

THE APPLICATION OF A CONTEXTUAL APPROACH TO IMPROVE MATHEMATICAL CREATIVE THINKING SKILLS IN TERMS OF THE SELF-EFFICACY OF GRADE VIII STUDENTS OF SMP PGRI 1 PULOMERAK

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ABSTRACT

The purpose of this study was to determine whether there is a difference in increasing mathematical creative thinking skills using a contextual approach with conventional learning in grade VIII SMP PGRI 1 Pulomerak. Another objective is to determine whether there is an influence of students' self-efficacy on the ability to think creatively using a contextual approach. This research was conducted experimentally, and the research design was a non-equivalent control group design. The experimental class received learning with a contextual approach, while the control class accepted conventional learning. This study involved students of grades VIII A and VIII C. Tests of mathematical creative thinking ability and self-efficacy questionnaires were used to obtain data on research results. Data processing with ANOVA test N-Gain score and t-test, to determine the difference in increasing the ability to think creatively mathematically using a contextual approach with conventional learning and the influence of students' self-efficacy on the ability to think creatively using a contextual approach. Based on the results of data analysis, 1) there are differences in students' mathematical creative thinking abilities using contextual approaches with conventional learning models, 2) the influence of self-efficacy on students' mathematical creative thinking abilities with contextual approaches.

Keywords: Contextual Approach, Mathematical Creative Thinking Ability, Self-Efficacy

INTRODUCTION

Education is a process in developing all human abilities and attitudes through teaching to mature humans. Not only that, education is a forum for activities that can be seen as a printer of large quality human resources. Education is implemented, one of which is in mathematics subjects.

So important is the role of mathematics, mathematics is one of the subjects it is undeniable that mathematics subjects are still subjects that are considered complex, tedious and often cause problems in learning. This condition results in mathematics subjects being disliked, ignored and even ignored. This certainly creates a considerable gap between what is expected from learning mathematics and the reality that occurs in school. Mathematics is a science that is needed to improve students' creative thinking skills so that it is expected to produce quality human resources. In accordance with Permendikbud No. 59 of 2014,

mathematics lessons must be taught to all students starting from elementary school to equip them with logical, analytical, systematic, critical, and creative thinking skills, as well as the ability to work together (Minister of Education and Culture of the Republic of Indonesia, 2014). Therefore, one of the talents needed by students to master mathematics is the ability to imagine creatively.

The ability to think creatively is the ability to generate new ideas or ideas in producing a way to solve problems, and can even produce new ways as alternative answers (Indayanti & Sagala, 2023). The ability and success of students in learning mathematics is also influenced by other factors and abilities, including students' confidence or self-efficacy.

According to Bandura (in Mukhaeris Ayatollah; Yuhana, 2023), self-efficacy is a person's belief in their ability to manage and complete tasks that affect their life. Some factors that can affect student self-efficacy include

teachers, learning materials, learning strategies, and the dominant factor is the use of daily problems around students in 'learning' activities. A good learning approach is applied in mathematics, one of which is learning with a contextual approach.

Sanjaya (in Pratiwi, 2019) argues that the contextual learning approach is a learning approach that emphasizes the process of full student engagement, to be able to understand the material learned, and relate it to real-life situations, thus encouraging students to be able to apply it in their lives.

Based on the results of interviews with mathematics teachers at SMP PGRI 1 Pulomerak stated that there is still a lack of creative mathematical thinking of students, teachers still use conventional methods, namely teacher-centered learning. As a result, students' creative thinking is still lacking and makes students' self-efficacy less in learning mathematics lessons. Based on the results of the study, it can be concluded that the low level of students' mathematical creative thinking ability is because most teachers in Indonesia still use learning that focuses learning only on teachers, so that students are not trained to think independently and develop their creative thinking skills. Students must also try to seek knowledge independently, so that students' creative thinking skills can develop.

Before conducting research, researchers need previous research with the aim of finding the uniqueness of the research to be carried out. The results of Ratnasari & Nasrullah's previous research, 2022 namely the use of contextual learning models in mathematics can improve students' creative thinking skills. The difference between previous research and this study is that it uses additional self-efficacy abilities of students.

This study aims to determine whether there is a difference in increasing mathematical creative thinking skills using a contextual approach with conventional learning in grade VIII of SMP PGRI 1 Pulomerak. Another objective is to determine whether there is an influence of students' self-efficacy on the ability to think creatively using a contextual approach, based on the problems mentioned above. This study is different from previous studies because it uses a population of grade VIII students of SMP PGRI 1 Pulomerak.

RESEARCH METHODS

The study used quantitative methods. However, the research methodology used is

experimental. In this study, the Non Equivalent Control Group Design group design to start the study, the first group was given an initial test (pre-test) to determine the initial state, while the second group was used as a control class. Then, at the end of the study, the first and second control groups were given the same final test (post-test).

The Nonequivalent Control Group Design research design is as follows:

Experimental group : O X O

Control group : O O

Information:

O : *pre-test* and *posttest*

X : Treatment using a contextual approach

This research was carried out at SMP PGRI 1 Pulomerak, in July – August 2023 for the 2023/2024 academic year. The population in this study was grade VIII students of SMP PGRI 1 Pulomerak. The samples in this study were two classes. Sampling in this study used random sampling. Generate VIII C for experimental classes using Contextual Approach and VIII A for control classes using regular learning. Many of the subjects studied were the number of students who participated in the pretest and posttest administration, which was 37 students in the experimental class and 37 students in the control class.

Objectives: This research is carried out in three stages: preparation: making observations, determining problems, and compiling research; Implementation: testing students with math problems and questionnaires, as well as processing and analyzing data.

The study used tests and questionnaires to collect data. The exam method consists of five questions that have been recognized as valid and reliable. The indicators to be achieved are described in the description questions given. In this questionnaire, there are four answer choices, namely: Strongly Agree (SS), Agree (S), Disagree (TS) and Strongly Disagree (STS)—data analysis technique using ANOVA test, N-Gain score and t-test.

RESULTS AND DISCUSSION

Data Analysis Mathematical Creative Thinking Ability

Pretest and posttest score data can be searched for the extent of the increase in students' mathematical creative thinking ability with the N-Gain Score formula. N-Gain Score data on students' mathematical creative thinking ability can be presented in the following table:

Table 1. N-Gain Score

Group	Mean Pretest	Mean Posttest	NGain Score	Desc.
Experiment	27,19	88,97	.8473	High
Control	14,72	79,35	.6736	Medium

Based on table 1 above, it can be seen that the average value of the experimental class pretest is higher than the average value of the control class pretest. Similarly, it can be seen that the N-Gain value of the experimental class is higher than that of the control class. Next, the N-Gain data normality test will be carried out.

The normality test of N-Gain data was carried out to determine whether the increase in research data was average or not. The meaning of ordinary in this test is the distribution of the data produced evenly, so that the population used in the study comes from the same or average population. Pretest and posttest data obtained from experimental and control classes were tested using the Shapiro-Wilk test using SPSS Version 27 software. The data can be said to be normally distributed if the sig is $> \alpha$, where the value of $\alpha = 0.05$. The normality test results of pretest and posttest data are shown in the table below:

Table 2. N-Gain Data Normality Test

Group	Shapiro-Wilk Sig.
Experiment	.200
Control	.122

Table 2 shows that the significant values for the experimental and control class n-gain data normality test were 0.200 and 0.122 respectively where the Sig. value > 0.05 . This shows that the study data are typically distributed. Then the homogeneity test will continue.

The homogeneity test used in this study was the f-test with SPSS Version 27 software. Data can be said to be homogeneous if it meets the criteria of Sig. $> \alpha$ (0.05). The homogeneity test results of pretest and posttest data are shown in table 3.

Table 3. N-Gain Data Homogeneity Test

Group	Sig. Based on Mean	Dest
Experiment and Control	.113	Homogeneous

Based on table 3, it is known that the significance value (Sig.) based on mean is $0.113 > 0.05$. Because the significant value of the experimental and control class pretest and posttest data > 0.05 , it can be concluded that the variance of pretest and posttest data in the experimental and control classes is homogeneous.

After the normality test and homogeneity test, it is known that the research data used are normally distributed and have homogeneous variance. Because the data is usually distributed and has homogeneous variance, hypothesis testing is carried out using parametric statistics independent sample t-test (t-test) unpaired in SPSS Version 27 software.

The ANOVA test was performed on N-Gain data. This test is used to determine the difference in improvement between students' mathematical creative thinking skills using a contextual approach with conventional learning. The ANOVA test result data N-Gain data in the following table:

Table 4. ANOVA Test N-Gain Data

Data	f_{count}
N-Gain	43.815

Based on table 4.5 above it can be seen that the fcount of the ANOVA test N-Gain data is 43.815, the ftable at frequency 37 is 4.11. So $f_{\text{count}} > f_{\text{table}}$ then H_1 is accepted. It can be concluded that there are differences in increasing students' mathematical creative thinking skills using a contextual approach with contextual learning in class VIII of SMP PGRI 1 Pulomerak.

Data Analysis of Student Self-Efficacy Questionnaire

Before conducting a hypothesis test, an analysis prerequisite test is carried out, namely the normality test and the homogeneity test.

The normality test is carried out to determine the data taken from the population that is normally distributed or not. The calculations were performed with the help of the Statistical Package for Social Science (SPSS) Version 27 program with the Shapiro-Wilk Normality Test.

The results of the normality test can be seen in the output of the Tests of Normality section of Shapiro-Wilk at the value of Sig. (significance). Average data if the $\text{sig} > \alpha$, to a significant degree (α) 5%. If the significance is more than 0.05, then the data is usually distributed, and vice versa if the data is not normally distributed non-parametric statistics can be used. This test is carried out to determine whether or not a data is normally distributed, then it can be seen in the following table:

Tabel 5. Questionnaire normality test

Test	Shapiro-Wilk Sig.
Posttest	.141
Questionnaire	.519

Based on table 5 shows that the significant values for the experimental class questionnaire and posttest were 0.141 and 0.519 respectively where the value of $\text{Sig.} > 0.05$. This shows that the study data are typically distributed. Then the homogeneity test will continue.

The hypothesis test is carried out after a normality test. Based on the normality test, a distribution of normally distributed data was obtained between self-efficacy and the ability to think creatively mathematically of grade VIII students of SMP PGRI 1 Pulomerak. The following is a table of Levene test results (one-way anova):

Tabel 6. Uji Homogenitas Data N-Gain

Group	Sig. Based on Mean	Desc.
Posttest and questionnaire	.080	Homogeneous

Based on table 6 it can be seen that the value of Sig. Based on Mean is 0.08. The requirements are homogeneous if the probability or $p > 0.05$ and if the probability < 0.05 then the data are not homogeneous. Because the value of $\text{Sig.} > 0.05$, homogeneous will be continued with hypothesis testing.

After the prerequisite test of the analysis is declared to meet the criteria, then the next step is to conduct a hypothesis test. Hypothesis testing is done using the mean difference test or t-test because the data are homogeneous and regular. This test calculation is used with the help of the SPSS Version 27 program. The results of the t test in the table below:

Table 7. Test the hypothesis

Type	t_{count}	Sig.
Self-efficacy of mathematical creative thinking ability	3.441	.07

Based on table 7 it can be seen that the t_{count} of the t-test is 3.441, the t_{table} at the frequency of 37 is 2.030. So $t_{\text{count}} \geq t_{\text{table}}$, then H_0 is accepted. This means that there is an influence of students' self-efficacy on the ability to think creatively with a contextual approach.

CONCLUSION

Based on the results of research at SMP PGRI 1 Pulomerak in class VIII regarding the Application of Contextual Approaches to Improve Creative Thinking Skills in terms of Self-Efficacy, the following conclusions were obtained::

1. There are differences in increasing the mathematical creative thinking ability of students who learn using a contextual approach with conventional learning in class VIII SMP PGRI 1 Pulomerak.
2. There is an influence of students' self-efficacy on the ability to think creatively using a contextual approach.

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***The Application of A Contextual Approach to Improve Mathematical Creative Thinking Skills
in Terms of The Self-Efficacy of Grade VIII Students of SMP PGRI 1 Pulomerak***

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