Implementation of Blended Learning to Improve Motivation and Learning Outcomes of Pre-Service Early Childhood Teachers

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Abstract

In pre-service early childhood teachers, learning motivation is important to understand the theory and special learning planning for early childhood, which is incidentally different from primary or secondary education. The motivation to learn certainly influences learning outcomes later. Therefore, this study's objective is to analyze the effectiveness of blended learning on pre-service early childhood teachers' motivation and learning outcomes. A quasi-experimental design with a non-equivalent control group design and a sample of 90 students were used. The results showed that blended learning could significantly increase students' learning motivation than conventional learning. Blended learning is also effective for improving pre-service early childhood teachers' learning outcomes compared to fully online learning. The flexibility offered in blended learning is the main advantage that can be considered. The research implies that blended learning can be implemented as an appropriate learning model during the Covid-19 pandemic or when learning is entirely offline.

Keywords: Blended learning, Learning motivation, Learning outcomes

1. Introduction

The Covid-19 pandemic has significantly impacted various aspects, including education (Chaturvedi et al., 2020; Tarkar, 2021). The spread of Covid-19 has made education implementation activities carried out from home and forced physical distancing policies (Agaton & Cueto, 2021; Chaturvedi et al., 2020; Pokhrel & Chhetri, 2021; Selvanathan et al., 2020; Tarkar, 2021). So far, education in Indonesia has been carried out conventionally or face-to-face and has never experienced such a drastic change. However, the emergence of new clusters of the spread of Covid-19 in schools makes face-to-face learning difficult. To minimize the spread of Covid-19, the Indonesian Ministry of Education has adopted a policy to conduct online learning while the pandemic is still not under

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control (Fakhrunisa & Prabawanto, 2020; Setiawan & Munajah, 2020; Sulisworo et al., 2020).

Online learning is a learning activity done through online media using the internet network so that it is carried out without direct face-to-face between teachers and students (Batubara, 2021; Firmansyah et al., 2021; Mpungose, 2020; Prestiadi et al., 2020; Ridho, 2020; Simamora, 2020). So the teacher must ensure that learning activities keep going, even though the teacher and students are at home. One of the online learning activities is blended learning, a combination of face-to-face learning (offline) with online learning (Atef & Medhat, 2015; Bielousova, 2017; Titov et al., 2019). So students can do face-to-face virtually with their teachers through various platforms. Through blended learning, the teaching process is considered to be more effective. It does not make students feel bored quickly because they still have the opportunity to communicate directly in two directions (Castro-Rodríguez et al., 2021; Dewantara et al., 2020; Ma & Lee, 2021; Sefriani et al., 2021).

Learning motivation is very important for students because success in the learning process depends on oneself and the environment (Alcivar, 2020; Lin et al., 2017). A great desire from within oneself to succeed will make a person more active in learning. In pre-service early childhood teachers, learning motivation is important to understand the theory and special learning planning for early childhood, which is incidentally different from primary or secondary education (Ogunnaike, 2015). The motivation to learn certainly influences learning outcomes later. Previous research (Bećirović, 2017; Feng et al., 2013; Lemos & Veríssimo, 2014) showed that elementary education students' learning motivation significantly influenced their learning outcomes. This learning outcome is also very important because it can be used to measure the effectiveness or success of the learning process, including for pre-service early childhood teachers.

Previous research conducted by (Islam et al., 2018) shows that blended learning can effectively increase the learning motivation of vocational students. In addition, research by (Nguyen, 2017) shows that the use of blended learning-based media can greatly influence student learning outcomes. Supported by (Atmacasoy & Aksu, 2018) review, the application of blended learning to pre-service teachers is more effective than conventional learning or fully online learning. Based on this empirical research, the application of blended learning can potential to increase the motivation and learning outcomes of pre-service early childhood teachers during the Covid-19 pandemic. However, there is still no research that examines this matter until now. This is also supported by regulations by the Indonesian Ministry of Education that during the Covid-19 pandemic, all learning activities must be done online, including in higher education. Our university's early childhood study program also implements online learning.

Therefore, this study will apply a blended learning model to increase motivation and learning outcomes for pre-service early childhood teachers. The difference between this research and previous research is the subject of the research, which is the target of pre-service early childhood teachers. The blended learning model make it easy to ensure that teaching and learning activities for early childhood educators and students are implemented in the era of the pandemic. Based on the results of this study, it is expected that this research will be used as a reference or basis for the development of blended learning as an educational method during the pandemic. This study aimed to analyze the effectiveness of blended learning on the motivation and learning outcomes of Pre-service early childhood teachers.

2. Literature Review

Blended learning is learning that combines face-to-face learning models with ICT-based learning models (Bauk et al., 2014). This combination learning is also often called a hybrid teaching method, which is a learning method that combines face-to-face teaching methods with online teaching methods. Blended learning aims to combine models of online-based learning and face-to-face learning in the classroom (Martínez et al., 2020). The online learning model is more time efficient and easy to access learning materials. Then the nature of the face-to-face learning model in the classroom is that students can interact directly with other students and teachers during the learning process.

In implementing the blended learning model, there is a need for learning implementation

stages to make it easier to design learning steps or scenarios. According to Carman (2005, p.2), there are five stages to implementing blended learning: live events, self-paced learning, collaboration, assessment, and performance support materials.

1. Live Event is a direct (syncs) learning activity at the same time and place.
2. Self-Paced Learning is a combination of learning activities independently (self-paced learning).
3. Collaboration is activities between educators and learners and between fellow learners.
4. Assessment is an activity educator determines developing learning by choosing a matching combination of various online and offline assessments.
5. Performance Support Materials, preparing supporting learning resources and media in digital form that learners can access.

Implementing the blended learning model in vocational high schools effectively improves student learning outcomes (Irawan et al., 2017; Islam et al., 2018). Meanwhile, the results also showed that learning motivation significantly relates to learning outcomes. (Alhadi & Saputra, 2017). Thus, the implementation of the blended learning model and its effect on student's motivation and learning outcomes are interesting to be researched for pre-service early childhood teachers.

3. Methodology

The research was conducted at the early childhood Department, Universitas Negeri Surabaya during February 2021 with the regulations set for online learning. The research method used is a quantitative method with a quasi-experiment and non-equivalent control group design (Creswell & Creswell, 2018). The sampling technique used was random cluster sampling because the college selected the two classes randomly. The sample number in this study was 90 students consisting of two classes with 45 students in each class.

The instruments used in this research are learning implementation instruments, test instruments, and motivation questionnaires. The learning implementation instrument used refers to the semester lecture plan in the Lesson Planning course. The test instrument is 20 multiple choice questions to measure student learning outcomes in applying blended learning. As for the motivation questionnaire, the Motivated Strategies for Learning Questionnaire consists of 30 question items adapted from Pintrich in (El-Adl & Alkharusi, 2020).
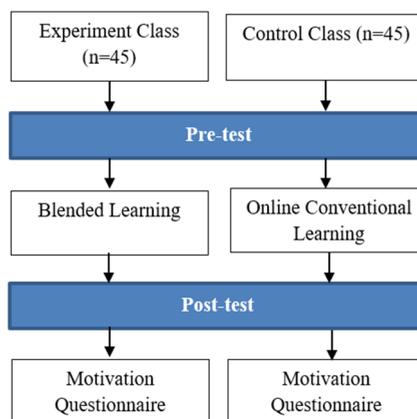

Figure 1: Data Collecting Process

The data collection technique was carried out by giving a test instrument initially given a pre-test to

both classes (see Figure 1). Then the experimental class was given treatment with blended learning using several face-to-face platforms. At the same time, the control class used conventional learning in full online without any face-to-face platform assistance (Viljoen et al., 2020). After being given treatment, both classes were given a post-test to determine the improvement in learning outcomes for pre-service early childhood teachers. In addition, after being given treatment, both classes were given a learning motivation questionnaire to determine the differences in learning motivation in the two classes.

The data analysis technique used descriptive statistics, including the minimum, maximum, and average pre-test and post-test scores, to obtain an overview of student learning outcomes before and after treatment. In addition, descriptive statistics are also used to describe the student's learning motivation in both classes. The data from the pre-test, post-test, and motivation survey were then analysed further using inferential statistics which included tests for normality, homogeneity, paired t, and n-gain so that the significance of the two classes could be known. The device is said to be effective if (1) there is a significant difference in student learning outcomes; (2) moderate student learning outcomes; (3) n-gain is at least moderate for the experimental class; (4) there is a significant difference between the two classes. The N-gain value was determined by: (post-test score - pre-test score)/(100 - pre-test score) and the results were adjusted according to Hake's criteria as shown in Table 1 (Hake, 1999). In addition, the size of the effect was determined using Cohen's d-effect size to see the impact of field operations as shown in Table 1 (Morgan et al., 2012).

Table 1: Criteria for determining N-gain and Size Effect

Hake's N-gain		Cohen's d-effect size	
N-gain	**Category**	**D-effect**	**Category**
g < 0.3	Low	≥ 1.00	Very Large
0.3 ≤ g <0.7	Middle	0.8	Large
g ≥ 0.7	High	0.5	Medium
		0.2	Small

4. Results

4.1 Learning Motivation

Learning motivation is the entire driving force from within students so that students can have enthusiasm for learning and ensure the continuity of learning in accordance with its direction so that learning objectives can be achieved properly (Baharun et al., 2021; Cook & Artino, 2016; Oproiu, 2015; Panisoara et al., 2020; Sogunro, 2014). In this research, the difference in the average score of student learning motivation can be seen in Figure 2. There are differences in the technical implementation of blended learning compared to conventional learning, so it certainly influences student motivation.
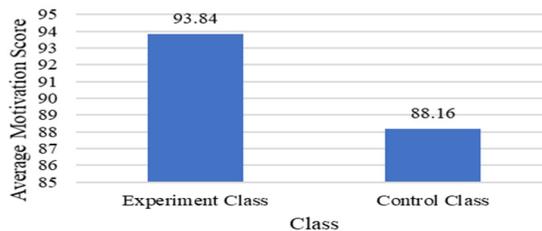
Figure 2: The average difference diagram in learning motivation between the both classes

It showed that the average motivation score in the experimental class using blended learning is 93.84,

while in the control class using conventional learning it is 88.16. So, there is a difference of 5.68 between the two scores. To see the significance between the experimental and control classes, it is necessary to test inferential statistics using an independent t-test. However, before that, it is necessary to test for normality and homogeneity first, as shown in Table 2. It can be seen that the normality test for the experimental class has a significance value of 0.057, while for the control class, it is 0.430. Because the significant value in both classes is $p > 0.05$, the data is normally distributed. Meanwhile, the homogeneity in both classes has a significance of $p\ 0.971 > 0.05$, so that the data is homogeneously distributed. Therefore, inferential statistical analysis used an independent t-test ($\alpha=5\%$).

Table 2: The differences in student learning motivation in both classes inferentially

Class	N	Shapiro-Wilk Normality Test		Levene Statistic Homogeneity Test		Independent t-test
		p (Sig.)	Distribution	p (Sig.)	Criteria	p (Sig.)
Experiment Class	45	0.057	Normal	0.971	Homogenous	0.000
Control Class	45	0.430	Normal			

It showed that the significance value for the independent t-test is $p < 0.05$, so there is a significant difference in learning motivation between both classes. The experimental class uses a blended learning model that can dynamically shift the learning principles from the teacher center to the student center (Eryilmaz, 2015; Herloa, 2015; Sajid et al., 2016). Blended learning has the advantage that it can complement the fully online learning model by doing face-to-face virtually. Online learning makes students and teachers physically separated and reduces face-to-face interactions. In addition, online learning is more likely to be applied to training than education, so it places more emphasis on cognitive and psychomotor abilities than affective. So through virtual face-to-face, teachers can provide direct and expressive motivational encouragement to students and position themselves as educators (Hou, 2015; Panisoara et al., 2020; Sholihah et al., 2021). The blended learning model makes student activities in the classroom more varied. They not only rely on the lecturer's information but also try to seek information from various sources flexibly (Bruggeman et al., 2021; Waha & Davis, 2014). These results align with several previous studies by (Islam et al., 2018; Oweis, 2018; Wahyuni et al., 2019), showing that blended learning can increase students' learning motivation when learning online. Students will be motivated to learn when they know what to learn, learn the material first, and are ready to learn. In addition, through blended learning, students can build knowledge to explore material that has been proven to be more effective than traditional methods, according to constructivism learning theory (Slavin, 2011).

4.2 Learning Outcome

The learning outcomes that students achieve or obtain through their efforts or thoughts are described in the form of basic mastery, knowledge, and skills contained in various aspects of life. So that it appears in the individual using an assessment of attitudes, knowledge, fundamental skills, and changes in behaviour quantitatively (Supena et al., 2021). Measurement of learning outcomes focused on the cognitive aspects shown in Table 3.

Table 3: The difference between pre and post-test student learning outcomes descriptively

Group	N	Pre-test			Post-test		
		Lowest	Highest	Average	Lowest	Highest	Average
Experiment	45	25	85	56.67	55	100	78.00
Control	45	25	85	57.44	45	85	62.66

It can be seen that there is a descriptive difference in scores between the pre and post-test. Based on this data, all pre-test scores were equally low in both classes because students had not yet studied the material given so if they were tested, they would have low scores. Then after being given the blended learning treatment and a post-test, there was an increase in scores in both classes. The mean score of the experimental class increased from 56.67 to 78.00, while in the control class increased from 57.44 to 62.66. This means that the experimental class's N-gain is greater than the control class due to the difference in treatment when the experimental class uses the blended learning model and the control class uses the fully online (conventional) learning. This result is consistent with research by (Nortvig et al., 2018) which revealed that blended learning could improve student learning outcomes. The next analysis is an inferential statistical test that begins with an analysis of homogeneity and normality of the data as shown in Table 4. The normality test results on the pre-test and post-test of both classes are normally distributed. In addition, the homogeneity test result also of all data is homogeneous. Thus, the parametric paired t-test ($\alpha=0.05$) was used to determine the difference between both classes

Table 4: Test result for normality and homogeneity of student learning outcomes data

Shapiro-Wilk Normality Test			
Group	Test	p (Sig.)	Distribution
Experiment Class	Pre-test	0.658 > 0.05	Normal
	Post-test	0.449 > 0.05	Normal
Control Class	Pre-test	0.654 > 0.05	Normal
	Post-test	0.253 > 0.05	Normal
Levene Statistic Homogeneity Test			
Test	Number of Sample	p (Sig.)	Homogeneity
Pre-test	59	0.752 > 0.05	Homogenous
Post-test		0.463 > 0.05	Homogenous

Based on the paired t-tests shown in Table 5, there is a significant value of $p < 0.05$, indicating acceptance of the hypothesis. This means a significant difference between pre-test and post-test for both classes. Before being given the blended learning treatment, students did not understand and study the material. Then after being given the blended learning treatment, it can provide optimal learning outcomes for pre-service early childhood teachers, so there is a significant increase in post-test results. In line with (Hasanah & Nasir Malik, 2020; Mumtaz et al., 2017; Surjono et al., 2017; Yapici & Akbayin, 2012), which shows that the implementation of blended learning can significantly improve pre-service teachers learning outcomes.

Table 5: Paired t-test results and effect size in both classes

Paired T-Test		
Group	p (sig.)	Hypothesis
Experiment Class	0.00 < 0.05	There is a significant difference between the pre- and post-test scores
Control Class	0.00 < 0.05	
Cohen's d-effect size		
Group	d-effect size	Category
Experiment Class	4.94	Very Large
Control Class	0.96	Large

The same thing happened in the control class, with significant differences in the results before and after the test. To see which effect has the greatest effect, the d-Cohen effect size is used. In the experimental class, the value of the effect size d is 4.94, so it falls into a a vast category. The control class effect size is 0.96, it falls into a large category. So, the treatment in blended learning has a

greater effect than conventional learning. The use of face-to-face media combined with online makes learning more interactive so that students better understand the material being explained. In line with research by (Ceylan & Kesici, 2017; Liu et al., 2016) that the effect size for blended learning is significantly larger than conventional methods.

Table 6 shows a comparison of N gain values between the experimental class and the control class. The average gain value of N for the experimental class is 0.518, which belongs to the middle class. On the other hand, the average value of N gain for the control class is 0.096, so it belongs to the low class. Therefore, the acquisition learning outcome of the experimental class is greater than the control class. Furthermore, statistically inferential, the Shapiro-Wilk normality test was carried out and obtained a significant result of $p < 0.05$. so that the The N-gain data for both classes were not normally distributed. The treatment caused the student's scores to be higher, and the data skewed to the right. Then, the Levene Statistical Homogeneity Test was carried out, which showed a significance value of $p > 0.05$ so that the data was homogeneously distributed.

Table 6: Descriptive statistical and Mann-Whitney test for the value of N-gain in both classes

Class	Descriptive		Shapiro-Wilk Normality Test		Levene Statistic Homogeneity Test		Mann-Whitney Test
	Average N-Gain	Criteria	p (Sig.)	Distribution	p (Sig.)	Criteria	p (Sig.)
Experiment Class	0.518	Middle	0.000	Not Normal	0.775	Homogenous	0.000
Control Class	0.096	Low	0.001	Not Normal			

The Mann-Whitney statistical test showed a significant difference in the N-gain value of both classes. It causes blended learning to increase the interaction between lecturers and students synchronously or virtually face-to-face. In addition, blended learning supports student-centered learning because the teacher can provide direction and deliver initial material so students can develop their knowledge (Lim et al., 2007). In contrast to conventional learning, the interaction between lecturers and students when learning online is very limited. Lecturers also find it challenging to convey learning materials, so students find learning more difficult. This finding aligns with research by (Ranjan, 2020; Sefriani et al., 2021) that applying the blended learning model effectively improves student learning outcomes and achievement more than conventional learning.

The use of blended learning is supported by Ivan Pavlov's Classical Conditioning theory, which suggests that a conditioned stimulus is needed to produce an actual learning response (Schunk, 2011). By requiring reinforcement to strengthen the learning response, learning activities occurred systematically and controlled to obtain excellent and adequate learning behaviour. In this blended learning, virtual face-to-face interaction activities become reinforcement for students so that their learning activities become more controlled and get an actual response. In addition, blended learning requires audio-visual media to carry out face-to-face interactions between lecturers and students (Dey & Bandyopadhyay, 2019). Therefore, audio-visual media has higher effectiveness than visual or verbal media alone, which is done in conventional learning (Bambaeeroo & Shokrpour, 2017; McLoughlin & Lertola, 2014). So, in practice blended learning has higher effectiveness than conventional learning.

5. Conclusion

It can be concluded that a blended learning model has been implemented to improve the motivation and learning outcomes of Pre-service early childhood teachers. This learning model can increase student learning motivation significantly compared to conventional learning. In addition, blended learning is a model that effectively improves student learning outcomes and achievement more than

fully online learning. This research implies that the blended learning model can be applied as an appropriate learning model during the Covid-19 pandemic or when learning is entirely offline. The flexibility offered in blended learning is the main advantage that can be considered. However, this research still has limitations: it only focuses on measuring learning outcomes and motivation. So, it is recommended to measure several other important abilities, such as critical thinking, problem-solving, and self-efficacy. Motivational questionnaires should also be used before treatment to compare students' learning motivation before and after.

6. Acknowledgements

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