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# ANALYSIS OF STUDENTS' UNDERSTANDING OF CONCEPTS AND LEARNING INDEPENDENDENCE IN TERMS OF STUDENT LEARNING MOTIVATION ASSISTED BY MACROMEDIA FLASH

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**Abstract**

This research aims to: (1) To find out whether there is a difference in students' ability to understand concepts between students who were given Macromedia Flash media and students who were given Power Point media (2) To find out whether there is a difference in students' independent learning abilities between students who were given Macromedia Flash media. with students who were given power point media. This type of research is a quasi experiment. This research was carried out in SMA Kesatuan Meranti in the even semester of the 2021/2022 academic year. The results of the research show that: 1) There is a difference in students' ability to understand concepts between students who were given Macromedia Flash media and Power Point media, where the application of Macromedia Flash media was better than students who received Power Point media for their ability to understand concepts; 2) There is a difference in students' independent learning abilities between students who were given Macromedia Flash media and Power Point media, where the application of Macromedia Flash media was better than students who received Power Point media for students' independent learning abilities; 3) There is an interaction between learning media and student learning motivation which is used on students' ability to understand concepts; 4) There is no interaction between learning media and student learning motivation which is used on students' independent learning abilities.

**Keywords**: concept understanding ability, student learning independence, student learning motivation

**Abstrak**

Penelitian ini bertujuan untuk: (1) Untuk mengetahui apakah terdapat perbedaan kemampuan pemahaman konsep siswa antara siswa yang diberi media *macromedia flash* dengan siswa yang diberi media power point (2) Untuk mengetahui apakah terdapat perbedaan kemampuan kemandirian belajar siswa antara siswa yang diberi media *macromedia flash* dengan siswa yang diberi media power point. Jenis penelitian ini adalah eksperimen semu (*quasi experiment)*). Penelitian ini dilaksanakan di SMA Kesatuan Meranti pada pada semester genap Tahun Ajaran 2021/2022. Hasil penelitian menunjukkan bahwa: 1) Terdapat perbedaan kemampuan pemahaman konsep siswa antara siswa yang diberi media macromedia flash dan media power point, dimana penerapan media *macromedia flash* lebih baik daripada siswa yang memperoleh media power point untuk kemampuan pemahaman konsep; 2) Terdapat perbedaan kemampuan kemandirian belajar siswa antara siswa yang diberi media *macromedia flash* dan media power point, dimana penerapan media *macromedia flash* lebih baik daripada siswa yang memperoleh media power point untuk kemampuan kemandirian belajar siswa; 3) Terdapat interaksi antara media pembelajaran dan motivasi belajar siswa yang digunakan terhadap kemampuan pemahaman konsep siswa; 4) Tidak terdapat interaksi antara media pembelajaran dan motivasi belajar siswa yang digunakan terhadap kemampuan kemandirian belajar siswa.

**Kata kunci:** kemampuan pemahaman konsep, kemandirian belajar siswa, motivasi belajar siswa.

## INTRODUCTION

Mathematics has a significant role in human life, especially in education. So that mathematics is a subject that is taught from elementary school level to college affairs to help students to have the ability to solve problems critically, carefully, effectively and

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efficiently. Maths is still a scary subject for some students who learn it and is considered a difficult subject because it always deals with numbers, formulas, and counting. Maths requires concentration of the mind to recall material that has been learned, so that students are able to master the concept of the material.

In learning mathematics, concept understanding is a very important foundation for thinking in solving problems in mathematics. Kesumawati (Ismawati et al., 2019) stated that 'students are said to understand concepts if students are able to define concepts, identify and give examples or non-examples of concepts, develop mathematical connection skills between various ideas, understand how mathematical ideas are interrelated with each other so that a comprehensive understanding is built, and use mathematics in contexts outside of mathematics.

According to Depdiknas (Arifah & Saefudin, 2017) concept understanding is one of the mathematical skills or proficiencies that are expected to be achieved in learning mathematics, namely by showing an understanding of the mathematical concepts they learn, explaining the relationship between concepts and applying concepts or algorithms flexibly, accurately, efficiently, and precisely in problem solving.

The ability to understand mathematical concepts is very important because in addition to being one of the objectives of learning mathematics, the ability to understand concepts can also help students not just memorise formulas, but can really understand what is the meaning in learning mathematics (Mathematics, 2022). Based on the explanation explained above, it can be seen that the ability to understand concepts is a very important ability for students to have, this is because so that students can provide explanations and arguments for solving mathematical problems that they have obtained, so that students are not confused by what they have solved.

However, the reality that occurs today is that the ability to understand mathematical concepts is still relatively low. This is also as stated by Sari (Ismawati et al., 2019) that the low ability to understand student concepts is due to students who are less active and lack the initiative to learn the lessons themselves. Based on the explanation above, the researcher decided to conduct an initial observation test which aims to measure students' initial concept understanding ability. There are several questions given to students, each of

which measures indicators of students' mathematical concept understanding ability. This is shown from the results of the initial observation test as follows:

Here is one example of a low ability student's answer in solving problem number 1.

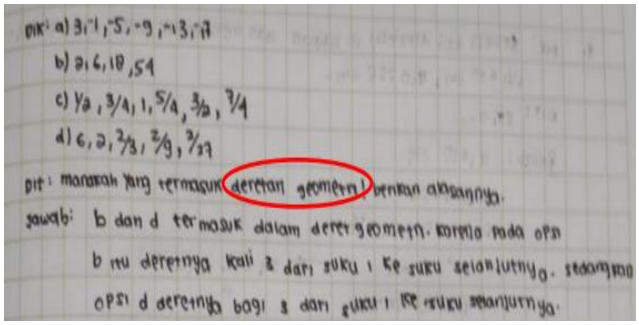


Figure 1 Student Answers with Indicators of Determining Examples and Non-Examples

In the picture problem above, given some arithmetic rows and geometric rows, on the student's answer sheet only states the geometric series only while the question instructions are about the concept of rows not the concept of series. After the researcher conducted an interview, it was found that students misunderstood the difference between the concept of arithmetic and geometric rows and the concept of arithmetic and geometric series.

Based on the results of observation tests that have been carried out in class X SMA Kesatuan Meranti, it is obtained that the ability to understand mathematical concepts of students is still low in several indicators of concept understanding ability. In class X SMA Kesatuan Meranti with a total of 30 students, this ability can be seen from the way they restate a concept that has been learned by 9 students (30%), giving examples and non-examples of a concept by 6 students (20%) and linking various mathematical concepts by 12 students (40%), as well as students who do not understand completing the assigned task by 3 students (10%).

In addition to the above factors that cause low concept understanding ability, student learning independence also needs to be considered. Understanding of mathematics concepts and student learning independence are interrelated. Active student learning activities and being able to master mathematics lessons well also come from student learning independence. Learning independence is a condition where learning activities are independent and do not depend on others, have the will and responsibility for themselves in solving their learning problems. Learning independence is realised if students can actively

control themselves from everything that is done, evaluate and then can plan something from everything that is done, evaluate and then can plan something more from the learning that has been passed and students can also be active in the learning process. The learning independence factor is thought to have an important influence on student achievement.

According to Hargis and Kerlin (Isnaeni et al., 2018) suggest that learning independence (self-regulated learning) is a process of careful design and self-monitoring of cognitive and affective processes in completing an academic task, and students who have high learning independence tend to be better at their own supervision, able to monitor, evaluate, and manage their learning effectively; save time in completing tasks; and manage learning and time efficiently.

In the learning process activities when the teacher finishes explaining the material the teacher gives exercise questions to students. It is often found that in answering the exercise questions given by the teacher, students copy the answers from their classmates, which has an impact on students' low learning motivation. The difficulties experienced by students in working on exercise questions given by the teacher make students not independent in doing it, meaning that students lack confidence, discipline and responsibility, which is what causes students' learning motivation to be low.

Motivation is an encouragement contained in a person to try to make changes in behaviour that are better in meeting their needs (Uno, 2016: 53). In line with that, motivation is also a conscious effort to move, direct and maintain a person's behaviour so that students are encouraged to act to do something so as to achieve certain goal results (Rumhadi, 2017). Motivation according to Suprihatin (2019) is defined as a person's strength that can raise the level of willingness to carry out an activity. In learning activities, motivation can be said to be the overall driving force within students that gives rise to learning activities, which ensures continuity and gives direction to learning activities, so that the goals desired by the subject can be achieved.

Fostering student learning motivation is a very important task for teachers. Learning will take place effectively if students have motivation to learn. Teachers must make maximum efforts so that students have motivation to learn. Learning motivation must be generated in students so that students are motivated in learning. According to Emda (2017) Motivation is a series of efforts to provide certain conditions, so that someone wants and

wants to do something and if he doesn't like it, he will try to negate or avoid that feeling of dislike.

The learning process also has media or tools that can be used to understand concepts and student independence in learning. Lack of media use in learning can also hamper the learning process. Learning media aims to help convey information to students to make it easier to convey. Macromedia Flash is one of the animation design software. With the help of Macromedia Flash, it can motivate students to easily understand the concepts taught by the teacher and make students more independent in completing the assignments given.

## METHODS

The type of this research is quasi experiment research (Sugiyono, 2013: 77). This study involved two experimental classes, where the two classes were each given a treatment, namely the implementation of the learning process using a particular learning model. Experimental class 1 was given treatment in the form of a learning process using macromedia flash learning media, while experimental class 2 was given treatment in the form of a learning process using power point learning media. After the learning is complete, then both samples are given a post test.

Tabel 1 Research design

| Class | Treatment | Post test |
|---|---|---|
| Eksperimen-1 | $X_1$ | O |
| Eksperimen-2 | $X_2$ | O |

The data analysis used is two-way Anava to see the interaction of the independent variable on the dependent variable. The two-way anava research design is as follows:

Tabel 2 Two-way ANOVA Research Design

| **A** \ **B** | | **Learning Media (B)** | |
|---|---|---|---|
| | | *Macromedia flash* ($B_1$) | Power Point ($B_2$) |
| **Student Learning Motivation (A)** | High ($A_1$) | $A_1$ $B_1$ | $A_1$ $B_2$ |
| | Medium ($A_2$) | $A_2$ $B_1$ | $A_2$ $B_2$ |
| | Low ($A_3$) | $A_3$ $B_1$ | $A_3$ $B_2$ |

## RESULTS AND DISCUSSION

### Description of Student Learning Motivation

To obtain a description of student learning motivation, the mean and standard deviation were calculated, the summary results are presented in the following tabel:

Tabel 4 Student Learning Motivation Test Score

| Class | N | $X_{max}$ | $X_{min}$ | $\bar{x}$ | SD |
|---|---|---|---|---|---|
| Class Eksperimen I | 30 | 100 | 40 | 71 | 14,01 |
| Class Eksperimen II | 30 | 95 | 45 | 70 | 14,83 |

Furthermore, the grouping of student learning motivation (high, medium, and low) was formed based on the value of student learning motivation. For students who have student learning motivation scores ≥ + SD are grouped in high student learning motivation, students who have student learning motivation scores between less than + SD and more than - SD are grouped in moderate student learning motivation, while students who have student learning motivation scores ≤ - SD are grouped in low. For the learning media class using macromedia flash the value = 71.83 and SD = 13.81, so + SD = 85.64 and - SD = 58.02. As for the learning media class using power point, the value = 70.00 and SD = 15.38, so that + SD = 85.38 and - SD = 54.61.

Based on data on the level of student learning motivation obtained in experimental class I, the level of student learning motivation for the high category was 8 students, 15 students were moderate, and 7 students were low. And for experimental class II the level of student learning motivation for the high category is 9 students, moderate 13 students, and low 8 students.

**Description of Student Concept Understanding Ability Test**

To obtain an overview of the posttest test of students' concept understanding ability, the mean and standard deviation were calculated. The summary results are presented in the following tabel:

Tabel 5 Description of Posttest of Students' Concept Understanding Ability

| Class | N | $X_{min}$ | $X_{max}$ | $\overline{X}$ | SD |
|---|---|---|---|---|---|
| Class Eksperimen I | 30 | 65 | 95 | 80,00 | 8,26 |
| Class Eksperimen II | 30 | 70 | 90 | 81,83 | 4,40 |

Based on the results of the research on students' concept understanding ability test, it shows that the data groups come from a normally distributed population with the variance of each pair of data groups is homogeneous, so then two-way ANOVA statistical analysis is carried out.

Tabel 6 Two-way ANOVA Test Results with SPSS

**Tests of Between-Subjects Effects**

Dependent Variable: Nilai

| Source | Type III Sum of Squares | Df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Corrected Model | 1922,232[a] | 5 | 384,446 | 27,594 | ,000 |
| Intercept | 357448,568 | 1 | 357448,568 | 25655,868 | ,000 |
| Model_Pembelajaran | 60,805 | 1 | 60,805 | 4,364 | ,041 |
| KAM | 1606,093 | 2 | 803,046 | 57,639 | ,000 |
| Model_Pembelajaran * KAM | 308,288 | 2 | 154,144 | 11,064 | ,000 |
| Error | 752,351 | 54 | 13,932 | | |
| Total | 395525,000 | 60 | | | |
| Corrected Total | 2674,583 | 59 | | | |

a. R Squared = ,719 (Adjusted R Squared = ,693)

Based on the above, the information for the learning model factor obtained a Sig. (p-value) of 0.041. Because the value of Sig. (p-value) = 0.041 <0.05 then reject H0 and accept Ha. This means that the category of learning media affects the ability to understand concepts. So it can be concluded that there are differences in concept understanding ability between students taught with macromedia flash media and power point media.

It can also be seen that the learning media factor with student learning motivation obtained Sig. (p-value) = 0.000 <0.05 then reject H0 and accept Ha. So it can be concluded that there is an interaction between learning media and student learning motivation on students' concept understanding ability. The picture of the results of the interaction between learning media and student learning motivation on the ability to understand concepts is as follows:

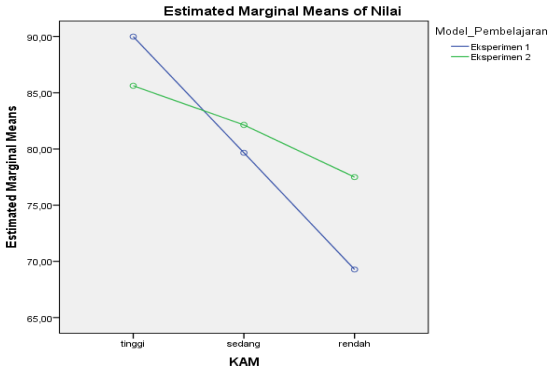


Figure 2 Interaction between Learning Media and Student Learning Motivation on Students' Concept Understanding Ability

**Description of Student Learning Independence Ability Test**

To obtain an overview of the posttest test of students' learning independence ability, the mean and standard deviation are calculated. the summary results are presented in the following tabel:

Tabel 7 Description of Posttest of Student Learning Independence Ability Test

| Class | N | $X_{min}$ | $X_{max}$ | $\overline{X}$ | SD |
|---|---|---|---|---|---|
| Class Eksperimen I | 30 | 65 | 95 | 80,33 | 9,33 |
| Class Eksperimen II | 30 | 55 | 95 | 77,67 | 10,93 |

Based on the research results of the student learning independence ability test, it shows that the student learning independence ability data group comes from a normally distributed population with the variance of each pair of homogeneous data groups, so then the two-way ANOVA statistical analysis is carried out.

**Tabel 8 Two-way ANOVA Test Results with SPSS**

**Tests of Between-Subjects Effects**

Dependent Variable: Nilai

| Source | Type III Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Corrected Model | 5310,089[a] | 5 | 1062,018 | 58,525 | ,000 |
| Intercept | 339711,511 | 1 | 339711,511 | 18720,503 | ,000 |
| Model_Pembelajaran | 83,724 | 1 | 83,724 | 4,614 | ,036 |
| KAM | 5128,458 | 2 | 2564,229 | 141,307 | ,000 |
| Model_Pembelajaran * KAM | 31,856 | 2 | 15,928 | ,878 | ,422 |
| Error | 979,911 | 54 | 18,146 | | |
| Total | 380750,000 | 60 | | | |
| Corrected Total | 6290,000 | 59 | | | |

a. R Squared = ,844 (Adjusted R Squared = ,830)

Based on the above, the information for the learning media factor obtained a Sig. (p-value) of 0.036. Because the value of Sig. (p-value) = 0.036 <0.05 then reject H0 and accept Ha. This means that the learning media category affects the ability of student learning independence. It is concluded that there is a difference in the ability of student learning independence between students taught with macromedia flash media and power point media.

It can also be seen that the learning media factor with student learning motivation obtained Sig. (p-value) = 0.422. Because the value of Sig. (p-value) = 0.422 > 0.05 then

accept H0 and reject Ha. It is concluded that there is no significant interaction between learning media and student learning motivation on the ability of student learning independence. The picture of the interaction results between learning media and student learning motivation on student learning independence can be seen in the following figure:

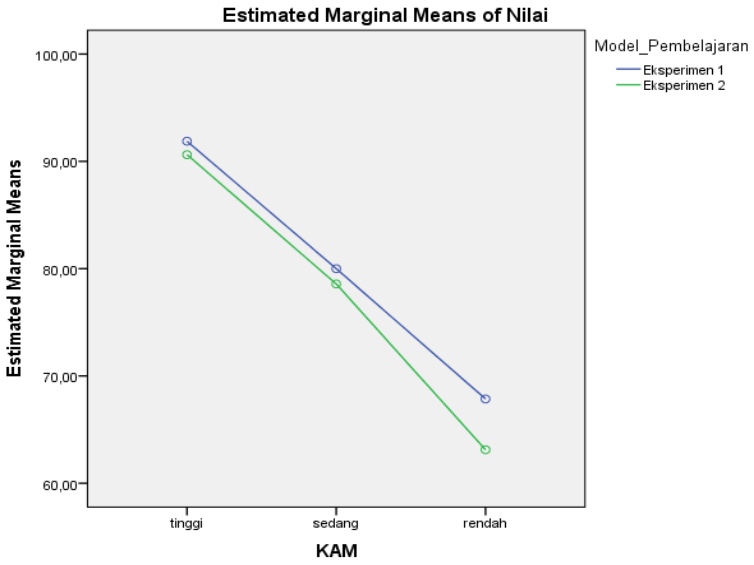


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Figure 3 Interaction between Learning Media and Student Learning Motivation on Students' Learning Independence Ability

**CONCLUSION**

Based on the results of the analysis, findings and discussion that have been stated in the previous chapter, several conclusions are obtained relating to the macromedia flash and power point learning media as well as the ability to understand concepts and student learning independence. Some of these conclusions are as follows: (1) There are differences in students‘ concept understanding ability between students taught with macromedia flash media and power point media, where the application of macromedia flash media is better than students who get power point media for students’ concept understanding ability, (2) There are differences in students' learning independence ability between students taught with macromedia flash media and power point media, where the application of macromedia flash media is better than students who get power point media for students‘ learning independence ability, (3) There is an interaction between learning media and student learning motivation on students’ concept understanding ability, (4) There is no interaction

between learning media and student learning motivation on students' learning independence ability.

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