The Influence of Learning Mathematics in Online Learning on The Results of Mid-Semester Assessment

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ABSTRACT

This research is a quantitative analytical survey research with an explanatory method in which the researcher attempts to explain to what extent the effect of learning mathematics on the results of mid-semester assessments for class VIII students in one of the junior high schools in Tangerang Regency. The sample of this research is students in class VIII. The sample selection was done randomly by taking 31 students from a total of 70 students. In collecting data related to student learning, we distributed a simple questionnaire by google form and to obtain data on the results of the mid-semester assessment of our students, we collaborated with the mathematics teacher in charge of the school. The results of this study stated that the way students learn in learning mathematics, especially in online learning, is said to have an effect of 11.45% on the results of the students' midterm assessment. The way to learn in online learning is divided into four sub categories of learning methods, including: how to take math lessons online, how to learn math independently at home, how to study math textbooks, and how to face math exams. Of these four sub-categories, three of them are in the good category in their implementation, while the sub-category of how to learn in online learning is in the sufficient category which indirectly means that there is still a need for re-evaluation related to the mechanism for implementing mathematics online learning.

Keywords: How to Learn Math, Midterm Assessment, Online Learning

Introduction

The Covid-19 case in Indonesia has had a major impact on the Indonesian education system. Learning that should be done face-to-face directly becomes distance learning or online learning. However, after two years of fighting against the Covid-19 pandemic, the learning system in the world of education can finally be carried out through face-to-face learning and online learning (Hybrid Learning). This is based on the decision of the Ministry of Education and Culture (Kemendikbud) which has allowed schools to carry out limited face-to-face learning.
As it is known that learning is an activity or the most important main activity in an educational process. Without learning, education will never exist (Istiadah, 2020, p. 7). It is stated that learning is a complex internal process that includes all mental aspects, including the cognitive, affective, and psychomotor areas. W. H. Buston also suggests that learning is a process of changing individual behavior towards other individuals or their environment. Each learning activity has its own purpose. Learning objectives are something to be achieved in every learning activity (Suardi, 2018).

Learning is a process in humans in making changes, by showing a change in the form of increasing the quality and quantity of one's behavior or behavior such as in communication, knowledge, attitudes, habits, understanding, skills, mindset, thinking power and others (Hakim, 2005). Another opinion was stated by Sagne that learning is a process of changing the nature of the environmental simulation cognitively by passing information processing into new compatibility in the form of skills, attitudes, knowledge, and values (Suardi, 2018). This is related to the opinion of Sardiman A.M (2016) which states that the purpose of a learning activity is to gain knowledge, skills, character growth or values (Sadirman, 1988).

In the process of achieving the learning objectives that have been formulated, each student has their own way to achieve them. This is because each student must have different characteristics and ways of learning, so that in the process of receiving information, processing that information and remembering information is also different (Widayanti, 2013). This is also stated in the research (Nurhayati & Subekti, 2017) that in the learning process each student must have their own characteristics that are different from the others as well as in various aspects. In addition (Ernita & Fatimah, 2016) also states that each student has a different way of learning with other students both in the physical aspect, mindset, and how to respond or learn and understand something new. One of them is in Mathematics learning.

In Mathematics learning, each student has a different way of learning in accepting each material and understanding the mathematical concepts learned to achieve learning goals. Mathematics online learning also allows students to formulate selected learning strategies and methods so that each learning goal can be achieved. According to research (Ernita & Fatimah, 2016) explained that Suryabrata put forward the notion of how to learn, that is the path chosen and taken by someone in a way to achieve learning goals and these ways become a habit for those who live them. In Mathematics online learning, of course, every student must have their own path to achieve the goal of Mathematics learning. This is done by students so that the results obtained in the learning process can be in accordance with the objectives of Mathematics learning.

Given that the success of achieving learning and learning objectives is determined by the learning method, to see whether the learning activities and educational processes have succeeded in achieving the objectives or not (Ernita & Fatimah, 2016). Then an effective way of learning can determine student success in the learning process and get good learning outcomes. Because whether or not learning outcomes are achieved can be seen from student learning outcomes (Mulasari et al., 2020). Learning outcomes are a measure that becomes a benchmark to be able to see whether or not students are successful in receiving and
understanding the material after carrying out learning activities obtained by conducting evaluations, and the quality of success obtained from tests at the end of learning (Paba et al., 2020).

The learning outcomes referred to in this study are the learning outcomes obtained in Mathematics learning from the results of the evaluation of the mid-semester assessment for class VIII in the form of academic ability in Mathematics learning which is carried out online in achieving the standards of mathematics learning objectives that have been set after students participate in learning activities.

In responding to the challenges of the world of education during the Covid-19 pandemic, Hybrid learning is one of the effective solutions to be applied in every school (Sowanto et al., 2019). However, in practice, of course, it is necessary to consider the systematics or flow of hybrid learning in each school. One thing that still needs to be considered in implementing this learning system is an effective learning media in the online learning process. Online learning is one of the learnings contained in hybrid learning. Online learning is still a challenge for every teacher and educational institution to keep creating a comfortable and good learning space for students. Effective learning media will certainly help and facilitate students in the process of teaching and learning activities.

Research Methods
The type of this research is a quantitative analytical survey research with an explanatory method where the researcher seeks to find a causal relationship that occurs between the learning methods of class VIII students in one of the junior high schools in Tangerang Regency with the results of the mid-semester assessment obtained by students. The sample of this research is students in class VIII. The sample selection was done randomly by taking 31 students from a total of 70 students.

In collecting data, the researcher distributed a simple questionnaire through a Google Form. Students who became the research sample were given a google form link and instructed to answer questions honestly. This google form in the form of a Likert Scale for positive statements and negative statements with four answer choices (always, often, sometimes and never) to state the level of truth of the statement given and these results will later be converted into numbers that will be processed using Ms. Excel. The questionnaire in this google form was created and distributed to 31 students in order to obtain data on the results of questions about how students learn mathematics in bold learning. Then, in order to obtain data on the results of the mid-semester assessment, we collaborated with teachers in mathematics at the school.

This study uses descriptive statistical data analysis techniques that include the lowest score (min score), the highest score (max score), the mean (M), median (Me) and standard deviation (SD). The variables in this study were made into a frequency table in which the scores were divided into interval classes. The classification of criteria is based on the benchmark guidelines according to Handoko Riwidikdo (Rokhmah, 2014) which is presented in table 1.

This study also used inferential statistical analysis with a simple regression analysis approach with one independent variable (how to learn mathematics in online learning) and one dependent variable (students’ midterm assessment results). This simple regression analysis test was conducted to determine whether the two variables influence each other or not. We carry out a
set of tests ranging from data normality tests, linearity tests to hypothesis testing to prove whether the way of learning mathematics, especially in online learning, affects students' midterm exam assessment results. Inferential statistical analysis is a type of analysis used to predict whether the regularity patterns available in the study sample class can also apply to the study population class (Burhan, 2013). In data processing we use Ms. Excel and SPSS (Statistical Package for the Social Science).

Table 1. Table of Category Determination

| Scale                             | How To Learn In Online Learning | Midterm Results |
|-----------------------------------|---------------------------------|-----------------|
| Skor min ≤ X ≤ Mean – 1,5 SD      | Less                            | Less            |
| Mean – 1,5 SD < X ≤ Mean          | Enough                          | Enough          |
| Mean < X ≤ Mean + 1,5 SD          | Good                            | Good            |
| Mean + 1,5 SD < X ≤ skor max      | Excellent                       | Excellent       |

Result and Discussions

The description of the data that has been obtained and processed by the researcher includes the lowest score (Min), the highest score (Max), Median (Me), the average value (Mean) and standard deviation (SD). Here are the results of the descriptive analysis of the independent variables in the form of how to learn mathematics in online learning and the dependent variable in the form of mid-semester assessment results or MIDTERM results. These data are presented in table 2 below.

Table 2. Table of Research Variable Statistical Data

| Parameter      | How to Learn in Online Learning | Midterm Results |
|----------------|---------------------------------|-----------------|
| Min            | 58,594                          | 25              |
| Max            | 91,146                          | 64              |
| Mean           | 76,550                          | 32,613          |
| Standard Deviation | 8,571                        | 10,613          |

The value of each parameter for the learning method column is the cumulative value of the four existing sub-categories. If we look at the data above, we will find a fairly large difference from the average value for the two categories, as well as the minimum and maximum values that exist. But on this research, we will not discuss this difference because the instruments used to obtain this data are also different.

For the learning method category, we obtained data from the questionnaire results in the form of a Likert scale with positive and negative statements which we distributed to students, while in the mid-semester or MIDTERM assessment results we obtained this value from the teacher in charge of mathematics in the class directly. The data that we process into the form of numbers are all in the same range with the lowest possible value of 0 and the highest possible value of 100. The distribution of data on the results of the mid-semester assessment is also much more spread away from the average value than the data on the category of learning methods, this can...
be seen from the larger standard deviation in the category of mid-semester assessment results. This standard deviation represents the data we have is good or bad. This is because of the standard deviation shows whether the distribution of the data is away from or close to the average value, where it is said that the data is good if the standard deviation is small because the data held moves closer to the existing average value (Aden et al., 2019).

As we all know, the category of how to learn mathematics in online learning that we are discussing today has four sub-categories. The following table 3 provides an explanation of how learning in online learning occurs in four main sub-categories.

| Parameter       | How to Learn Online | How to Study at Home | How to Study Math Books | How to Take the Exam |
|-----------------|---------------------|----------------------|-------------------------|----------------------|
| Min             | 10,471              | 17,708               | 7,292                   | 12,500               |
| Max             | 20,833              | 35,417               | 19,792                  | 19,792               |
| Mean            | 16,532              | 28,293               | 12,433                  | 16,230               |
| Standar Deviasi | 2,673               | 4,202                | 3,238                   | 2,148                |

From these four sub-categories, we give several negative and positive statements with four choices of answer statements in the form of statements always, often, sometimes and never. Each answer represents a score from 1-4. Respondents’ answers that have been converted into numerical form are then processed and produce the descriptive statistical data above. These data then provide results reflecting the good or bad category of the existing sub-category of learning methods. The following table are the results of data categorization that has been carried out which can be briefly presented in tables 4 to 7 below.

| Parameter | Interval       | Frequency | Percentage |
|-----------|----------------|-----------|------------|
| Excellent | X > 20,541     | 1         | 3%         |
| Good      | 16,532 < X ≤ 20,541 | 19    | 61%        |
| Enough    | 12,523 < X ≤ 16,532 | 6      | 19%        |
| Less      | X ≤ 12,523     | 5         | 16%        |

In this category, the researcher gives five statements including how students like math lessons which are considered to have many formulas to memorize, how students get bored or feel sleepy during online math lessons, do students take notes on the material presented by the teacher, then do students do the exercises themselves or copy the answers to practice questions belonging to friends. From these statements, most of the students fall into the good category in participating in online learning.

Students also fall into the good and sufficient category in the sub-category of how to learn at home in online learning as described in table 5. In this sub, the researcher gives nine statements related to how students study at home, starting from whether students have a schedule for studying mathematics at home, whether students only study mathematics when there are only...
assignments/homework, do students learn only when asked by their parents, and so on. In this category the researcher focuses on how students have a habit of online learning at home after school online learning hours.

**Table 5.** Table Categories and Frequency of Sub-Category Data

| How to Study at Home | Parameter Interval | Frequency | Percentage |
|---------------------|--------------------|-----------|------------|
| Excellent           | X > 34,596         | 1         | 3%         |
| Good                | 28,293 < X ≤ 34,596| 14        | 45%        |
| Enough              | 21,990 < X ≤ 28,293| 14        | 45%        |
| Less                | X ≤ 21,990         | 2         | 6%         |

Based on table 6, as many as 48% of students also counted well in the sub-category of how to study mathematics textbooks. Where in obtaining this data, the researchers gave five statements related to how they studied mathematics textbooks. Starting from whether they can quickly understand their math books independently, whether they prefer reading math books than comics/magazines, and so on.

**Table 6.** Table Categories and Frequency of Sub-Category Data

| How to Study Math Textbook | Parameter Interval | Frequency | Percentage |
|---------------------------|--------------------|-----------|------------|
| Excellent                 | X > 17,290         | 2         | 6%         |
| Good                      | 12,433 < X ≤ 17,290| 15        | 48%        |
| Enough                    | 7,576 < X ≤ 12,433 | 13        | 42%        |
| Less                      | X ≤ 12,433         | 1         | 3%         |

Finally, based on table 7 in this fourth sub-category, we get results that are both good for the good category and sufficient on students' habits in taking math exams. The researcher gave 5 statements that they felt could represent how the students' habits in taking exams in online times like this were. Students are asked to explain with answers in the form of choices on a Likert scale about how students try to do their own exams, do students feel anxious when they see the test questions are difficult, do students feel normal when they get bad results and so on.

**Table 7.** Table Categories and Frequency of Sub-Category Data

| How to Take a Math Exam | Parameter Interval | Frequency | Percentage |
|-------------------------|--------------------|-----------|------------|
| Excellent               | X > 19,452         | 2         | 6%         |
| Good                    | 16,230 < X ≤ 19,452| 14        | 45%        |
| Enough                  | 13,008 < X ≤ 16,230| 13        | 42%        |
| Less                    | X ≤ 13,008         | 2         | 6%         |

Categorization of data is adjusted to the benchmark guidelines for determining categories according to Handoko Riwidikdo as explained in the previous methodology chapter. From these four sub-categories, we can conclude that the way students learn in online learning is included in the good category. Where every student continues to follow online learning well and provides good study time at home as well. If we look at how students use mathematics textbooks in
learning and how students take math exams, we also find in the table that this category is considered good.

There are many kinds of student learning methods, but in this study the researcher only refers to these four sub-categories. Overall, from these four categories, we got the results of how to learn in online learning which are presented in table 8 as follows:

| Parameter | Interval               | Frequency | Percentage |
|-----------|------------------------|-----------|------------|
| Excellent | X > 89,406             | 3         | 10%        |
| Good      | 76,550 < X ≤ 89,406    | 11        | 35%        |
| Enough    | 63,694 < X ≤ 76,550    | 13        | 42%        |
| Less      | X ≤ 63,694             | 4         | 13%        |

The table above is the result of the overall processing of the respondent's data related to how to learn in online learning, from the table we can conclude that online learning is quite good and the distribution of the data is also good.

From the various things discussed in the way of learning earlier, the researchers also focused on the results of the data obtained from the mid-semester assessment or MIDTERM obtained by students. Where this is the dependent variable in this study. The results of categorizing students' MIDTERM scores are found in table 9 as follows:

| Parameter  | Interval            | Frequency | Percentage |
|------------|---------------------|-----------|------------|
| Excellent  | X > 48.533          | 4         | 13%        |
| Good       | 32.613 < X ≤ 48.533 | 6         | 19%        |
| Enough     | 16.693 < X ≤ 32.613 | 21        | 68%        |
| Less       | X ≤ 16.693          | 0         | 0%         |

The results of the assessment obtained by students are said to be sufficient, not in the good or very good category. However, according to a survey conducted on how to learn in online learning, it was found that this score is a pure student score because students tend to complete their own exams.

The form of assessment carried out is a test assessment with questions in the form of description questions and short questions. The material tested in class VIII is the matter of saying power, sets, Cartesian coordinates, and function relations. This exam is conducted offline at school. So that the subject teacher can directly supervise the exam.

From the data obtained on two variables in the form of learning methods in online learning and the results of the student's midterm assessment, then the researchers conducted an analysis test starting from the data normality test, linearity test to hypothesis testing in order to find out how much influence the independent variable in the form of learning in online learning had. on the results of the mid-semester assessment of class VIII students. This is based on Sugiyono's
opinion (2010: 209-210) which says that inferential statistics are statistics used to analyze sample data and the results are applied to the population. Based on this, Riduwan (2011: 119) said that the analysis prerequisite test needs to be tested for normality and linearity tests in order to test correlation and regression in hypothesis testing later.

Normality test is used to determine whether the data on each variable has a normal distribution or not. This test uses the Kolmogorov-Smirnov test with the help of SPSS. The data in this study is said to be normal because it has a significance value of more than 0.05 when calculated using a 95% confidence level. In this case, a significance value of 0.206 was obtained as shown in Figure 1 below.

![Figure 1. Normality Test Results](image)

After performing the normality test, we then conducted a linearity test which aims to determine whether two variables have a linear relationship or not significantly. With the same level of confidence of 95%, the results of the linearity test are obtained as follows:

![Figure 2. Linearity Test Results](image)
Based on Figure 2 which presents the results of the linearity test, there is a significant linear relationship between the two variables tested in this study. Variable X in the above calculation is a way of learning in online learning and variable Y is the result of the mid-semester assessment. Dwi Priyatno said 2 variables were said to have a linear relationship if their significance was less than 0.05. In the calculations that have been done, the result is 0.017. This shows that there is a significant linear relationship between the two tested variables.

Then the next step is to test the hypothesis related to this research. Simple regression analysis was conducted to determine the effect of the independent variable how to learn in online learning on the dependent variable of the mid-term assessment results. H0 in this research is how to learn mathematics in online learning does not affect the results of the mid-semester assessment for class VIII and Ha in this study is how to learn mathematics in online learning has an effect on the results of the mid-semester assessment for class VIII.

Hypothesis testing with simple regression analysis was carried out with the help of MS. Excel. The results of the model reliability test (F test) with simple regression analysis are presented in Figure 3 which contains the ANOVA (Analysis of Variance) table as follows:

| Source    | df | SS       | MS       | F         | Significance F |
|-----------|----|----------|----------|-----------|----------------|
| Regression| 1  | 486,848,9616 | 486,848,9616 | 4,881103267 | 0,035205203     |
| Residual  | 29 | 2892,505877   | 99,74158197  |            |                |
| Total     | 30 | 3379,354839   |          |           |                |

From the table above, a significance value of 0.035 is obtained where this value is smaller than 0.05. So, it is true that based on this it is concluded that H0 is rejected and Ha is accepted. In other words, it is true that the way of learning mathematics in online learning affects the results of the midterm assessment.
Based on the results of the regression analysis in Figure 4 above, it is shown that there is a positive correlation between x and y of 0.37 with the coefficient of determination indicated by the adjusted R square value above 0.1145. This means that there is an effect of learning methods in online mathematics learning on the results of the mid-semester assessment of 11.45%. The correlation value and the coefficient of determination are considered low. That is, the factor of how to learn mathematics in online learning does affect the results of the mid-semester assessment but only by 11.45%, the rest may be influenced by other factors not examined in this study.

Other factors that affect learning outcomes or student assessment results include math anxiety and self-concept. This is in accordance with previous research conducted in a journal by Atmojo & Ibrahim in 2021. In addition, relevant research related to learning outcomes has also been carried out by Trisniawati (2021) and a journal by Susanto & Khasanah (2017).

This strengthens the results of our research that it is not only the way of learning mathematics in online learning that affects the results of the midterm assessment or the results of student learning assessments, there are many influencing factors. Among them were math anxiety, self-concept, student independence, student attitudes, the learning system used and others.

**Conclusion**

From a simple regression test, a significance value of 0.035 was obtained, which means less than 0.05, so it can be concluded that there is an influence on how to learn mathematics in online learning on the results of the mid-semester assessment for class VIII. The contribution of the variable how to learn mathematics in online learning to the mid-semester assessment result variable is 11.45%. So, the remaining 88.55% is another factor that affects the results of the math mid-semester assessment.

Suggestions for further research are to explore what affects the results of the midterm mathematics assessment in addition to how to learn mathematics in online learning, math anxiety, self-concept, student independence, student attitudes, and the learning system used so that later we can find out how much influence each one has. this factor in the results of the students' mathematics midterm exams.

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