

Analysis Of The Effect Of Blended Learning Models Towards Mathematical Student's Problem Solving Abilities And Self-Regulated Learning

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Abstract. A This study aims to determine: (1) the effect of Blended Learning models towards Mathematical Student's Problem Solving Abilities and Self-Regulated, (2) the improvement of student's mathematical problem solving and self regulated learning (3) the advantages of the advantages and disadvantages of blended learning model. This type of research includes descriptive qualitative research using library research methods. The data in this study were obtained from a collection of literature such as theses and journals that are relevant to the topic of discussion, namely Mathematical Student's Problem Solving Abilities And Self-Regulated. The results show that, 1) Blended Learning Model has a great effect on students' problem solving abilities based on the overall effect size calculation which produces an average effect size of 1.56 where this number is included in the high category and Blended Learning Model has a great effect on student's self-regulated based on the overall effect size calculation which produces an average effect size of 1.73 2) There is an increase in mathematical the student's problem solving abilities and self-regulated learning that are taught through blended learning models. This can be seen from the achievement of N-Gain value and indicators in the experimental class in the literature which is generally better than the control class. 3) Based on the analysis, it was found that the advantages and disadvantages of blended learning. it can be obtained that the advantages of blended learning models as follows: (a) Learning is more effective and efficient, (b) Improve accessibility. with blended learning, it is easier for learning participants to access material learning. and disadvantages of blended learning is Not evenly distributed facilities owned by students, such as computers and internet access. Even though blended learning requires adequate internet access, if the network is inadequate it will make it difficult for participants to take part in independent learning via online.

Keywords: *Blended Learning, Problem-Solving Abilities, Self-Regulated Learning*

INTRODUCTION

Education has a very important role in the life of the nation and state so that through education, intelligent and competent future generations will be formed in their fields so that the quality of human resources increases and the condition of the nation can change for the better. That is, it is very important to improve the quality of education in Indonesia, so that through quality education, the Indonesian nation can have individuals who are ready to respond to changing times and can become a developed country.

Mathematics is a universal science that underlies the development of modern technology, has an important role in various disciplines and advances the power of human thought. Countries that ignore mathematics education as a top priority will be left behind from progress in all fields, especially science and technology. This is in line with what

was stated by Hudoyo (1979) that the role of mathematics in the world today is very dominant, because 60% to 80% of the progress achieved by developed countries is very dependent on mathematics.

Based on the explanation, the mathematical problem solving ability is very important for students to have. Mathematical problem solving skills are very useful for students, not only in solving mathematical problems but also in solving problems in everyday life. Problem solving ability is not something that is easily found by students so students must train to develop these abilities. To develop these abilities, the learning processes and strategies applied must be able to help students understand problems, plan problem solving, find solutions and be able to draw conclusions from solving these problems.

Ulya (2016) reveals, problem solving ability is the ability to use self-understanding to solve new problems in different situations. Furthermore, Aqib (2013) revealed, problem-solving abilities, namely individual skills to reason problems, develop alternatives and apply alternatives to solve problems. A similar opinion was also expressed by Polya (in Hartono, 2014) namely, problem solving ability is a mental activity that is carried out since students understand the problem, make plans, carry out plans, and look back at problem solving. Referring to this explanation, problem-solving ability has the meaning of an ability to organize concepts, facts, and connect previous knowledge, and to use reasoning skills to solve problems.

Self-regulated is a learning skill which in the individual learning process is encouraged, controlled, and assessed by the individual self in learning mathematics because of the curriculum demands so that students can face problems in the classroom and outside the classroom which are increasingly complex and reduce students' dependence on other people in everyday life (Fauzi, 2011). However, currently the reality is that learning independence has not been socialized and developed among students, they assume that teachers are the only source of knowledge, causing students to have dependence on other people, especially teachers.

The Blended Learning model is a learning activity that combines face-to-face learning in class with learning activities using the internet (Rosmiati et al., 2013). According to Sjukur (Aprilia, 2015) said that Blended Learning is a combination of traditional learning and an electronic learning environment. Blended Learning combines

aspects of web/internet-based learning, video streaming, synchronous and asynchronous audio communication with traditional or face-to-face learning. Blended Learning is basically a combination of the advantages of learning that is carried out face to face (face to face learning) and virtually (e-learning).

Blended learning integrates innovative learning by utilizing technological advances in the form of online learning and increasing student positive participation than ordinary learning. Where they are possible to be in a different world, but can give each other feedback, ask questions, answer, interact between students and educators or between students and students. Among the advantages of Blended learning is being able to make a positive contribution to students.

LITERATURE REVIEW

Analysis

According to Sugiyono (2015), analysis is an activity to look for patterns, or ways of thinking related to systematic testing of something to determine parts, relationships, between parts, and their relationship to the whole. According to Satori and Komariyah (2014), analysis is an attempt to break down a problem into parts so that the arrangement is clear and then the meaning can be grasped or the problem is understood.

Analysis is a research method used to determine the tendency of content. In the perspective of quantitative methodology, content analysis is a variable, while in qualitative methodology, content analysis is close to data analysis methods and text interpretation methods (Ahmad, 2018) Data analysis in qualitative research starts from formulating and explaining the problem, before going into the field and continuing until the writing of research results (Sugiyono, 2015). In this study, the analysis aims to analyze the results of thesis and journal research using the literature study/library research method.

Blended Learning Model

Etymologically the term blended learning consists of two words, namely blended and learning. The word blend means "a mixture, together to improve quality so that it gets better", or the formula of a combination or combination alignment (Heinze and Procter, 2006), while learning has a general meaning, namely learning, with Thus at first glance it implies a learning pattern that contains elements of mixing, or merging between one

pattern and another. "This Blended Learning learning model is a combination of various learning models aimed at optimizing learning processes and services, both distance, traditional, mediated, and even computer-based" (Darmawan, 2016: 21).

Kurtus (in Istiningsih & Hasbullah, 2015) states that "Blended Learning is a mixture of the various learning strategies and delivery methods that will optimize the learning experience of the user" (p. 51). It states that Blended Learning is a mixture of various learning strategies and delivery methods that will optimize the learning experience for its users. From the definitions of these experts, it can be concluded that blended learning is the mixing of two or more strategies or learning methods to get the expected learning outcomes.

Self-Regulated Learning

The term self-regulated comes from the basic word self which gets the beginning "ke" and the suffix "an", then forms a state word or noun. Desmita (2014) says that the word independence comes from the word self, so the discussion of independence cannot be separated from the development of oneself. Self-regulated is an attitude not to depend on others in learning activities, accompanied by persistence in business, freedom to make their own choices, having initiative, acting effectively on their environment, and consequently in achieving the expected goals (Aziz and Basry, 2017).

Self-regulated learning is a proactive process by which students acquire academic skills, such as setting goals, selecting and implementing strategies, and monitoring their effectiveness (Eliserio, 2012). Students are said to have independence if they take the initiative to learn, can determine their own destiny, diagnose learning needs, are creative, and take initiative in utilizing learning resources and choosing learning strategies as well as monitoring, regulating, and controlling learning (Lestari and Yudhanegara, 2015). It can be seen that learning independence is a condition of an individual or self-reflection in his learning activities.

RESEARCH METODOLOGY

Type of Research

This research is a qualitative research which is library research. Library research is a series of activities related to collecting library data, reading, and recording and processing research materials, is a research that utilizes library resources to obtain research data.

Method of Research

The method used in this research is library research. Library research is a series of activities related to the method of collecting library data, reading and recording and processing research materials.

Location and Time of Research

This research was carried out at the Digital Library of the State University of Medan which has literature sources regarding the problems contained in this research. In addition to the library, this research is also carried out in college, at the researcher's house, and in various places that have sources of literature and information that are relevant to the research topic. This research was conducted in June – July 2022 to collect data, process data, analyze data, to draw conclusions from the problems in the research.

Types and Source of Data

In this study the researchers used secondary data because the authors found it difficult to find primary data sources, the authors used existing references and were aware that this research was very important.

In this type of research, the knowledge, ideas, or findings contained in the literature are examined to provide theoretical and scientific information related to the trend of the influence of the blended learning model on students' mathematical problem-solving abilities. the tendency of the influence of the blended learning model on students' self regulated-learning. the research methods used include data sources, data collection, and data analysis.

Instrument of Research

According to Sugiyono (2017) in qualitative research, the main instrument of the researcher is the researcher himself or as a human instrument whose function is to determine the focus of research, select informants as data sources, assess data quality, analyze data, interpret data and draw conclusions from their findings. In this study,

researchers recorded information to identify how influence was generated by the Analysis of effect of Blended Learning model towards students' mathematical problem solving abilities and self-regulated learning and analyze the advantages and disadvantages of the Blended Learning learning model .

Procedure of Research

There are several stages to be carried out in this research, namely :

- First, collect research materials,
- Second, reading the material that has been collected,
- Third, make a note,
- Fourth, namely,

Data Validity Technique

In qualitative research, researchers need to validate the data and check the data again before it is processed in the form of a presented report. So that there is no mistake, the researchers tested the credibility of the data. The data credibility test conducted by the researchers here uses triangulation. Triangulation is a data collection technique by combining various data sources that have been obtained.

Data Analysis Technique

In qualitative research, conceptualization, categorization, and description are developed on the basis of the "events" obtained when fieldwork takes place. Therefore, it is not possible to separate data collection and data analysis from one another. Both take place simultaneously, the process is cyclical and interactive, not linear. Miles and Huberman (1992) describe the process of analyzing qualitative research data consisting of three activities that occur simultaneously, namely data reduction, data display, and make conclusions/verification.

RESEARCH AND RESULT

The research carried out is a literature study (library research), so that the results of the research and discussion in this study contain data that are in accordance with relevant research topics, namely the influence of students' mathematical problem solving abilities through the blended learning model, the influence of student learning independence through the blended learning model learning and the advantages and disadvantages of blended learning learning models. The stages that will be carried out are

data collection, data reduction, data presentation and drawing conclusions. At the data collection stage the researcher will collect journals related to increasing problem-solving abilities with the blended learning model, and student learning independence with the blended learning model.

Collecting Data

In this research, the researcher determines the search area for accredited journal articles Sinta (Science and Technology Index) S1- S5 and Google Scholar and Thesis The journal to be taken must have the following criteria:

- The year of publication of the journal and thesis is 2016-2021
- Middle school and high school level
- Location in Indonesia
- The method used is Experimental and Quasi-Experimental
- Research objectives relevant to the research topic.

As a result, before using the moodle-based blended learning model, 13 students had high self-regulated learning abilities, 19 students had moderate abilities and 3 students had low abilities. After using the Moodle-based blended learning model, there were no students with low abilities, 30 students with high abilities and 5 students with moderate abilities. Furthermore, statistically the ability of self-regulated learning of different students is higher than before. With this shows, there is a large influence as well as opportunities for positive influence. Thus, learning to use a moodle-based blended learning model is effective in increasing the ability of self-regulated learning at a moderate level of effectiveness.

Based on the formulation of the first problem, namely how the effect of blended learning models towards mathematical student's problem solving abilities and self-regulated. There are 10 literatures that the researchers have collected that discuss the Blended Learning model on students' mathematical problem solving abilities and from the 10 literature there are 8 journals that are relevant to the research formulation that discusses problem solving abilities. The data the researchers obtained from search results on various sites of accredited national and international journals. So it can be concluded that *blended learning* has a big influence on towards mathematical student's problem solving abilities and self-regulated learning.

Based on the formulation of the second problem, namely how to increase the students' problem solving abilities and self-regulated learning that are taught using blended learning. This can be seen from the results of the increase based on the N-Gain value and based on the indicators in the journal selected as the data source. So it can be concluded that there is an increase in mathematical students' problem solving abilities and self-regulated learning who are taught through blended learning model.

Based on the formulation of the third problem about the advantages and disadvantages of learning by blended learning in mathematics. Therefore, it can be obtained that the advantages of blended learning are as follows :

- Learning occurs independently and conventionally, both of which have advantages that can complement each other. Learning is more effective and efficient.
- Learning occurs independently and conventionally, both of which have advantages that can complement each other.
- Improve accessibility. with Blended Learning, it is easier for learning participants to access material learning.

CONCLUSION

Based on the results and discussions that have been described, the following conclusions are obtained:

1. *Blended Learning* Models has a great influence on students' problem solving abilities based on the overall effect size calculation which produces an average effect size of 1.56 where this number is included in the very high category.
2. *Blended Learning Models* has a great influence on students' self-regulated learning based on the overall effect size calculation which produces an average effect size of 1.73 where this number is included in the very high category.
3. There is an increase in the students' problem-solving abilities and self regulated learning that are taught through *Blended Learning*. This can be seen from the achievement of indicators in the experimental class in the literature which is generally better than the control class.
4. Some of the advantages of blended learning that have been analyzed are as follows:

- a. Learning occurs independently and conventionally, both of which have advantages that can complement each other.
 - b. Learning is more effective and efficient.
 - c. Improve accessibility. with Blended Learning, it is easier for learning participants to access material learning
5. Some of the disadvantages of blended learning that have been analyzed are as follows:
- a. Not evenly distributed facilities owned by students, such as computers and internet access. Even though Blended Learning requires adequate internet access, if the network is inadequate it will make it difficult for to take part in independent learning via online.
 - b. Lack of public knowledge towards the use of technology.

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