Mathematics Learning Interest of Elementary School Students in Using Metaphorical Thinking Learning Model

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A B S T R A K

Rendahnya minat belajar matematika menjadi salah satu masalah yang sangat penting untuk dipecahkan. Hal tersebut dikarenakan belum maksimalnya penerapan suatu model pembelajaran yang dapat merangsang siswa aktif dalam proses pembelajaran, sehingga akan berdampak pada minat belajar matematika siswa. Penelitian ini bertujuan untuk mengkaji penggunaan model pembelajaran *Metaphorical Thinking* terhadap minat belajar Matematika siswa kelas V SD. Jenis penelitian ini adalah eksperimen semu (*quasi experiment*) dengan desain *post-test only no treatment control design*. Populasi pada penelitian ini berjumlah 182 siswa. Sampel diambil menggunakan teknik *random sampling* dengan jumlah sampel 70 siswa. Data hasil penelitian ini diperoleh menggunakan metode non-tes, yaitu dengan menggunkan kuisioner (angket). Teknik analisis yang digunakan adalah teknik analisis deskriptif dan uji-t. Berdasarkan analisis data dengan uji-t diperoleh nilai t_{hitung} sebesar 2,256 dan t_{tabel} pada taraf signifikansi 5% sebesar 2,000. Oleh sebab itu, $t_{hitung} > t_{tabel}$, artinya H_0 ditolak dan H_a diterima. Dapat disimpulkan bahwa model pembelajaran *Metaphorical Thinking* berpengaruh terhadap minat belajar matematika kelas V SD. Hasil penelitian ini dapat dijadikan sebagai pedoman atau acuan guru dalam merancang proses pembelajaran di sekolah.

A B S T R A C T

The lack of interest in learning mathematics is one of the most important problems to be solved. It is because the implementation of a learning model has not been maximized which can stimulate active students in the learning process so that it will have an impact on students' interest in learning mathematics. This study aimed to examine the use of the Metaphorical Thinking learning model for students' interest in learning mathematics in the fifth grade of elementary school. The design of the study was a quasi-experiment with a post-test only no treatment control design. The population of the study was 182 students. The samples were taken using a random sampling technique with a total sample of 70 students. In this study, the data was obtained from a non-test method, namely by using a questionnaire. Descriptive analysis techniques and t-test were used in this study. Based on t-test analysis, the value of t_{count} was 2.256 and t_{table} at a significance level of 5% was 2.000. Therefore, $t_{count} > t_{table}$, it means that H_0 was rejected and H_a was accepted. It can be concluded that the Metaphorical Thinking learning model affects the students' interest in learning mathematics in the fifth grade of elementary school. The results of this study can be used as a guide or reference for teachers in designing the learning process in schools.

Introduction

Mathematics has a very important role in education, it starts with counting and training students' way of thinking. One of the things that students worry about in learning mathematics is the determinant of whether or not they will pass in an education level (Suandito, 2017). Because of this reason, mathematics is given at all levels of education from elementary to university. Even though mathematics is one of the important subjects in school, many students do not like mathematics and want to understand mathematics material in depth. It can be seen from the result of observations and interviews at the Field Experience Program (PPL-Real) activities. (Erlando, 2016) states that learning interest is needed to maximize student learning outcomes in learning mathematics. However, many people assume that mathematics is a boring subject and hope to avoid it. This assumption arises because the teachers have not innovated yet the learning process, the teachers have not mastered various learning models so the applied learning model is used repeatedly and monotony that makes students dull and quickly get bored (Firmansyah, 2013; Prihatini, 2017). Thus, students are not interested in learning mathematics and make students interest in learning low.

The low interest of students in learning mathematics will directly impact their learning outcomes (Dores, 2019). Although most students follow and try to pay attention to what the teacher says, most of them just take notes without knowing the meaning of their writing. Although all students do not do the same, however (Jannatin, 2018) argues that only a few students understood the meaning of the teacher's explanation in delivering material and mathematics formulas. Considering this problem, all teachers should build students' interest in learning mathematics. It is because interest is the tendency of being attracted to something without coercion (Slameto, 2010). Therefore, if students have an interest in learning mathematics, they will learn happily without coercion. Two factors can be used in learning and understanding mathematics, namely external factors and internal factors (Putra, 2019). Internal factors come from naturally within students. Meanwhile, external factors come from the environment, namely family and study mate. Another external factor is the use of the learning model used by the teacher, it is because the choice of the learning model used by the teacher affects greatly the enthusiasm of students in learning mathematics (Sulistyawati, 2018).

Nowadays, there is a lot of renewal learning models that can be used to increase students' enthusiasm for learning mathematics. In practice, the teacher has implemented several various learning models and mathematics learning resources (Zaenal, 2017). However, over time and the development of knowledge, the teachers need to enrich their knowledge in choosing and applying the right learning model so that it can improve learning outcomes and increase students' interest in learning, especially mathematics. Thus, it is known that the learning model plays a major role in the learning process, especially in attracting students' interest in learning mathematics. The existence of various learning model makes some teachers difficult to choose one of them that fits the mathematics material. One model that is considered to increase students' interest in learning mathematics is the Metaphorical Thinking learning model. This learning model has various advantages that can increase students' interest in learning mathematics (Setiawan 2018; Widyasari 2016). (Amelia, 2018) states Metaphorical Thinking as a learning model that is designed to develop unusual ways of thinking and let students create a new way of solving problems. Thus, in this case, students are allowed to think, understand, explain, and present (communicate) abstract mathematical concepts into more concrete concepts in everyday life by comparing two things with different meanings (Hendriana, 2019).

So, the Metaphorical Thinking learning model is a learning model that can help students understand, explain, and communicate abstract concepts into more concrete things by comparing two or more things with different meanings, both related and unrelated. It will be appropriate to be applied in learning mathematics in the fifth grade to maximize the understanding and in-depth understanding of the material, especially mathematics. It is also in line with a study conducted by (Anggraeny, 2019) that shows the Metaphorical Thinking learning model can increase students' interest in learning.

Several relevant study results strengthen the metaphorical thinking model which has a positive impact on the success of the student learning process, including a study conducted by (Lesmana et al., 2018) shows that the students' ability of mathematical generalization using metaphorical thinking approach is better than students using conventional learning. The differences are in the dependent variable, place, and time of implementation as well as the grade level understudy. A study conducted by (Bernard & Senjayawati, 2019) show that the achievement and improvement of mathematical connection abilities between students who are taught with a metaphorical thinking approach assisted by GeoGebra software is better than students who are taught with conventional learning. Furthermore, a study conducted by (Nurhikmayanti, 2017) shows that the students' understanding and reasoning abilities of mathematics using the metaphorical thinking approach are better than students who are taught with conventional learning. Based on the relevant research above, the difference between the present study and previous study lies in the subject matter, place, time of the study and the grade level understudy.

Based on the explanation of the background above, it is necessary to conduct a study entitled "Mathematics Learning Interest of Elementary School Students in Using Metaphorical Thinking Learning Model ". The purpose of this study was to determine whether or not the influence of this learning model on students' interest in learning mathematics so it will be useful to increase the effectiveness of teaching and learning activities, especially mathematics.

Method

The design of the study was experimental research with a quasi-experimental design using Post-test Only No Treatment Control Design. The population of the study was all the fifth grade students of public elementary schools in cluster Ki Hajar Dewantara South Denpasar which consisted of five classes with a total of 182 students. To determine the research sample, a random sampling technique was conducted to provide equal opportunities to all parts of the population to become research samples (Agung, 2014). Based on this random sampling, it was found that two schools became the research sample, namely SD N 9 Pedungan (public elementary school) was the

experimental group and SD N 1 Pedungan (public elementary school) was the control group. In this study, there are two variables, namely the independent variable and the dependent variable. The independent variable was the Metaphorical Thinking learning model and the dependent variable was students' interest in learning mathematics.

In this study, the experimental class was taught with the Metaphorical Thinking learning model while the control group was taught with conventional model. In both samples, a post-test was also conducted to determine students' interest in mathematics at the beginning of the study. Furthermore, after each sample was taught with the specified learning model, then a non-test method was used to collect data in this study, namely by using a questionnaire. The closed questionnaire was used in this study with the questionnaire answer options that have been provided to make it easier for respondents in the process of filling out the answers (Sugiyono, 2017). The questionnaire was created using aspects and criteria for assessing students' interest in learning mathematics that was adapted from the previous study by (Arifin, 2018). The grid of the instruments in this study was presented in Table 1.

Table 1. The Instrument Grid

Dimension	Indicator
Passion	Preparing the lesson materials that will be taught by the teacher
Attention	Getting attention to know the material being taught
Interest	There is an interest in answering the questions given by the teacher
Happiness	There is a sense of joy in participating the learning
Involvement	Getting active in the learning process

Table 01 above described the instrument grid that was used to collect data from research results that previously tested construct validity, content validity, and reliability tests, it is done because a good measuring instrument also provides an accurate result for a study (Arikunto, 2015). In this study, the dimensions include liking, attention, interest, happiness, and involvement. These dimensions were the measurement of students' interest in mathematics. Furthermore, the score interval on the questionnaire data from the research results applied the Likert scale assessment analysis which was presented in Table 2.

Table 2. The Analysis of Skala Likert Assessment

Score	Description
Score 5	Strongly agree
Score 4	Agree
Score 3	Less agree
Score 2	Disagree
Score 1	Strongly disagree

Source: (Arikunto, 2015) with modification understudy

The inferential descriptive statistical method and t-test were used as the data analysis method (Anas, 2015). However, the prerequisite analysis test was conducted first, namely the normality test using the Chi-Square test and the homogeneity test using the F-test. After these prerequisites were met, the hypothesis test using parametric statistics was done, namely by using the t-test to determine whether or not there was an effect of using the Metaphorical Thinking learning model on the students' interest in learning Mathematics of the fifth grade elementary school students in cluster Ki Hajar Dewantara, South Denpasar. With the provision of using a significance level of 5%, if $t_{count} > t_{table}$ the hypothesis H_0 was rejected and H_a was accepted and vice versa.

Result and Discussion

Based on the results of data analysis on the students' interest in learning mathematics of the experimental group, it is known that the result of the experimental group questionnaire data normality test using learning model Metaphorical Thinking was $X^2_{count} = 7.28 < X^2_{table} = 11.07$, then the experimental group questionnaire data was normally distributed. Meanwhile, the result of the control group questionnaire data normality test using conventional learning models was $X^2_{count} = 4.36 < X^2_{table} = 11.07$ which indicated that the data was normally distributed. The results of the variance homogeneity test of the questionnaire data regarding students' interest in learning mathematics, namely $F_{count} = 1.48$ with a significance level of 5%, the value of $F_{table} = 1.78$ was obtained. Thus, the value of $F_{count} < F_{table}$ and the data is stated to be homogeneous. Based on the results of the normality and homogeneity test, it can be seen that the obtained data from the experimental group and the control group are

normally distributed and have homogeneous variances. Since the obtained data had met all the prerequisites, hypothesis testing was conducted using t-test analysis. The testing criteria were if t-count ≤ t-table, then H_o was accepted (fails to be rejected) and H_a was rejected. Conversely, if t-count > t-table, then H_o was rejected and H_a was accepted with db = n1 + n2 –2 and a significance level of 5% ($\alpha = 0, 05$) or a confidence level of 95%. The t-test result was presented in Table 3.

Table 3. The Analysis Result of T-Test Data *Post-test*

Sample	Average	Variance	Dk	N	t_{count}	t_{table}	Summary
Experimental Group	84,50	197,94	68	38	2,256	2,000	H_o is rejected
Control Group	76,66	294,49		32			

Source: The Result of Study

In this study, the tested hypothesis was H_0, namely, there was no significant difference between students who were taught using the Metaphorical Thinking learning model and groups of students who were taught using conventional learning models in the fifth grade. In testing the hypothesis using the t-test, there is a provision, namely, if the value of $t_{count} > t_{table}$ means that H_o is rejected and H_a is accepted (Sugiyono, 2017). Based on the results of the t-test in this study, the value of $t_{count} > t_{table}$ (2.256 > 2,000) was obtained, and it means that H_o is rejected and H_a is accepted. Thus, in this study it is stated that the Metaphorical Thinking learning model significantly influences students' interest in learning mathematic of the fifth grade elementary school students in cluster Ki Hajar Dewantara, South Denpasar.

Based on the research data, it is known that the Metaphorical Thinking learning model can increase the students' interest in learning mathematics of the fifth grade elementary school students compared to conventional learning model in the control group. Students who are taught using the Metaphorical Thinking learning model tend to be more active during learning, this is also in line with a study conducted by (Setiawan, 2018) which states that the use of the Metaphorical Thinking learning model makes students more enthusiastic in learning. The metaphorical thinking approach is a learning approach that is used to understand and explain abstract concepts to become more concrete things by comparing two or more things with different meanings, both related and unrelated (Setiawan, 2016; Roesdiana, 2016). The characteristic of the metaphorical thinking approach is that it bridges abstract concepts into more concrete things. It is because the activity of metaphor thinking is a part of assembling the problems in questions into everyday life (Malik, 2017; Setiawan, 2016). Metaphorical thinking is a bridge between models and interpretations, providing great opportunities for students to explore their knowledge in learning mathematics, and students learning processes become meaningful because students can see the relationship between the concepts that they learn and they are familiar with.

The use of the Metaphorical Thinking learning model also allows students to find many new ways of solving problems, in this context, solving mathematics problems. The indicators of metaphorical thinking, namely, First, Connect, connecting two different ideas (material); Second, Relate, connecting different ideas with prior knowledge; Third, Explore, making models; Fourth, Analyze, describing the similarity of the two previous ideas, reviewing the steps; Fifth, Transform, concluding information based on what has been done; Sixth, Experience, applying the obtained results to the problems at hand (Setiawan, 2016). Metaphorical thinking is an ability that must be mastered by students to improve their mathematical understanding because many mathematical concepts are abstract, as the nature of mathematics itself (Payadnya, 2020). Metaphorical thinking is a learning process that emphasizes the use of metaphors to understand a learning concept. Students will be invited to connect various existing concepts to solve the given problems independently. (Widyasari, 2016) states that this learning model can make students solve the given problems faster. By knowing how to solve problems directly, students will have an interest and pleasure in the material being taught and it will have an immediate impact on learning outcomes. This fun learning will have the advantage in grasping all the information in its entirety so that students' abilities can be improved (Najib 2016). This fun learning is also known as meaningful learning. The more meaningful learning will indirectly increase students' motivation and interest in learning so that their abilities will also increase.

The results of this study are also supported by several previous studies, namely a study conducted by (Lesmana et al., 2018) show that metaphorical thinking can improve students' mathematical generalization abilities. A study conducted by (Bernard & Senjayawati, 2019) show that GeoGebra software assisted metaphorical thinking can improve mathematical connection skills among students. A study conducted by (Nurhikmayanti, 2017) shows that metaphorical thinking can improve students' mathematical understanding and reasoning abilities.

Based on the explanation above, it can be said that metaphorical thinking can increase the interest in learning mathematics of the fifth grade elementary school students in Cluster Ki Hajar Dewantara, South Denpasar, academic year 2019/2020. It is because students are more active during learning mathematics, solving problems given by the teacher faster, and increasing student enthusiasm. The implementation of the metaphorical thinking

model can be used as a guideline and reference for teachers in designing and creating an active learning atmosphere that can increase students' interest in learning.

Conclusion

Based on the result of data analysis in this study, it can be concluded that there is a significant difference on students' interest in learning mathematics between classes of students who are taught using the Metaphorical Thinking learning model and students who are taught using the conventional model in the fifth grade elementary school in Cluster Ki Hajar Dewantara, South Denpasar in academic year 2019/2020. It proves that the use of the Metaphorical Thinking learning model has a positive effect on students' interest in the fifth grade elementary school in learning mathematics.

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