# Blended Learning: Can Increase Student's Interest and Learning Achievement?

Heny Sri Astutik[1]([✉]), Yus Mochamad Cholily[2], Akhsanul In'am[2], Surya Putra Raharja[1], and Firman[1]

[1] Department of Mathematics Education, Universitas Pendidikan Muhammadiyah Sorong, Sorong, Indonesia
henysriastutik@gmail.com

[2] Department of Mathematics Education, Universitas Muhammadiyah Malang, Malang, Indonesia

**Abstract.** This study aims to describe the effectiveness of blended learning based on the Edmodo in terms of students' interest and learning achievement in mathematics. This study is a quasi-experimental study with a one-group posttest-only design. The population in this study were all students of the mathematics education study program at the Universitas Pendidikan Muhammadiyah Sorong. The sample in this study was the second semester students who were selected by purposive sampling technique. Data collection techniques used were test techniques and non-test techniques with data collection instruments, namely learning achievement tests and learning interest questionnaires. The Kolmogorov Smirnov test, one sample at a significant level, was used to test the assumption of normality of the data. Data analysis techniques to test the effectiveness of learning was analyzed using the one sample t-test. To describe the improvement was analyzed using the normalized score gain test. The results showed that blended learning based on the Edmodo was effective in terms of interest and learning achievement and the average normalized gain score for blended learning based on the Edmodo showed that it could increase student interest and learning achievement where $\alpha = 5\%$ .

**Keywords:** Blended learning · Edmodo · Interest · Learning Achievement

## 1   Introduction

The industrial revolution 4.0 and the challenges of global competition in the 21st century currently require every country to have a strategy to deal with so as not to be left behind by other countries. Structuring the quality of education must be designed as well as possible in order to provide great benefits and contributions to the development of the country. Observation results show that students have not independently constructed their knowledge in learning activities. One way to deal with it is to improve the quality of human resources through learning or lectures. In an era like today, science and technology in the world of education have changed the conventional learning system into a modern technology-based learning, demanding to be innovate in the delivery of

learning. Utilization of science and technology is considered important in educational change, especially in the learning system. The results of observations show that the learning process that is running is still not optimal, this is due to conditions that they do not support students to make their own discoveries. Realistically, students are dominated by receiving the material directly. In addition, this is also due to the limited time to study in class while students need more time to find a theory or a solution to a problem. As a result, students have not been able to find concepts from theory but face-to-face time in class has been ended. This has an impact on the low learning achievement.

Blended learning is a concept that includes framing the teaching and learning process that combines face-to-face teaching and ICT-supported teaching. It is a mixed learning that combines direct instruction, indirect instruction, collaborative teaching, and individual computer-assisted learning [1]. Blended learning can be defined as the integration of face-to-face learning experiences in the classroom with online learning experiences. However, this does not only combine face-to-face and online learning but it must consider the portion of both aspects [2]. Blended learning in mathematics should cover four aspects such as classwork, web help, strategy, and assessment [3].

Previous research found that blended learning offers several advantages such as: a) flexible way of learning in terms of time and place, b) students have autonomy to determine their own learning pace, c) students have more responsibility in their learning [4]. Furthermore, the advantages of mixed learning were: a) flexibility as it allows students to access material from anywhere at any time; b) a well student support; c) improvement of pedagogy because it supports a face-to-face teaching approach; d) increased access and flexibility; e) increased cost effectiveness; f) information from face-to-face activities to total online interactions stored in one place; g) promotion of social interaction; h) quick feedback to learners that will help them in their learning process; i) providing collaborative activities between teachers and students; j) enable access to everyone who needs training by providing it in a different way [5]. Other research states that Blended learning can also improve students' affective aspects [6].

In the field of mathematics, technology can be used as a way to create practical and meaningful mathematics learning [7]. Observation results show that students prefer to open the internet to access social networks. The existence of these technological developments shows that one of the media that teachers can use so that the learning process can be fun, attract attention, and actively involve students is social network-based media. Therefore, students can optimize the use of social networking-based technology for educational purposes. One of the social networks that can be used in the learning process is Edmodo. Edmodo is a social network-based media that is similar to Facebook and contains various educational content [8]. Edmodo is a learning media that combines Learning Management System (LMS) with social networks, better known as social learning networks available at www.edmodo.com. Edmodo was developed by Nicolas Borg and Jeff O'Hara which is a social network equipped with features to ensure the security of interaction between users which is used for free learning by educators and students [9]. Edmodo provides various features to connect and collaborate between students and educators in sharing educational content, managing assignments, and handle notifications of every activity in a safe and easy way [10, 11]. Edmodo helps educators to build virtual classes (virtual classes) according to learning conditions in the classroom

based on real class divisions. The purpose of using Edmodo media in learning can be explained as follows: a) Improving the quality of student learning. b) Changing the teaching culture of teachers. c) Changing passive student learning to an active learning culture, so that independent learning is formed. d) Expanding learning opportunities for students. e) Develop and expand new products and services [12]. a) Improving the quality of student learning. b) Changing the teaching culture of teachers. c) Changing passive student learning to an active learning culture, so that independent learning is formed. d) Expanding learning opportunities for students. e) Develop and expand new products and services [12].

Based on the description above, the purpose of this study is to describe the effectiveness and improvement of blended learning based on the Edmodo media in terms of students' interest and learning achievement in mathematics.

## 2   Method

This type of research is a quasi-experimental with one group posttest only design because it is only possible to use one group as the research sample. This research was conducted at the Mathematics Education Study Program, Muhammadiyah University of Education, Sorong, West Papua. The population in this study was the students of the Mathematics Education Study Program which consisted of 4 batches, according to the research design, the fourth semester students were selected as samples with purposive sampling technique. The instrument used to measure student learning achievement is a student learning outcome test consisting of 5 description questions and the instrument used to measure student interest in learning is a learning interest questionnaire consisting of 25 statements in the form of a checklist.

To test whether blended learning based on the Edmodo is effective in terms of students' interest and learning achievement in mathematics, one sample t-test is used with the following hypothesis:

$$H_0 : \mu \leq \mu_0 \text{ and } H_a : \mu > \mu_0$$

The formula for the one sample t-test is, $t = \frac{\overline{x} - \mu_0}{\frac{s}{\sqrt{n}}}$.

With $\overline{x}$ the mean value obtained, $\mu_0$ the hypothesized value, s sample standard deviation, and n number of sample members. The test criteria is rejected $H_0$ if $t_{hit} > t_{(\alpha;n-1)}$ [13].

In addition to using the one sample t-test to see the improvement, a normalized gain score test was also used to avoid conclusions that would lead to bias in the study. The normalized gain score test formula is as follows [14].

$$\langle g \rangle = \frac{\% \langle G \rangle}{\% \langle G \rangle_{\max}} = \frac{(\% \langle S_f \rangle) - (\% \langle S_i \rangle)}{100 - (\% \langle S_i \rangle)}$$

with: $\langle g \rangle$ normalized gain score, $\langle S_f \rangle$ final test score, and.$\langle S_i \rangle$ initial test score

To relate the quality of increasing interest and student learning achievement, it can be seen based on the normalized gain scores with the classifications presented in Table 1.

**Table 1.** Interpretation Classification of Normalized Gain Values

| Normalized Gain Value | Interpretation |
| --- | --- |
| 0.7 [<g>] | Tall |
| 0.3 [<g >] < 0.7 | Currently |
| [<g>] < 0.3 | Low |

**Table 2.** Description of Student Mathematics Learning achievement

| Description | Final score |
| --- | --- |
| Average | 74 |
| Standard Deviation | 5.67 |
| variance | 32.13 |
| Theoretical Maximum Value | 100 |
| Theoretical Minimum Value | 0 |
| Maximum Value | 80 |
| Minimum Value | 60 |

However, before carrying out the above analysis, the assumption test was carried out on the students' interest scores and mathematics learning achievement, namely the assumption of data normality test using the one sample Kolmogorov Smirnov test with a significant level. The hypothesis being tested is, $\alpha = 5\%$ .

$H_0$ : data comes from a normally distributed population

$H_a$ : data does not come from a normally distributed population
The criteria for rejection are if the significance value is $H_0\alpha < 0, 05$ [15].

## 3   Research Results and Discussion

Description of the implementation of learning is a picture obtained during the research to support the discussion of research results. From this picture, it will be seen the final condition of each variable studied. Description of student learning achievement can be seen in the following table.

Based on the results of descriptive statistical analysis as shown in the Table 2, the average learning achievement have met the minimum standard of 60. The maximum and minimum scores on the final test of learning achievement have also met the minimum standards. Description of interest in learning can be seen in the following table.

From the Table 3, it can be seen that the average score of student interest in learning has met the minimum standard of the hypothesized value which is 75 as well as the maximum value obtained by students also has met the minimum standard, while the minimum value of student interest in learning is still below the hypothesized value.

**Table 3.** Description of Student Learning Interests

| Description | Final score |
|---|---|
| Average | 79 |
| Standard Deviation | 2.47 |
| variance | 6.12 |
| Maximum Value | 82 |
| Minimum Value | 74 |

**Table 4.** Kolmogorov Smirnov Normality Test Results.

| Aspect | Kolmogorov Smirnov | Significant Value |
|---|---|---|
| Learning achievement | 0.71 | 0.696 |
| Interest to learn | 0.61 | 0.850 |

**Table 5.** Results of One Sample t-test

| Aspect | $t_{hit}$ | $t_{tab}$ | Sig |
|---|---|---|---|
| Learning achievement | 10.22 | 2.11 | 0.000 |
| Interest to learn | 6.86 | 2.11 | 0.000 |

The normality test of students' interest and learning achievement in mathematics after treatment results in a row can be seen in the following table:

The data in the Table 4 shows that the learning achievement test data and the interest questionnaire data in learning mathematics have a significance value greater than 0.05. This means that the null hypothesis is accepted, that is, the data comes from a normally distributed population, or in other words, the interest questionnaire data and student mathematics learning achievement tests meet the assumption of data normality.

The test results regarding the effectiveness of learning (blended learning based on Edmodo) in mathematics learning for students in the mathematics education study program in terms of interest and learning achievement can be seen in Table 5.

Because the significance value of students' interest and learning achievement in mathematics is less than 0.05 and this value means that blended learning based on the Edmodo is effective in terms of students' interest and learning achievement in mathematics $t_{hit} > t_{tab}$.

Based on the decision criteria in the one sample t-test, blended learning based on the Edmodo is effective in terms of interest and learning achievement in mathematics. This is because blended learning based on the Edmodo can create an interesting, innovative, and effective learning process [16]. In addition, it is also in accordance with the objectives of learning with blended learning: a) helping students develop better, in the learning

**Table 6.** Average Gain Score < g >

| Aspect | Average < g > | Criteria |
|--------|---------------|----------|
| Learning achievement | 0.58 | Currently |
| Interest to learn | 0.31 | Currently |

process according to learning styles and combining the best aspects of face-to-face and online instruction, b) providing realistic practical opportunities for educators and students. Students for independent, useful and growing learning, c) increased scheduling flexibility for students [17].

In addition to using the one sample t-test, to see the improvement, we can use the Normalized Gain Score test. It is used to obtain an average normalized gain score of < g > for aspects of interest and learning achievement, which are presented in the following table.

In Table 6, it can be seen that the average normalized gain scores for aspects of learning achievement and interest in learning have the same score category, which is moderate. Thus it can be said that blended learning based on the Edmodo can increase student interest and learning achievement.

The results of this study indicate that blended learning based on the Edmodo can increase students' interest and learning achievement in mathematics. This is in line with many previous studies which have shown that blended learning is effective in improving learning achievement and interest in learning [18, 19]. In this study, blended learning is better in terms of increasing student interest and learning achievement in mathematics, this reason may be related to the character of blended learning which provides flexibility for each student to be able to access their own teaching materials. They can adjust their learning speed and repeat any material when encountering problems where this does not occur in the usual learning.

In the online blended learning phase, students can browse the learning materials as much as they need and repeat the exercises to understand the learning materials. In this process, students actively use learning resources, rather than passively receiving information or learning materials from the teacher so that it is possible to increase student interest and learning achievement [20]. This is in line with the results of Fahrurrozi & Majid's research, namely blended learning with the Edmodo platform can foster student enthusiasm for learning, students gain the freedom to access teaching resources and materials provided with the support of a good internet network, and opportunities for discussion, question and answer and do practice questions Wider [21].

Based on the factors that influence learning achievement, it is known that blended learning based on the Edmodo has an influence on the interests and learning achievement of students. Blended learning based on the Edmodo can be used as a learning medium in the classroom since it could attract the attention of students. This is in accordance with research conducted by Sandi which revealed that the use of blended learning encourages students to be active in participating in the learning process, so that students are more involved in the learning process [22]. Therefore, blended learning can be considered as

an alternative to increase interest and learning achievement in mathematics for students in the mathematics education study program.

## 4   Conclusion

Based on the results of data analysis and discussion, it can be concluded that blended learning based on the Edmodo is effective and can increase student interest and learning achievement. Based on these conclusions, it is recommended for lecturers to be able to apply blended learning based on the Edmodo as an alternative learning to increase student interest and learning achievement that are not limited to mathematics education study programs. Students' access to the internet needs to be considered before implementing this learning.

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