomas, J. W. 2000). In addition, they can gain the experiences directly from practice by enabling students to learn with more effectively (Dewey, J. 1938).

The designing of this learning activity was based on the problem solving ability's process of Weir (1974), including 4 abilities were; the problem identifying, the problems analysis, the problems solving suggestion and the results verifying. These process could increase the problem solving ability of student teachers, according to Dusit (2011) who studied about the effect of project based learning of bachelor's degree students in faculty of education, Burapha university, the comparison of the thinking skill of students between who were in the project based learning and the traditional learning indicated significantly difference at .05.

In additional to this research also according to Jollands, M, Jolly, L and Molyneaux, (2012), who studied about project based learning as a contributing factor to graduates' work readiness, the results revealed that the project based learning could effect to increase the project management, the problem solving ability, and communication skills, more than the students who were the traditional learning. Furthermore, the project can connect and develop the student's abilities to gain the experiences. Markham (2011) stated about the project based learning that the students should apply the knowledges from classroom to solve authentic problem in the real world, work in team to find a solution for the problem, and take advantage of digital tools to produce high quality and collaborative product.

From this study, the student teachers are proud of themselves after they achieved the project, it can be seen that the project based learning can fulfill needs of students, develop students in the problem solving ability, and they can apply their knowledges to find the solution in daily life and working life in the future.

Recommendations

1. For the process of this project based learning, the instructor and students should always communicate such as Face to Face, online social network, and email, to give them suggestion during the process.
2. To encourage the students to enhance problem solving ability, the researcher maybe use another process of learning management, for example, six thinking hat, problems based learning, etc.

3. In the future, other skills should be developed by the project based learning, such as teamwork skill or responsibility.

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