The Effectiveness of Blended Learning Model Integrated with Inquiry-based Learning Framework in Understanding Pre-service Elementary School Teachers' Social Competence

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Abstract

Currently, e-learning program becomes a hot issue in education field as technology becomes more advanced. As a result, learning methods will become more sophisticated as well. This research aims to examine the effectiveness of blended learning model integrated with inquiry-based learning framework in understanding pre-service elementary school teachers' pedagogical competence. This research is a quasi-experimental research with pretest-posttest control group design. The results of this research indicated a significant value in the use of blended learning model integrated with inquiry-based learning framework in understanding pre-service elementary school teachers' pedagogical competence. The model makes learning easier because it combines various ways of delivery, teaching models, and learning styles which introduce varied media for dialogue between facilitators and people who learn. Blended learning does not only serve as a combination of direct teaching and online teaching, but also as an element of social interaction.

Keywords:
Blended learning, Inquiry-based Learning Framework, Social Competence

1. Introduction

The use of information and communication technology in higher education learning makes the interaction between lecturers and students which is no longer limited by space and time possible. Initially, learning interaction assisted by information technology was limited to the activity of disseminating learning materials using floppy disk, compact disc, flash disk [1], [2], and Radio Frequency Identification [3]. With the introduction of the internet (interconnection network), the activity of disseminating learning materials is carried out via email, for example, mailing list and Android-based media [4]–[6]. The development of information communication technology affects the development of learning technology, for example creating a system to assist learning called electronic learning (e-learning) [7]–[9].

E-learning can be used by the academic community of higher education in the teaching and learning process. E-learning can be used if the system is ready to be used by lecturers and students as the main users and the access is smooth [10]–[12]. The smooth access to e-learning depends on the higher education institution support in providing the infrastructure and regulations. Clear regulations will encourage more use of e-learning in the interaction between lecturers and students.

At present e-learning based education with blended learning model has become a trend and has even become a selling point for educational institutions, especially for distance education. However, in its implementation, the e-learning-based blended learning model currently still plays a role as a complement to learning. A large number of e-learning-based blended learning are not designed attractively although blended learning model can be integrated with other learning models to make it easier for students to understand the materials and achieve the learning goals. Blended learning model can be integrated with inquiry-based learning framework.

The integration of blended learning model with inquiry-based learning framework emphasizes the process of searching and finding [13]. Learning materials are not given directly. The student's role is searching and finding the materials by themselves, while the teacher acts as a facilitator and guide students in learning [14], [15]. Inquiry-based learning strategy is a series of learning activities that emphasize critical and analytical thinking process to seek and find answer to a question. The thinking process itself is usually done through online question and answer session between the teacher and student [16], [17].

The use of blended learning which is integrated with inquiry-based learning framework develops the ability to think systematically, logically, and critically or develops intellectual ability as a part of mental process [18], [19]. Thus, in inquiry-based learning strategy students are not only required to master the materials but also to find ways on how to use their potential. Students who only master the materials are not necessarily able to develop the ability to think optimally. In contrast, students will be able to develop their thinking skill when they can master the materials, particularly in the education science course of the Elementary School Teacher Education study program in understanding social competence [20].

It is essential that pre-service elementary school teachers understand social competence because it is an attitude and behavior or willingness and ability to build cooperative ties with others in creating a relatively stable relationship to face problems in the workplace. This relationship is formed through the synergy of character, self-concept, internal motivation and social knowledge capacity [21], [22]. Social competence is related to the ability of teachers as social creatures to interact with other people [23]. As a social being, the teacher behaves politely, can communicate and interact effectively and attractively with students, community around the school and around the place where he/she lives and parties having an interest in the school. This objective condition illustrates that the teacher's social competence can be seen through the socialization and interaction as a teacher and as a community member and the ability to implement it in everyday life [24]. Therefore, this research was conducted as an innovation to investigate the effectiveness of blended learning model integrated with inquiry-based learning framework in understanding pre-service elementary school teachers' pedagogical competence. The novelty in this research is the integration between blended learning model and inquiry-based learning framework.

Theoretically, the benefits of this research are expected to broaden the existing theories of the effectiveness of blended learning model integrated with inquiry-based learning framework in understanding pre-service elementary school teachers' pedagogical competence. This model can be used as a reference for universities that have not or already employed e-learning.

1.2. Objectives
The implementation of blended learning model integrated with inquiry-based learning framework in a university that has e-learning will make the blended learning measurable. The measurable blended learning means that it can also measure the quality of the learning model which is integrated with the inquiry-based learning framework.

2. Methods
2.1. Research Design
This research aims to examine the effectiveness of blended learning model integrated with inquiry-based learning framework in understanding pre-service elementary school teachers' pedagogical competence. This research is a quasi-experimental research with pretest-posttest control group design. It means that in this research two groups consisted of control group and experimental group were selected randomly. These groups were then given a pretest before learning and a posttest after learning to investigate the difference between the control group and the experimental group [25]. The experimental class was treated with LMS-based blended learning integrated with

inquiry-based learning framework, while the control class used the conventional center learning method. The results of the pretest and posttest in the experimental and control classes were compared.

2.2. Respondents

Respondents in this research were students in the semester which used blended learning in the learning activities. The sampling technique used in this research was purposive sampling technique. The samples comprised 30 respondents.

2.3. Instruments

The instrument used in this research was the blended learning device in the form of semester lesson plan, students' worksheets, practice questions, handouts, and online learning classes.

2.4. Data Analysis

The data in this research were obtained from the pretest and posttest results. The pretest was used to measure the initial ability before the static fluid learning material was presented and the posttest was used to measure the ability of students after the learning was done. Both tests were given to the control class and the experimental class. Afterwards, the mean difference test was carried out to measure the initial achievement of each group. It was done to find whether there was a mean difference in initial achievement of the two groups. The test used was the independent sample t-test with a significance level of 0.05 in the SPSS 24.00 software.

3. Research Results

The results of the analysis in this research were used to examine the effectiveness of blended learning model integrated with inquiry-based learning framework in understanding pre-service elementary school teachers' pedagogical competence. The results are presented as follows:

Table 1. Paired Samples Statistics

	Mean	N	Std. Deviation	Std. Error Mean
Pretest	61.48	40	10.211	1.614
Posttest	84.38	40	3.394	.537

Based on the calculation in the Paired Samples Statistics table, it can be seen that the average value before using blended learning with moodle was 61.48 and after being treated with blended learning model integrated with inquiry-based learning framework in understanding pre-service elementary school teachers' pedagogical competence the average value was 84.38. Descriptively, it means that there is an average difference before and after the use of blended learning model integrated with inquiry-based learning framework in understanding pre-service elementary school teachers' pedagogical competence.

Table 2. Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	Pretest & Posttest	40	.143	.377

As can be seen in the Paired Samples Correlations table, the correlation coefficient value before and after using the blended learning model integrated with inquiry-based learning framework in understanding pre-service elementary school teachers' pedagogical competence was 143 with sig or p-value = $0.377 \geq 0.05$ or insignificant.

Table 3. Paired Samples Test

Paired Differences							
Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
			Lower	Upper			
-22.900	10.288	1.627	-26.190	-19.610	-14.078	39	.000

The table shows the mean difference = -22.900, meaning that there is a positive and meaningful difference between the scores after being treated with blended learning model integrated with inquiry-based learning framework in understanding pre-service elementary school teachers' pedagogical competence. The score was higher compared to

before receiving treatment. In addition, the table also shows the standard error mean which shows the standard error score for the average difference. The most important result presented in the table is the statistical t value = -14.078 with df 39 and a significant value or p-value 0.000 <0.05 or H0 is rejected. Thus, it can be concluded that there is a significant difference in results between the condition before and after using the blended learning model integrated with inquiry-based learning framework in understanding pre-service elementary school teachers' pedagogical competence.

4. Discussion

Based on the research results, it can be explained that the use of blended learning model integrated with inquiry-based learning framework in understanding pre-service elementary school teachers' pedagogical competence obtains a significant value of effectiveness. It means that statistically the use of this learning model has a positive impact on understanding pre-service elementary school teachers' pedagogical competence. It is because blended learning model integrated with inquiry-based learning framework can develop the ability to think systematically, logically, and critically or develop intellectual ability as a part of mental process [26], [27]. Thus, in blended learning model integrated with inquiry-based learning framework students are not only required to master the materials, but also to find ways on how to use their potential. Students who only master the materials are not necessarily able to develop the ability to think optimally. In contrast, students will be able to develop their thinking skill when they can master the materials [28], [29]

Blended learning model integrated with inquiry-based learning framework is a learning that is supported by effective combination of delivery methods, teaching methods and different learning styles and open communication between all parties involved in the training. For the advantages, the use of blended learning does not only serve as a combination of direct (face-to-face) teaching and online teaching but also has a role as an element of social interaction. The use of blended learning model integrated with inquiry-based learning framework is extremely important because it provides an understanding for prospective elementary school teachers to be able to communicate and interact effectively in the school environment and the environment outside of the school. A teacher must try to develop communication with students' parents so that continuous two-way communication can be cultivated. Two-way communication allows students to be better monitored and develop their character more effectively.

Blended learning model provides an alternative model so that every condition and situation experienced by educators can be covered by each of these blended learning models. In other words, each model requires different condition and situation. The advantages of using blended learning in universities were explored by Garrison & Kanuka (2004) [30] who found that blended learning has transformative potential, provides opportunities for institutions to accept technology, strengthens the community of inquiry, and supports active and meaningful learning. Another advantage conveyed by Twigg (2003) [31] is that blended learning can improve learning outcome in terms of higher level, greater knowledge, and better understanding of concepts. As found by Dziuban, Hartman, Juge, Moskal, & Sorg (2006) [32], Twigg (2003) [31] student satisfaction towards blended learning classes was greater than that of pure face-to-face classes. Furthermore, Twigg (2003) [31] suggests the advantages in terms of cost and effectiveness of learning resources from the implementation of blended learning. The cost incurred by the institution can be reduced when learning materials can be posted online and can be reused for the next learning period.

5. Conclusion

Blended learning model integrated with inquiry-based learning framework is a learning strategy that emphasizes the development of cognitive, affective, and psychomotor aspects in a balanced manner so that learning can be more meaningful. This strategy can provide students opportunities for studying according to their learning styles. Moreover, it is a strategy that is considered appropriate to the development of modern learning psychology which considers learning as a process of changing behavior through experience. Another advantage is that this learning strategy can serve the needs of students who have ability above the average. It means that students who have a good learning ability will not be hindered by students who have a poor learning ability. Blended learning model integrated with inquiry-based learning framework has a potential to be implemented along with the development of information and communication technology in terms of the proliferation of supporting applications as well as the equal uses of this technology in the community. Therefore, the drawbacks that are mentioned previously can be overcome with teacher's great willingness.

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