

THE EFFECTIVENESS OF THE GUIDED DISCOVERY *LEARNING MODEL* THROUGH A CONTEXTUAL APPROACH TO THE ABILITY OF MATHEMATICAL REPRESENTATION AND STUDENTS' INTEREST IN LEARNING MATHEMATICS IN CLASS VIII MTS AL MA'ARIF, SERANG REGENCY

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ABSTRACT

Students' mathematical representation ability and interest in learning mathematics are still low. The purpose of this study is to determine the effectiveness of the *Guided Discovery learning model* through a contextual approach to students' mathematical representation abilities and mathematical learning interests. The research method uses an experimental type of research. The population in this study is the entire class VIII MTs Al Ma'arif. The selected samples were class VIII A and class VIII D. Data collection techniques by providing mathematical representation ability test questions, and mathematical learning interest questionnaires. The results of data analysis show that the *Guided discovery learning model* through a contextual approach is effective for students' mathematical representation abilities and mathematical learning interests.

Keywords: Guided discovery *learning model*, mathematical representation ability, interest in learning mathematics

INTRODUCTION

Education has been regulated in Law of the Republic of Indonesia Number 20 of 2003 which contains the national education system article 1 paragraph 1 which reads that education is a conscious and planned effort to create a learning atmosphere and learning process so that students actively develop their potential to have religious spiritual strength, self-control, personality, intelligence, noble character, and skills needed by themselves, society, nation, and state (Government of Indonesia, 2003). Based on the Law, it can be said that education is one of the supports for the progress of a nation and education has become a necessity for humans for their future.

Education in Indonesia has a structured and tiered path consisting of primary education, secondary education, and higher education. At every level, Mathematics becomes a subject that always exists and becomes one of the subjects that must be learned by students (Bani & Abdullah, 2021). In its implementation so far, there are often

teachers who only provide material theoretically (Amieny & Firmansyah, 2021). This results in students in solving Mathematics problems tend only to follow the method or formula that has been taught by the teacher, so that the way students use in solving Mathematics problems does not vary. Even though in learning Mathematics there are learning objectives that students must achieve, these learning objectives are the standards of mathematical ability that students must have.

According to the *Principles and Standards for School Mathematics* in 2002 there are five mathematical abilities that students must master in learning mathematics, namely: problem solving, reasoning and proof, communication, connection, and representation. The ability of representation is one of the essential abilities mastered by students, in line with what is stated in the Minister of Education and Culture Regulation Number 58 of 2014 which states that "Students can understand Mathematical concepts with one of the indicators being able to present concepts in

various forms of mathematical representation, such as tables, graphs, diagrams, images, sketches, Mathematical models, and others".

According to Saputra (2021) There are several reasons why the need for representation skills in learning Mathematics, which can provide students fluency in building a strong and flexible concept. Then in communicating these mathematical ideas students need to represent them in various ways, namely in the form of written symbols, pictures (models), numbers, words or sentences so that they are easy to understand and can find solutions to problems (Ramadan & Aini, 2021).

In fact, the ability of mathematical representation in Indonesia is still categorized as low. This can be seen from the results *Trends in International Mathematics and Science Study* (TIMSS) in 2015, which has the characteristics of a problem whose substance is contextual, demands reasoning, argumentation, and creativity (Fauziah, 2020). From the test results in the field of Mathematics, Indonesia ranked 45 out of 50 countries and got an average score of 397 (Indriani & Noordiana, 2021), while the international average score is 500 (Hadi & Novaliyosi, 2019). The low test results and rankings obtained from the test are influenced by several factors, one of which is that Indonesian students are less familiar with story questions with a contextual approach, demanding reasoning, argumentation, and creativity in solving them (Saraswati & Agustika, 2020).

When talking about story-shaped problems, of course, it cannot be separated from a mathematical representation, representation is needed because Mathematics is a study that contains abstract ideas, so it is not easily understood by someone without a representation (Khairunnisa, As'ari, & Susanto, 2018). In solving story problems, students must first represent the problem in various forms such as symbols, pictures, numbers or diagrams to make it easier for students to solve the problem.

In addition to the factors that have been explained, students' interest in learning mathematics is also one of the factors for student success in learning Mathematics (Anggraini, Delyana, & Sari, 2022). Because interest in learning will affect learning activities and outcomes (Hendriana, Rohaeti, & Sumarmo, 2017). However, based on facts in the field, it is known that students' interest in learning mathematics is still low (Sunita, Mahendra, &

Lesdyantari, 2019). In line with this, according to Sunita, et al. (2019) low interest in learning and learning outcomes of Mathematics due to the use of monotonous learning models, so that students become less active in the learning process.

Departing from these problems, researchers conducted pre-research observations in class VIII MTs Al Ma'arif. Based on the results of interviews with teachers of Mathematics subjects, it is said that students' interest in learning Mathematics is still very minimal and students also still do not master the ability of mthematic representation with story problems using a contextual approach. Then in learning the teacher uses only the lecture method, and assignments

From these problems, there is a need for innovation in learning to improve the ability of mathematical representation and interest in learning mathematics students. According to Badriyah (2021) To improve these abilities, teachers need to design and develop effective learning strategies or models. The selection of learning models used in learning is a factor that affects the effectiveness and efficiency of the teaching and learning process (Sari, Hendriyono, & Lestiani, 2022). In addition, learning must also be able to support cognitive understanding, good learning attitudes, and knowledge experience, so the learning model used must focus on creativity, and student independence in solving problems (Sari, et al. 2022). Learning must also prioritize student activity in expressing ideas or ideas they have, students are required to explore, process, and use their potential and knowledge optimally (Sukma, Asnawati, & Widyastuti, 2019). That way Mathematics learning will become more meaningful for students so that the desired learning goals will be achieved optimally. One alternative learning model used so that students can build their understanding independently and be actively involved in learning is to apply the guided discovery model or *Guided Discovery*.

Learning model *Guided Discovery* is a student-centered learning model (Setyawati & Dwiyan, 2021). According to Sukma, et al. (2019) *Guided Discovery* is the implementation of discoveries made under the guidance of the teacher, the learning starts from the teacher asking various questions that track with the aim of directing students to the point of conclusion, then students conduct experiments to prove the opinions expressed. Correspondingly, according to Bruner's theory, learning discovery is in accordance with the active search for knowledge

by humans and trying to find solutions to problems and the knowledge that accompanies them, producing significant knowledge (Al-Tabani, 2014). Therefore, with the learning model *Guided Discovery* Or guided discovery, students will be directly involved in the learning process so that they are able to use their mental processes to find concepts and theories that are being studied and foster Shiva's creativity.

In addition to the learning model, the selection of approaches used in the method is also an essential factor. According to Agus (2019) said that students will learn best if what they learn has relevance between the knowledge they know and everyday life. One of the appropriate approaches used is the contextual approach, because the contextual approach emphasizes learning to the process of involvement as a whole to be able to find the material learned and relate it to everyday life (Zuriatni, Budiasih, & Sumari, 2019) This is in line with the problems experienced by students at MTs Al Ma'arif on the Cartesian Coordinates material whose material can be related to everyday life.

From what has been described above, researchers are interested in conducting research entitled **"The Effectiveness of the Guided Discovery Learning Model through a Contextual Approach to the Mathematical Representation Ability and Mathematical Learning Interest of Students in Class VIII MTs Al Ma'arif, Serang Regency"**.

In general, this study aims to (1) determine the mathematical representation ability of students who use the *Guided Discovery* learning model through a contextual approach with students who use conventional learning models; (2) knowing the mathematical learning interests of students who use the *Guided Discovery* learning model through a contextual approach with students who use conventional learning models; and (3) knowing the effectiveness of the *Guided Discovery* learning model through a contextual approach to the mathematical representation ability and mathematical learning interests of students

RESEARCH METHODS

In this study, researchers used *a proper experimental design design the pretest posttest control group design*, namely by using *pretest* and *posttest*. The population in this study was all students of grade VIII MTs Al Ma'arif for the 2023/2024 academic year, while the sample in this

study was students from two classes, namely class VIII A and class VIII D MTs Al Ma'arif which were determined using a *simple random sampling technique*.

The technique of collecting data on students' mathematical representation ability is carried out by giving test questions to experimental classes and control classes before *learning (pretest)* and after learning (*posttest*). Furthermore, the technique of collecting data on students' mathematical learning interest was carried out by giving questionnaires to the experimental class and the control class after learning.

The data obtained are then analyzed inferentially and descriptively. The steps in analyzing the data are by testing normality with the *liliefors* test, homogeneity test using the F test, *t-test using the independent sample t-test*, and descriptive analysis to find the average value of mathematical representation ability and students' interest in learning mathematics. .

RESULTS AND DISCUSSION

Before the t-test, tests were first carried out on the normality and homogeneity of *pretest and posttest data and* descriptive analysis by finding the average value of the ability of thematic representation and questionnaires of students' mathematical learning interest. The following are presented the results of the normality test of the experimental class and the control class.

Table 1. Normality Test Results

Data	Nili Sig. <i>Pretest</i>	Sig value. <i>Posttest</i>
Experiment	0.200	0.099
Control	0.200	0.200

Based on table 1 it is known that the significance value of the *experimental class pretest* and the control class is 0.200 where the value of sig. > 0.05. Then the *posttest significance value of the experimental class and the control class* was 0.099 and 0.200 respectively, which means the value of sig. > 0.05. After the normality test is carried out, the homogeneity test is carried out. The results of the homogeneity test can be shown in the following table:

Table 2. Homogeneity Test Results

Data	Sig value. <i>Pretest</i>	Sig value. <i>Posttest</i>
Experiments and Controls	0.108	0.089

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Based on table 2 shows that the significance value (sig.) of the experimental class and control class *pretest and posttest data* is 0.108 and 0.089, which means that the value of sig. > 0.05. After a normality test and homogeneity test, it was found that the data were regular and homogeneous. Therefore, it can be continued by testing the hypothesis using a t-test. Here is a t-test of students' mathematical representation ability.

Table 3. Mathematical Representation Ability t-Test Results

Data	Sig. 2 tailed	Information
Experiments and Controls	0.00	H0 rejected H1 accepted

Based on table 23, it can be seen that the significance value is 0.00 which means the sig value. < 0.05 so that H0 is rejected and H1 is accepted. Next, here are the results of the t-test of students' mathematical learning interest.

Table 4. Mathematical Learning Interest t-Test Results

Data	Sig. 2 tailed	Information
Experiments and Controls	0.00	H0 rejected H1 accepted

Table 4 shows that the significance value is 0.00 which means the sig value. < 0.05 so that H0 is rejected and H1 is accepted. Furthermore, after the hypothesis is carried out using the t-test, the next step is to find the average value using descriptive analysis.

Table 5. *Posttest Average Score of Mathematical Representation Ability*

Data	Experiments	Control
Mean	93,45	82,38

Based on table 5, it shows that the average score of the mathematical representation ability of the experimental class after learning got a value of 93.45 and in the control class got an average value of 82.38.

Table 6. Average Score of Mathematical Learning Interest

Data	Experiments	Control
Mean	68,71	58,52

Based on table 5, it shows that the average score of the experimental class mathematical

learning interest questionnaire was 68.71 and the control class got a score The average was 58.52.

After data analysis, results were obtained showing that there were differences in students' mathematical representation abilities on cartesian coordinate material given the Guided discovery learning model through a contextual approach with students given conventional learning models at MTs Al Ma'arif, these findings were in line with previous research whose results could be concluded that the model *Guided Discovery* affect students' mathematical representation ability (Sukma, 2019).

Furthermore, there are differences in students' mathematical learning interests given the guided discovery learning model through a contextual approach with students who are given a consequential learning model. This can be seen from the results of the average score of experimental class students is greater than the average score of the control class, which means that experimental class students have a higher interest in learning than the control class. . In line with this, the results of previous studies also showed that there were differences in the interest of mathematical learning students in experimental classes and control classes (Sunita et al, 2019).

Based on this, the use of learning models *Guided discovery* Through a contextual approach to provide meaningful experience and learning for students in solving mathematical problems independently, learning models *Guided Discovery* frees students to explore their ability to investigate a formula through examples of topics given by the teacher and directed to understand the topic, so as to improve students' mathematical representation skills and interest in learning mathematics (Agtiananda, 2021).

Based on the results of previous research, it shows that contextual approaches based on local culture are practical in terms of learning achievement, interest in learning, and appreciation of mathematics (Sulistyawati, 2020), also in other studies found the results that the learning model *Guided Discovery* Using a practical contextual approach in terms of critical thinking skills, learning achievement, and *Self efficacy* mathematics (Agus, 2019). Then in another study got the results that the model *Guided Discovery Learning* affect students' mathematical representation ability (Sukma, 2019).

From several explanations from previous research and the results of the analysis that have been described, it can be concluded that the

Guided discovery learning model through a contextual approach is effective for students' mathematical representation abilities and mathematical learning interests.

CONCLUSION

Based on the results of research that has been conducted at MTs Al Ma'arif, Serang Regency, it can be concluded as follows:

1. There are differences in the mathematical representation ability of students who use the *Guided discovery learning model* through a contextual approach in the experimental class, with students who obtain the learning model as usual in the control class
2. There are differences in mathematical learning interests of students who use the *Guided discovery learning model* through a contextual approach in the experimental class, with students who obtain the usual learning model in the control class
3. The *Guided discovery learning model* through a contextual approach is effective for students' mathematical representation abilities and mathematical learning interests.

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