

THE EFFECT OF BLENDED LEARNING ON STUDENT'S SELF EFFICACY IN MATHEMATIS LEARNING

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Abstrak

This research aims to find out whether there is a significant influence from blended learning on students' self-efficacy in learning mathematics. This type of research is quantitative research. The instruments used are tests and questionnaires. The questionnaire distributed to the sample was tested for feasibility using validity and reliability tests. The data analysis technique in this research uses simple linear regression analysis, which aims to see the effect of blended learning on students' self-efficacy in learning mathematics. The research subjects were 95 students of SMK Sandhy Putra – 2 Medan, obtained through random sampling techniques and the Slovin method. The results of the research show that there is an influence of the blended learning model on students' self-efficacy in mathematics learning, with the influence of blended learning on students' self-efficacy of 65.8%.

Kata kunci: blended learning, self efficacy, mathematics learning

I. Introduction

Blended Learning is a mixed learning system that combines face-to-face teaching with computer teaching. In the past, these two learning environments remained largely separate because they used different combinations of media and methods and met the needs of different groups. For example, traditional face-to-face learning typically occurs in a teacher-directed environment with two-way interaction in a shared setting and high compliance. On the other hand, distance learning systems emphasize independent learning and interaction with learning materials that usually occur in different settings and low compliance (Bonk & Graham, 2015).

The concept of blended learning is rooted in the idea that learning is not just a one-time event, but learning is a continuous process. Mixing provides various benefits compared to using a single learning delivery medium alone (Singh, 2021).

According to Bonk & Graham (2015) there are three general sorting categories by students in ordering learning content based on its values:

- High-value stuff: The content and context need to be remembered or even memorized. That's what I took from this learning activity.

- Medium-value stuff: Content and context that may need to be used in the future. Things that will feel familiar but won't be memorized and know how to get to them when and if needed.

- No-value stuff: Content that is not needed and does not want to be studied or thought about.

Blended learning provides a richer environment for students to make decisions. One of the main drivers from a student perspective towards blended learning is the need to reduce and target learning objectives and activities. Various processes and models improve students' ability to sort (Bonk & Graham, 2015).

One of the main factors involved in implementing blended learning is consideration of the 'suitability' of each learning delivery medium and the suitability of the type of delivery to the learning activity. Thus, the face-to-face part of learning can develop students' abilities through in-class discussions, while the electronic bulletin board component can develop students' critical thinking skills. However, in practice, of course, students may prefer one method of delivery (face-to-face or online) and ignore the other method (Sharma, 2010).

Mathematics is a subject that is considered quite difficult by some students. This assumption arises because students feel that Mathematics is filled with numbers, formulas and must use logical thinking skills. Judging from this, as well as the condition of development of information and communication technology, it is possible for learning to develop by combining the use of information developments with the internet as a learning tool. E-learning can be carried out using a blended learning model which is one of the innovations in internet-based learning or e-learning in an effort to obtain better results (Khilmi R, 2018). According to (Darma et al., 2020) specifications for the components of the applied mathematics blended learning design model include: 1) learning outcomes, 2) material organization map, 3) reference list, 4) teaching materials/materials, 5) synchronous learning activities and asynchronous, asynchronous learning design, 6) synchronous learning design, 7) synchronous learning design, and 8) synchronous learning flow.

Blended learning has a positive impact on mathematics learning. Students can develop knowledge independently without being limited by time at school by meeting face to face with teachers so that they can improve students' academic abilities (Indrayany & Lestari, 2021). In the research of Kurniawati et al. (2019) shows the results that the blended learning process in mathematics learning is in the very good category, student learning outcomes are in the sufficient category, and student responses to the application of blended learning are in the very high category. The mathematical communication skills of students who learn mathematics using e-learning are better than students who use conventional learning (Riasari, 2018). The application of the LMS (Learning Management System) based blended learning model shows good effectiveness in learning mathematics because it can be accessed anytime and anywhere without being limited by space and time (Haeruman et al., 2021). Jazuli et al. (2022) stated that blended learning has an effect on students' self-efficacy and there is a difference between the effect of blended learning compared to online learning on students' self-efficacy.

According to Schwarzer & Luszczynska (2008) self-efficacy is related to individuals' beliefs in their ability to control the challenges of their needs and functions. Self-efficacy is defined as people's beliefs about their ability to produce a certain level of performance that exerts influence over events that affect their lives (Bandura & Wessels, 1994).

Suciono (2021) differentiates self-efficacy into three dimensions, namely the level dimension which refers to the level of difficulty of tasks that students are able to overcome, ranging from easy to difficult; the generality dimension relates to the field of task or behavior, experience in dealing with problems provides mastery in a specific field of task or behavior; and the strength dimension is related to the strength of students' self-efficacy or ability to overcome existing problems.

Self-efficacy is not only related to achievement, but also a number of other motivational, cognition and regulatory factors (Bartimote-Aufflick et al., 2016). Academic self-efficacy is not only influenced by internal factors, but is also influenced by external factors. Internal factors that influence self-efficacy include interest, patience, resilience, character, and motivation to learn. Meanwhile, external factors that influence self-efficacy include attachment style, feelings of warmth, goal orientation, enactive mastery experiences, and verbal persuasion (Mukti & Tentama, 2019). Self-efficacy helps students make decisions and strive to progress, increases persistence and perseverance in achieving goals and is able to manage feelings of anxiety when experiencing difficulties (Zagoto, 2019). In addition, educational institutions can also actively stimulate student independence by providing programs that give students real tasks, which require them to apply knowledge and skills more often in various situations (van Dinther et al., 2011).

Mathematics is one of the compulsory subjects in school which is abstract, logical and systematic (Wijaya et al., 2019). Self-efficacy is one of the things that greatly influences students' mathematics learning outcomes (Ningsih & Hayati, 2020). In the research of Widyaninggar (2015) and Negara et al. (2021) obtained the results of the influence of self-efficacy on mathematics learning achievement. Self-efficacy has an influence on mathematics learning outcomes. Students who have high self-efficacy will also have high learning outcomes. If given challenging mathematics questions, students with high self-efficacy will feel happy and satisfied with their work compared to students who have low self-efficacy (Ghufron & Suminta, 2013). The teacher's role in learning mathematics should pay attention to the development of student self-efficacy, which is a key variable in the use of learning strategies and self-evaluation (Hartati et al., 2021). Teachers must be aware of the importance of influencing factors (self-regulation, teaching presence, and cognitive presence) to increase the effect of self-efficacy on student learning engagement (Doo et al., 2023).

II. RESEARCH METHODS

This research is quantitative research with a descriptive approach. The research was carried out at SMK Sandhy Putra – 2 Medan. The student population in this study was 125 class XII students. By using random sampling and the Slovin method, the number of samples studied was 95 people. To obtain research data, the instruments used were tests and questionnaires. The data obtained is in the form of answers from respondents to questions or items asked, with the following criteria: a. items must be relevant or tied to what is being measured; b. items must be concise; c. the items are not confusing; d. good bullet points should contain one thought.

The measurement scale used in this research is the Likert Scale. Each answer is given a score based on a Likert scale with a number or weight, namely 1 to 5. The questionnaire

distributed to the sample is tested for feasibility using validity and reliability tests. The data analysis technique in this research uses simple linear regression analysis, which aims to see the effect of blended learning on students' self-efficacy in learning mathematics. The hypothesis testing criteria in this research is that H_0 is accepted if $F_{count} \leq F_{table}$, meaning that there is no simultaneous influence between the blended learning variables on the self-efficacy variable. H_0 is rejected if $F_{count} > F_{table}$, meaning there is a simultaneous influence by the blended learning variable on the self-efficacy variable. To determine the magnitude of the influence of the independent variable on the dependent variable, coefficient of determination analysis is used.

III. RESULTS AND DISCUSSION

RESULTS

Based on the results of the test and questionnaire analysis, the comparison of pretest, posttest, initial and final questionnaire scores was analyzed through N-gain calculations, where the following results were obtained.

Tabel 1. Test of Means N-Gain Self-Efficacy

No	Class	Average	Tcount	t_{table}
1	Experiment	0.658	5.72	1.98
2	Control	0.299		

Based on Table 1, it is known that there is an increase in students' self-efficacy scores. Through testing, the N-Gain value was obtained at 0.658 for the experimental class and 0.299 for the control class, and there was a significant difference in the value as seen through the 5% significance level, the tcount value was greater than the ttable value ($5.72 > 1.98$). To carry out hypothesis testing, there must be a prerequisite for the data to be normally and homogeneously distributed. From the results of the analysis, normal and homogeneous data were obtained, then hypothesis testing was carried out using the t test (independent sample t-test).

Tabel 2. Initial and Final Questionnaire Hypothesis Test Results

Independent Sampel Test		Uji Hipotesis		
		thitung	df	Sig.
Initial Questionnaire	equal variance assumed	0.902	93	0.200
	equal variance not assumed	0.902	92.988	0.09
Final Questionnaire	equal variance assumed	5.72	93	0.00
	equal variance not assumed	5.06	92.619	0.00

Based on Table 2, it is known that the t value from the results of the initial student self-efficacy questionnaire is $0.902 < t$ table 1.98. Meanwhile, for the final questionnaire, the t value was $5.72 > t$ table 1.98.

Tabel 3. Results of Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.811 ^a	.658	.655	1.366

Based on Table 3, it is known that the R-Square value is 0.658, which shows that the influence of the blended learning model on student self-efficacy is 65.8%.

DISCUSSION

Based on the results of the data analysis that has been carried out, the results show that blended learning has an influence on students' self-efficacy in learning mathematics. The material taught in this research focuses on statistics. The implementation of the blended learning model is carried out as an effort to maximize digital-based learning. Before conducting research trials, tests and questionnaires are validated in the form of content validation and construct validation. This trial took the form of a 20-item questionnaire statement filled in by 50 students. Based on the test results, all statement items are valid and reliable. The research results show that there is an increase in the value of the initial questionnaire to the final questionnaire. Self-efficacy indicators show that students have confidence in their abilities. This increase in self-efficacy also shows that by implementing the blended learning model, students tend to have confidence and self-confidence because learning is not only carried out online, but also outside the network. Based on the results of hypothesis testing, the calculated t value from the results of the students' initial SLF-efficacy questionnaire was $0.902 < t$ table 1.98. Meanwhile, for the final questionnaire, the t value was $5.72 > t$ table 1.98. This shows that there is an influence of the blended learning model on students' self-efficacy in learning mathematics. The influence of the blended learning model on students' self-efficacy in learning mathematics is 65.8%.

IV. CONCLUSIONS AND SUGGESTIONS

Conclusions

Based on the results of research using simple regression analysis, it was concluded that there was an influence of the blended learning model on students' self-efficacy in learning mathematics, with the influence of blended learning on students' self-efficacy being 65.8%.

Suggestions

Based on the conclusions of this research, the author suggests that relevant educational institutions be able to facilitate students in implementing blended learning and teachers who teach Mathematics subjects can apply blended learning methods which have been proven to increase students' self-efficacy.

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