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COMPARISON OF MATHEMATICAL CRITICAL THINKING SKILLS TAUGHT USING POWERPOINT AND POWTOON LEARNING MEDIA

Marniati*[1], Chairuddin[2], Tahir
[1,2,3] Universitas Sembilanbelas November Kolaka

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ABSTRACT

This study aims to determine: whether the critical thinking ability of mathematics students taught using *powtoon* learning media is better than the critical thinking ability of mathematics students taught using *power point* learning media. *The* population in this study were all seventh grade students of SMP IT Wihdatul Ummah Kolaka. Sampling was determined by saturated *sampling* technique, so that class $VIII_A$ was obtained as experimental class I and class $VIII_B$ as experimental class II. The data on students' mathematical critical thinking skills were collected using a test instrument given during the *posttest*. The results showed that the critical thinking ability of mathematics of students taught using *power point* learning media consisting of 13 students showed an average value (mean) of 72.308. While the critical thinking ability of mathematics students taught using *powtoon* learning media consisting of 16 students showed an average value (mean) of 76.801. This shows that the average critical thinking ability of students in teaching social arithmetic material for Experiment II class is slightly higher than the average critical thinking ability of students in Experiment I class. Furthermore, the results of hypothesis testing using the $_{t\text{-test}}$ have obtained the value of t (-0.892) < t_{tabel} (1.703), indicating that H_0 is accepted, inferentially this means that the critical thinking ability of mathematics students taught using *powtoon* learning media is not better than the critical thinking ability of mathematics students taught using *power point* learning media.

Corresponding Author:

Name of Corresponding Author,
Departement of Mathematics Education,
Universitas Sembilanbelas November Kolaka, Indonesia
Email: bungaitb@gmail.com
Phone Number: 082293908268

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1. INTRODUCTION

The quality of mathematics education can be seen in two aspects, namely in terms of the quality of the process and the quality of the results. Improving the quality of education is inseparable from achieving the overall educational goals, especially in terms of learning

objectives. (Manullang, 2014). This can affect math learning achievement in Indonesia. In fact, in Indonesia, students' mathematics learning achievement is still relatively low.

Based on the results of the 2018 *Program for International Student Assessment* (PISA) study released in December 2019, Indonesia ranked 74 out of 79 countries in the world with three categories assessed, namely literacy, mathematics, and science performance. Especially in the math category, Indonesia is ranked 7th from the bottom (73rd). Judging from the average score in 2015 the math ability was worth 386 and in 2018 there was a decrease in the score, namely 379. (Tohir, 2019).

The problem that often arises in learning mathematics is the weak ability of students to use their thinking skills. (Ariani, 2019). Where it is known that students' thinking skills are very important to support the success of the learning process. Septikasari (2018) said that in the 21st century schools as educational institutions are required to have the ability to think creatively (*creative thinking*), think critically and problem solving (*critical thinking and problem solving*), communicate (*communication),* and collaborate (*collaboration*) or commonly referred to as 4C. Human Resources (HR) in the 21st century are required to have several competencies, one of which is critical thinking. (Lathifah, 2020).

Critical thinking skills are needed by students considering that science and technology are developing very rapidly and allow anyone to obtain information quickly and easily. (Eka et al., 2022). One alternative that can be used to support students' critical thinking skills is learning media. (Lathifah, (2020)) said that learning media is one of the alternatives that can be used to fulfill student competencies in the 21st century, especially critical thinking competencies.

Learning media is an alternative form of the rapid development of technological progress to be used by humans as an interactive learning media on material that is considered difficult to be more fun because it is presented with a combination of several media such as audio and visual media (Karmilah et al., 2021). (Fajar et al., 2021)). Learning media is used by teachers to convey lesson topics to students in order to make it easier for students to master the topics taught.

Based on the results of observations and initial interviews with one of the mathematics teachers in class VIISMP IT Wihdatul Ummah Kolaka odd semester of the 2022/2023 academic year, it is known that students' mathematical critical thinking skills are still low and the use of learning media is still not varied.

The low level of students' critical thinking skills can be seen from the results obtained when students work on problems that contain indicators of critical thinking skills. Only a few students can solve the problem correctly, while other students still seem to have difficulty in solving it. In answering the questions, some students did not write the things needed in the solution, namely not writing what is known and asked. In addition, some students were unable to determine the method that could be used to solve the problem. The stages that some students went through to get the answer were also unsystematic. After they wrote the answer, some of them also did not include a conclusion. It can be seen from the percentage results on each indicator of critical thinking ability of all seventh grade students at the school, as follows: (1) Interpretation of 45% is classified in the category of less; (2) Analysis of 18% is classified in the category of very less; (3) Evaluation of 22% is classified in the category of very less; (4) Inference of 9% is classified in the category of very less. The reality shows that the ability of some students to know and solve problems is still lacking, and these abilities are indicators of critical thinking skills, namely interpretation, analysis, evaluation and inference. In addition, the problem at the school is the use of learning media that is still not varied.

The use of learning media in mathematics subjects at the school is known to still use makeshift learning media such as pictures and textbooks. The media is less attractive, so that during the learning process students are less enthusiastic when learning. When the teacher explains the subject matter in front of the class, only some pay attention to the lesson, and some students always talk behind. One of the reasons why the teacher has not used a variety of learning media is because the teacher feels confused in choosing the learning media to be used.

Based on the above problems, researchers try to offer the use of more innovative learning media by comparing two learning media, namely *power* point *media and powtoon* animated video media so that students are more enthusiastic and active so that they can maximize the learning process. There are many choices of learning media that can be applied, but the media chosen to be applied at SMP IT Wihdatul Ummah Kolaka Class VII are *power point* media and *powtoon* animated video media.

Power point learning media is a *visual* learning media that can be used by teachers as a tool to convey learning materials. *Power point* media can be interpreted as a multimedia-based presentation tool in the form of software created and developed by the Microsoft company, which can be used as a tool for delivering messages in the world of education. (Sulastri, 2017). In addition to power point learning media, other learning media that the author wants to offer is *powtoon* animated video media.

Powtoon animated video media is an *audiovisual* learning media that can be used by a teacher as a tool to convey learning material. *Powtoon* is a web-based software for creating an exposure that has animation features, including handwriting animation, cartoon animation, livelier transition effects and very easy timeline usage. (Trina, Z. et al., 2017).. In the research results Eka et al (2022) said that the development of animated video media using *powtoon software* on students' critical thinking skills is very good, it can be seen from the validity level of 92.36% with a very valid category, the practicality level of video media is 92.12% very practical, and the effectiveness level is 83.33% classified as effective.

There are several studies that have been conducted related to the use of power point learning media and powtoon media on students' critical thinking skills. Among them are, research conducted by (Marjito, 2015)The results of this study indicate that the use of *power point* as a learning media has an influence on critical thinking skills in the History of Indonesian Independence course in the History Education Study Program. Other research conducted by (Fajar et al., 2021)The results of this study indicate that there are differences in students' creative thinking skills in the mathematics material of building space between the experimental class using *powtoon* interactive multimedia and the control class which only uses conventional methods, namely *power point*. In other words, the process of learning mathematics material about building space using interactive multimedia can significantly affect students' creative thinking skills compared to the learning process using conventional methods.

Based on the description above, the purpose of this article is to find out the Comparison of Critical Thinking Ability of Mathematics Students Taught by Using *Power Point* Learning Media and *Powtoon* Learning Media.

2. METHOD

This type of research is experimental research. This research is included in the *Quasi Experimental Design*. This study used two classes, namely, experimental class I and experimental class II. Experimental class I was given treatment using *power point* learning media and experimental class II was given treatment using *powtoon* learning media. The research design that will be used in this study is *The Nonequivalent Posttest-Only Control*

Group Design, which is one type of *quasi experimental design.* (Lestari & Yudhanegara, 2015). In this study, two different samples will be used. Both samples will be applied to different learning *(treatment)*. Then after applying different learning, each sample is given the same final test *(posttest)* to obtain students' mathematical critical thinking skills.

This research was conducted at SMP IT Wihdatul Ummah Kolaka for seventh grade students. The number of students involved was 29 students with class A as many as 13 students who were experimental class I and class B as many as 16 students who were experimental class II. The study has 2 variables, the first variable is the critical thinking ability of mathematics students who are taught using *power point* learning media. *The* second variable is the critical thinking ability of mathematics students who are taught using *powtoon* learning media.

Data collection techniques in this study were test techniques, observation techniques and documentation. The test questions given are essay test questions in the form of story problems as many as 4 questions that have been tested for validity, reliability, difficulty level and differentiation. The purpose of the test is given to measure students' critical thinking skills on social arithmetic material.

The data obtained were analyzed descriptively and inferentially. Starting with classifying students' critical thinking skills after treatment according to Table 2.1.

Table 2.1. Categories of Students' Critical Thinking Ability

Student Critical Thinking Ability Score Interval	Category
$81 \le N \le 100$	Very High
$61 \le N < 81$	High
$41 \le N < 61$	Medium
$21 \le N < 41$	Low
$N < 21$	Very Low

(Maslakhatunni'mah et al., 2019)

Furthermore, descriptive statistical analysis of the data was carried out in the form of the amount of data, mean, variance and standard deviation. To see the average difference in critical thinking skills in experimental class I and experimental class II, t test was used with the formula.

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{(n_1 - 1)S_1^2 + (n_2 - 1)S_2^2}{n_1 + n_2 - 2}\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}}$$

Before the data is tested, it is first tested for normality using the normality test. *Lilliefors* and and homogeneity using the F test. The hypothesis to be tested in this study is that the critical thinking ability of mathematics students taught using *powtoon* learning media is better than the ability of critical thinking ability of mathematics students taught using *power point* learning media.

3. RESULTS AND DISCUSSION

3.1 Result

In this study, experimental class I was given treatment, namely learning using *powtoon* learning media, and experimental class II was given treatment, namely learning using *power point* learning media. After being given different treatments, these two class samples were

given *posttest* questions to determine students' critical thinking skills in mathematics. Based on the results of descriptive statistical calculations of students' mathematics critical thinking skills as summarized in Table 3.1.

Table 1. Summary of Descriptive Statistics of Students' Mathematics Critical Thinking Ability

Analysis	Experiment Class I	Experiment Class II
A lot of data	13	16
Average	72,308	76,801
Variance	237,981	137,472
Standard Deviation	15,427	11,725

Based on the results of descriptive analysis in Table 1 above, the average value of students' critical thinking skills in mathematics taught using *power point* learning media (experimental class I) was 72.308, variance 237.981 and standard deviation 15.427. While in the experimental class II, the average value of the ability to
critical thinking in mathematics of students taught using *powtoon* learning media is 76.801, variance is 137.472 and standard deviation is 11.725.

The categorization of students' mathematics critical thinking skills at SMP IT Wihdatul Ummanh Kolaka can be seen in Table 3.2 below:

Table 3.2. Percentage Category of Critical Thinking Ability of Students at SMP IT Wihdatul Ummah Kolaka Experiment Class I

Student Critical Thinking Ability Score Interval	Category	Frequency	Percentage
$81 \leq N \leq 100$	Very High	5	38.46%
$61 \leq N < 81$	High	4	30.77%
$41 \leq N < 61$	Medium	4	30.77%
$21 \leq N < 41$	Low	0	0.00%
$N < 21$	Very Low	0	0.00%

Based on the percentage categorization in table 2 above, it is obtained that 5 students (38.46%) are in the very high category, 4 students (30.77%) are in the high category, and 4 students (30.77%) are in the medium category, with the average overall score of experimental class I students of 72.308 which indicates that the average critical thinking ability of students in the class is in the high category.

Table 3.3. Percentage Categories of Critical Thinking Ability of Students at SMP IT Wihdatul Ummah Kolaka Experiment Class II

Student Critical Thinking Ability Score Interval	Category	Frequency	Percentage
$81 \leq N \leq 100$	Very High	7	43.75%
$61 \leq N < 81$	High	8	50.00%

$41 \leq N < 61$	Medium	1	6.25%
$21 \leq N < 41$	Low	0	0.00%
$N < 21$	Very Low	0	0.00%

Based on the categorization in Table 3 above, it is obtained that 7 students (43.75%) are in the very high category, 8 students (50.00%) are in the high category, and 1 student (6.25%) is in the medium category, with the average overall score of experimental class II students of 76.801 which indicates that the average critical thinking ability of students in the class is in the high category.

The assessment of students' critical thinking in mathematics was carried out to see the comparison between the critical thinking skills of students taught using *powtoon* learning media and *power point* learning media with the analysis stages, namely the analysis prerequisite test and the analysis requirement test.

The analysis prerequisite test includes normality test and homogeneity test. In this research, the normality test uses the *Liliefors* test with a significant level of 5%. The data analysis results are contained in Table 3.4.

Table 3.4. Data Normality Test Results

Class	SPSS Statistics	Manual		Description
		Counter	L_{tabel}	
Experiment I	0,139	0,139	0,234	Normal
Experiment II	0,126	0,126	0,213	Normal

Based on table 4 above, the data normality test using *power point software* and *SPSS* 26. In experimental class I obtained L_{hitung} of 0.139 < L_{tabel} of 0.234 which means that the data in experimental class I is normally distributed, while in experimental class II obtained L_{hitung} of 0.126 < L_{tabel} of 0.213 which means that the data in experimental class II is also normally distributed. Furthermore, the data homogeneity test was carried out using the F-test.

The homogeneity test is carried out using the Fisher test, this is done to see the similarity of the sample variance. Based on the analysis conducted, $F_{hitung} = 1{,}731$ and $F_{tabel} = 2{,}480$ were obtained. Because $F_{hitung} < F_{tabel}$ (1.731 < 2.480) then H_0 is accepted and it can be concluded that the data has the same variance or homogeneous. Because both data are normally distributed and have the same variance, hypothesis testing is carried out through *polled variant* t-test testing. *The* results of the hypothesis test are seen in table 3.5

Table 3.5. Hypothesis Test Results

t_{hitung}	t_{tabel}
-0,892	1,703

Based on the results of hypothesis test analysis using the t test obtained $|t_{hitung}| = |-0.892|$ and $t_{tabel}(\alpha = 0{,}05; dk = n_1 + n_2 - 2 = 27) = 1{,}703$. Because $|t_{hitung}| < t_{tabel}| = |(-0.892 < 1.703)|$ then H_0 is accepted in other words the critical thinking ability of mathematics students taught using *powtoon* learning media is not better than the ability of critical thinking ability of mathematics students taught using *powtoon* learning media.

3.2. Discussion

Based on the results of the study that the critical thinking ability of mathematics of students taught using *powtoon* learning media is not better than the critical thinking ability of mathematics of students taught using *power point* learning media. Based on descriptive analysis, the average critical thinking ability of mathematics students taught using *power point* learning media was 72.308 while the average critical thinking ability of mathematics students taught using *powtoon* learning media was 76.801. When compared between the two, the average value of students' critical thinking ability in mathematics in experimental class II taught using *powtoon* learning media is slightly higher than the average critical thinking ability in mathematics in experimental class I taught using *power point* learning media. Based on this explanation, it cannot be concluded whether the critical thinking ability of mathematics students taught using *powtton* learning media is better than the critical thinking ability of mathematics students taught using *power point* learning media. For more details, hypothesis testing is carried out.

In testing the hypothesis obtained by $|thitung > ttabel| = |(-0.892 < 1.703)|$ with a probability value (*P-Value)* of 0.380> 0.05 (α), so it can be concluded that H_0 is accepted in other words the critical thinking ability of mathematics students taught using *powtoon* learning media is not better than the critical thinking ability of mathematics students taught using *power point* learning media.

4. CONCLUSION

Based on the results of the analysis and discussion, it is concluded that the critical thinking ability of mathematics students taught using *powtoon* learning media is not better than the critical thinking ability of mathematics students taught using *power point* learning media, especially in social arithmetic teaching material in class VII SMP IT Wihdatul Ummah Kolaka.

The results obtained in this study are different from the results of several relevant studies, this is because there is no significant difference between the two media. When viewed from a visual display, the material presented by both learning media is the same, the only difference is the provision of features. The making and application of this learning media also still has several things that are still lacking, especially the learning process that is less strategic and varied. In addition, in the application of learning media in each class, teacher activities and student activities in experimental class I and experimental class II were also classified as good. However, when viewed from the percentage comparison, the percentage of teacher activities is higher than the percentage of student activities. Where this condition is inversely proportional to the main objective of applying learning media so that students are more active in class, in fact, during the application of the two learning media, it appears that the teacher is still more active than students. It is suspected that some of this is the cause of the critical thinking ability of mathematics students taught using *powtoon* learning media is not better than the critical thinking ability of mathematics students taught using *power point* learning media.

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