

# Self-development of Teacher Students through Problem-Based Learning

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Received: May 23, 2022    Accepted: June 22, 2022    Published: June 30, 2022

doi:10.5296/jei.v8i1.19880    URL: <https://doi.org/10.5296/jei.v8i1.19880>

## Abstract

World of education is now changing and requires lifelong learning, self-development, and dealing with the sustainable development. The goal of this study is to look into the self-development of teacher students through problem-based learning. The participants were 78 Thai teacher students from a single university. For the study, data were examined using the mean, standard deviation, Pearson's product moment correlation coefficient, and content analysis. The outcomes of the study revealed that teacher students had a high level of self-development in learning skills in relation to the Qualifications Framework for Higher Education. Cognitive skills, morals and ethics, knowledge, interpersonal connections and responsibility, learning management, numerical analysis, and communication and information technology abilities were the students' top six skills.

**Keywords:** Cognitive skill, Learning outcome, Problem-based learning, Qualification framework, Self-development

## 1. Introduction

The current expectations of society and needs of labour market have been changed based on the social and economic dynamic and scientific and technological advancement in both national and international levels. Educational institutes where produce teachers have to be active and prepare for educational change. Therefore, producing teachers realizes and focuses on active educational management for competency improvement of the students in many

aspects: knowledge and virtue, intellectual skills, teamwork skills, and communicative and technological skills through lifelong learning for upgrading educational standards equivalent to other higher education institutes where offer education program and produce teachers (Andreev et al., 2020; Nuangchalerm, 2020).

Educational institutes have been improved the educational management and quality by focusing on learning outcomes. Professional programs in teacher preparation offered by education institutes after National Education Act B.E. 2542 (1999) has been promulgated officially. The promulgation of law has affected educational reform of curriculums and process of educational management for teacher students focusing on thinking skills, problem-solving skills and value of local culture (Office of the Higher Education Commission, 2009).

Five major qualities of the students based on Qualification Framework for Higher Education which consisted of morals and ethics, knowledge, cognitive skills, interpersonal relations and responsibility, numerical analysis, communication and information technology skills. The higher educational institutes have developed curriculum and learning management based Qualifications Framework for Higher Education. The higher education institute has to offer the education program based on the national qualification framework of Ministry of Education for producing qualified teacher students in the changing current situation and required characteristics of professional teachers in the 21<sup>st</sup> century (Prachagool et al., 2016; Nuangchalerm, 2017).

Additionally, service mind and public mind are also strongly required for the teacher students. Moreover, student oriented their self-study skills, knowledge and experience exchange skills relating to the requirements of the education program based on Qualifications Framework for Higher Education focusing on student-centered instruction and active learning model (Guglielmino, 2008). Therefore, the university lecturers have to find appropriate teaching methods for improving necessary skills of the students such as self-study skills, problem-solving skills for the current changing situation (Abushkin et al., 2018; Al-Swelmyeen & Sakarneh, 2020). That is, teacher students, learn to practice the best in school contexts which might want to face variety of problem solutions.

Problem-based learning is one of important instructional models for active learning and student-centered instruction. The problem-based learning provides the students to participate in learning activities through small group work on identifying and analyzing the assigned problems with self-oriented learning objectives (Dolmans et al., 2005; Savery, 2006). The problem-based learning also enhances students to study and find the solutions for the problems by themselves and present the solutions to the class (Schmidt & Moust, 2000; Yew & Goh, 2016). Teachers only facilitate, motivate and give some useful suggestions for efficient problem-based learning model for self-directed learning from various learning resources (Alavi, 2002; Williams & Beattie, 2008; Ates & Eryilmaz, 2010).

It is obvious that problem-based learning improves the requirement of educational qualities, necessary learning skills for the teacher students in the 21<sup>st</sup> century based on Qualifications Framework for Higher Education (Barrows, 2000; Hmelo-Silver & Barrows, 2006; Bayrak &

Gurses, 2020). The government has to support and facilitate the faculty of education and educational institutes to produce and develop educational personnel to be professional teachers take in charge (Kirmizigul & Bektas, 2019). Therefore, the authors expected that problem-based learning would improve learning outcomes, teamwork skill and other skills based on Qualifications Framework for Higher Education. This research aims to study self-development of teacher students through problem-based learning.

## 2. Method

### 2.1 Participant

Participants were 78 undergraduate students, the first semester of academic year 2020. They were 2-year of teacher students who registered learning and instruction class from Faculty of Education, one of northeastern university in Thailand.

### 2.2 Research Instruments

*Problem-Based Learning Questionnaire*: it based on Qualifications Framework for Higher Education. It was constructed and developed as follows,

- Study related literatures and research on constructing a questionnaire about problem-based learning outcomes based on Qualifications Framework for Higher Education.
- Design scope and structure of contents of a questionnaire on problem-based learning outcomes based on Qualifications Framework for Higher Education relating to definition of key terms.
- Construct a questionnaire on problem-based learning based on Qualifications Framework for Higher Education and propose the questionnaire to five experts for assessing validity and appropriateness of the contents.
- Assess the index of congruence of the questionnaire by the experts after assessing the validity and appropriateness of the contents.
- Pilot study the questionnaire to 30 teacher students. The data were analyzed and calculated for item discrimination of the questionnaire. The discrimination indices of the questionnaire on ethnics and morals, knowledge, cognitive skills, interpersonal relations and responsibility, and numerical analysis, communication and information technology skills.
- Analyze reliability of the questionnaire by alpha of Cronbach. The reliability index of the questionnaire on ethnics and morals, knowledge, cognitive skills, interpersonal relations and responsibility, and numerical analysis, communication and information technology skills.

*Assessment Abilities in Problem-Based Learning*: it was constructed and developed as follows,

- Study related literatures and research on constructing an assessment form of the abilities in problem-based learning.
- Study on constructing five items of an assessment form of the abilities in problem-based learning
- Establish a 4-point rating scale criteria, which consisted of very good, good, fair, and poor.
- Propose the assessment form of the abilities in problem-based learning to the experts for assessing the quality.
- Assess the index of congruence of the assessment form of the abilities in problem-based learning by the experts based on the standardized criteria of 0.80-1.00, and try out the assessment form to thirty research participants who were not the research samples.
- Assess the reliability of the assessment form of the abilities in problem-based learning by the experts. The reliability index of the assessment form was .83.

### *2.3 Data Collection*

- (1) Organizing a training course of problem-based learning for an experimental group focusing of steps of problem-based learning and roles of learners.
- (2) Informing objectives of the study on the abilities in problem-based learning and learning outcomes based on Qualifications Framework for Higher Education.
- (3) Providing the course of problem-based learning to teacher students in problem-based learning of five assigned situations were assessed by the teacher after finishing the course.

### *2.4 Data Analysis*

The skills of the students based on Qualifications Framework for Higher Education were assessed by 5-point rating scale criteria. It ranges from 1-5 by means of 1-very poor; 2-poor; 3-fair; 4-good; 5-very good. The abilities of students in problem-based learning were assessed by 4-point rating scale criteria. It ranges from 1-4 by means of 1-low; 2-moderate; 3-high; 4-very high.

## **3. Result and Discussion**

The research results showed that the average learning outcome of the students based on Qualifications Framework for Higher Education was at a high level. The five high rated qualifications of the students were cognitive skills, morals and ethics, interpersonal relations and responsibility, knowledge, numerical analysis, communication and information technology skills respectively as shown in Table 1.

Table 1. Learning outcomes of teacher students

Qualifications Framework for Higher Education	Learning outcomes		
	$\bar{X}$	S.D.	Level
Morals and ethics	4.40	0.47	High
Knowledge	4.28	0.50	High
Cognitive skills	4.38	0.48	High
Interpersonal relations and responsibility	4.19	0.52	High
Numerical analysis, communication and information technology skills	4.15	0.49	High
Total	4.26	0.41	High

Table 2 shows results of the relationship between the abilities in learning through problem-based learning and the learning achievement of the students.

Table 2. Abilities in learning through PBL and learning achievement

variables	r	p
• Abilities in learning through PBL and learning outcomes based on Qualifications Framework for Higher Education	0.12	0.72
• Abilities in learning through PBL and learning achievement	0.45	0.81
• Learning outcomes based on Qualifications Framework for Higher Education and learning achievement	0.05	0.01

Note. \*  $p < 0.05$ .

The learning outcomes of teacher students based on Qualifications Framework for Higher Education were related to the learning achievement at the .05 level of the statistical significance. Whereas, that the learning outcomes of the students were not related to the abilities in learning through PBL. Additionally, the abilities of the students in learning through PBL were not related to the learning achievement. The findings indicated that of the teacher students who had the high score of the learning achievement would also have the high learning outcomes based on Qualifications Framework for Higher Education.

However, it was not necessary that the teacher students would also have the abilities of in learning through PBL were also high. It was not necessary that the teacher students who had the high abilities in learning through PBL had the high score of learning achievement.

Regarding the reflection, the opinions of the students toward PBL were summarized. Enthusiasm for learning and participation in learning activities “PBL makes enjoyable and very interested instructional model because PBL provides the students with excitement and interest in thinking and solving problems ...”, self-study “PBL stimulates the students in learning and finding knowledge from various learning resources by themselves, including enhancing analytical thinking from the actual situations”, group work learning “PBL improves teamwork skill and social skills of the students, including self-study ...”, various new learning methods “PBL is a teaching method in which complex real-world problems are used as the vehicle to promote student learning of concepts and it is a student-centered approach in which students *learn* about a subject by working in groups to solve an open-ended *problem*”.

According to the findings of the study, students had a high average learning outcome based on the Qualifications Framework for Higher Education. Cognitive skills, morals and ethics, interpersonal interactions and responsibility, knowledge, numerical analysis, communication, and information technology skills were the students’ top five credentials. The outcomes could be due to the bachelor’s degree curriculum and instructional management method based on the Qualifications Framework for Higher Education and the National Education Act (1999). It is a crucial and practical guideline for efficient and successful educational management, which includes assessing the learning outcomes of students at higher education institutions that develop professional teachers (Caspersen et al., 2017; Michelsen et al., 2017; Chea et al., 2019).

Moreover, the major focus of the education program serves greatly five main qualification frameworks for higher education. The major aims of the education program are to produce professional teachers with knowledge concerned with teaching profession, cognitive skills, interpersonal relations and responsibility, numerical analysis, communication and information technology skills, including value, service mind. Additionally, university level aims at producing qualified teachers with value, service mind, ideology, spirit and competencies in teaching for schools, colleges and universities based on the country development plan. The process of learning focuses on improving necessary skills through various instructional models for problem-solving skills and decision-making skills (Office of the Higher Education Commission, 2009; Lambert & Gong, 2010).

The mean score of the teacher students for the abilities in learning through Problem-Based Learning was 80.38 points and 80.38% which was higher than the established criteria. The results may be caused by PBL, which is a teaching method in which complex real-world problems are used as the vehicle to promote student learning of concepts and PBL is also a student-centered approach in which students *learn* about a subject by working in groups to solve open-ended *problems organized by the teachers*. Problem-based learning stimulates the students in learning and finding knowledge from various learning resources by themselves, including enhancing analytical thinking from the actual situations (Torp & Sage, 1998; Ali & Sebai, 2010, Masek & Yamin, 2011; Ozbicakci et al., 2012; Bayrak & Gurses, 2020).

The learning outcomes of the students based on Qualifications Framework for Higher

Education were significantly related to the learning achievement. The findings indicated that of the teacher students who had the high score of the learning achievement would also have the high learning outcomes based on Qualifications Framework for Higher Education. However, it was not necessary that the teacher students would also have the abilities of in learning through PBL. The results may be caused by efficient teaching and learning management based on the course description, learning outcome analysis, learning assessment and evaluation (Murtonen et al., 2017; Hill & Chin, 2018; Wisetsat & Nuangchalerm, 2019; Sosutha et al., 2021).

#### **4. Conclusion**

Problem-based learning is a teaching style in which students are taught concepts through the use of complicated real-world challenges. It can encourage students to learn and obtain knowledge on their own from a variety of learning materials, as well as improve analytical and critical thinking skills for problem solving. However, the weakness of PBL is the low confidence of the students, who have different educational backgrounds and other roles in classroom activities. Students can develop themselves to face the modern classroom and disruptive education.

#### **Acknowledgements**

This research is financially supported by Mahasarakham University.

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