



# The Guided Inquiry Learning Model Aided by Audiovisual Media Improves Students' Mathematics Learning Outcomes

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## ABSTRAK

Rendahnya hasil belajar matematika siswa disebabkan karena kurangnya kemampuan guru dalam menerapkan model serta media pembelajaran yang tepat dalam kegiatan belajar mengajar. Adapun tujuan dari penelitian ini yakni untuk mengetahui perbedaan hasil belajar matematika antara kelompok kelas eksperimen dengan penerapan model pembelajaran inkuiri terbimbing berbantuan media audiovisual dan kelompok kelas kontrol yang diterapkan model pembelajaran konvensional di kelas III SD. Penelitian ini tergolong kedalam jenis penelitian eksperimen semu. Populasi dalam penelitian ini yakni seluruh siswa kelas III SD yang berjumlah 97 orang siswa. Penarikan sampel dalam penelitian dilakukan dengan menggunakan teknik random sampling atau pengambilan sampel secara acak. Adapun jumlah sampel dalam penelitian ini yakni 60 siswa kelas III SD. Pengumpulan data menggunakan tes hasil belajar berupa instrumen tes objektif, tes diberikan secara perseorangan untuk mengetahui hasil belajar siswa. Tes yang berbentuk objektif ini memuat 15 butir soal dengan pilihan jawaban a, b, dan c. Data hasil penelitian kemudian dianalisis dengan teknik analisis deskriptif yang memuat mean (nilai rata-rata), modus, median (nilai tengah), dan standar deviasi dengan menggunakan bantuan IMB SPSS Software 25. Hasil analisis data menunjukkan bahwa terdapat pengaruh model pembelajaran inkuiri terbimbing berbantuan media audiovisual terhadap hasil belajar matematika siswa kelas III SD. Disimpulkan bahwa model pembelajaran inkuiri terbimbing berbantuan media audiovisual dapat meningkatkan hasil belajar siswa sekolah dasar.

## ABSTRACT

The low student mathematics learning outcomes are due to the teacher's lack of ability to apply appropriate learning models and media in teaching and learning activities. This research aims to discover the differences in mathematics learning outcomes between the experimental class group by applying the guided inquiry learning model assisted by audiovisual media and the control class group, which applies the conventional learning model in third-grade elementary school. This research belongs to the type of quasi-experimental research. The population in this study were all third-grade elementary school students, totaling 97 students. Sampling in this study was carried out using random sampling techniques or random sampling. The number of samples in this study was 60 third-grade elementary school students. Data collection uses a learning achievement test as an objective instrument; the test is given individually to determine student learning outcomes. This objective test contains 15 questions with answer choices a, b, and c. The research data were then analyzed using descriptive analysis techniques, which included the mean, mode, median, and standard deviation using IMB SPSS Software 25. The results of the data analysis showed that there was an influence of the assisted guided inquiry learning model. Audiovisual media on the mathematics learning outcomes of third-grade elementary school students. It was concluded that the guided inquiry learning model assisted by audiovisual media can improve the learning outcomes of elementary school students.

## 1. INTRODUCTION

Education in the 21st century is a transitional period from the developed curriculum, from a teacher-centered learning process to student-centered learning (Indarta et al., 2022; Puadah & Rustini, 2022). 21st-century education is carried out with the aim that students can master all skill demands in 21st-century education, such as students having a critical, innovative, creative mindset, able to solve their

problems, and being able to work together (Andrian & Rusman, 2019; Rahayu et al., 2022). In the implementation of 21st-century education, schools and education staff are required to be able to change the teacher-centered learning approach to student-centered so that teachers and schools can create a generation that has a critical mindset, collaborates, is proficient in communicating, and can solve problems (Sugara & Mutmainah, 2020; Wulansuci et al., 2022). A critical mindset, such as mathematics, needs to be developed in the learning process. Mathematics is a field of science that examines numbers, space, symbolic language, numeric, and patterns of shapes and structures that are presented through abstract and deductive science so that they can develop patterns of critical and logical thinking (Eismawati et al., 2019; Sinaga, 2023; Widiarti et al., 2021). Mathematics can be formed from empirical human experience. Then this experience will be processed in the world of ratios, which is processed analytically with the reasoning in cognitive structures so that the formation of mathematical concepts is understandable by others and can be manipulated precisely. That is why mathematics uses symbols that refer to a meaning or term but are simplified in form so that someone who is learning them becomes easy (Pasani et al., 2018; Pratiwi & Wiarta, 2021; Sakiah & Effendi, 2021; Wuyung & Widiastuti, 2020). The function of mathematics education itself is to develop the ability to count, measure, derive, and use mathematical formulas needed in everyday life (Armin & Purwati, 2021; Marjuki et al., 2021). In addition, mathematics also functions as a means of developing the ability to communicate ideas with language through mathematical models, which can be in the form of sentences, problems, diagrams, tables, or graphs (Aditya, 2018; Naharir et al., 2019; Octavyanti & Wulandari, 2021). Well-executed mathematics education will create quality and highly competitive human resources.

The reality shows that students' mathematical abilities are still relatively low. It aligns with the initial observations made in the three SD Gugus II Rendang District. The observation results showed that out of 97 students, there were 31, or 30% of the total, with scores below the minimum completeness criteria. Furthermore, the interviews with the teacher and principal showed that when the teacher asked students to complete the questions or assignments, they had yet to complete them independently. Students think that mathematics is considered very difficult, complicated, and deadly among students. Low student learning outcomes can occur due to the tendency of teachers to apply conventional learning models so that learning is centered on the teacher (teacher center) and students only become listeners, so they are less actively involved in the learning process. Learning activities like that could be more exciting and varied for students. If left continuously, this will certainly impact not achieving learning objectives. Efforts can be made to overcome these problems by implementing an interesting learning model for students. The learning model is a conceptual framework that systematically guides teachers in learning and organizes learning experiences to achieve learning objectives (Arif et al., 2021; Fa'idah et al., 2019). The learning model is an important communication means in learning activities (Shabrina & Diani, 2019; Siahaan et al., 2020). The effectiveness of using learning models can be seen in how students respond to the learning process (Agustina et al., 2020; Chotimah et al., 2018). If the right learning model is selected, students will be actively involved in every stage of the learning process (Lestari & Premono, 2019).

One learning model that can be used to improve students' mathematics learning outcomes is the guided inquiry learning model. Guided inquiry is an inquiry learning model in which the teacher guides students or gives instructions to students, then students carry out each stage according to the syntax of the learning model itself (Fitriansyah et al., 2021; Lovisia, 2018; Suryantari et al., 2019). Guided inquiry not only develops intellectual abilities in the cognitive aspects of students, but all the potential that exists in students includes two other aspects, namely affective aspects and psychomotor aspects (Firdaus & Wilujeng, 2018; Komalasari et al., 2019). In the learning process, this model provides a lot of directions and questions to students. The syntax in this learning model has six stages: presenting problems, formulating hypotheses, designing experiments, conducting experiments to obtain information, collecting and analyzing experimental data, and making conclusions (Amijaya et al., 2018; Fitriansyah et al., 2021). The guided inquiry learning model requires students to be actively involved in the learning process, and the teacher is only a guide at every stage carried out by students (Fajriah et al., 2017; Nurmayani et al., 2018). It is very different from conventional learning models, where they are implemented as teacher-centered, where teachers have an important role in learning activities. Hence, students tend to be inactive in the learning process. The application of the guided inquiry learning model will be more effective if the use of audiovisual learning media accompanies it, this is because learning media can function as a tool and learning resource for students (Marwani et al., 2022; Sulfemi, 2019). Learning media is a tool that can convey messages (Himawan, 2022; Wahyuni et al., 2019). Media can be interpreted as conveying a message to the recipient (Rifmasari & Nuvus, 2021; Suastika & Lestari, 2021). One of the media that is now widely used in the learning process is audiovisual learning media. Audiovisual learning media is a learning tool presented by loading various sounds and images adapted to the subject matter (Darihastining et al., 2020; Khoiriyah et al., 2021; Pratama et al., 2018). The use of audiovisual learning

media will be able to help students to concretize various abstract concepts presented in learning material (Saputro et al., 2021; Setiyawan, 2021). The application of appropriate learning media will influence the student's understanding of each concept being studied so that it will be related to the learning outcomes obtained by students (Antari, 2020; Yanti et al., 2020).

Several previous studies have revealed that audiovisual media can improve second-grade reading skills in elementary school (Saputro et al., 2021). Other studies reveal that using the guided inquiry learning model assisted by concrete object media positively affects scientific attitudes and students' science learning outcomes (Suryantari et al., 2019). Further research revealed that the inquiry method could significantly increase students' motivation and social science learning outcomes in the fourth grade of elementary school (Rahmadani, 2018). Based on some of the results of these studies, the guided inquiry learning model and audiovisual media can positively influence student learning processes. In previous research, no studies specifically discussed the effect of the guided inquiry learning model assisted by audiovisual media on the mathematics learning outcomes of third-grade elementary school students. So this study focused on knowing differences in mathematics learning outcomes between the experimental class group with the application of the guided inquiry learning model assisted by audiovisual media and the control class group, which applied the conventional learning model in the third grade of elementary school.

## 2. METHOD

This type of research is quasi-experimental research (Quasi-Experimental Research). The population of this study was third-grade students at SD Gugus II, Rendang District, which consisted of five elementary schools. The number of population in this study can be seen in Table 1.

**Table 1. Research Population**

No	Elementary School Name	Class	Number of Students
1	SD N 1 Rendang	Third Grade	31 students
2	SD N 2 Rendang	Third Grade	29 students
3	SD N 3 Rendang	Third Grade	12 students
4	SD N 4 Rendang	Third Grade	14 students
5	SD N 5 Rendang	Third Grade	11 students
<b>Total</b>			<b>97 students</b>

After knowing the population size in this study, an equivalence test was carried out to determine whether the abilities of third-grade students in each school were equivalent. The test used the one-way ANOVA test on the odd midterm test in mathematics at a significance level of 5% to obtain an output of 0.237. So that count < ttable or 0.237 < 0.05. The results of this equivalence test show that it is significant that the results of the odd mid-semester test results for mathematics in third-grade elementary school students in Cluster II Rendang District for the 2022/2023 academic year are equivalent. Of the five schools in Cluster II of Rendang District, two schools were selected as samples: SD N 1 Rendang as the experimental group and SD N 2 Rendang as the control class. The sample was selected using random sampling or random sampling. The design of this study is the Post Test Only Control Group Design. Data collection uses a learning achievement test as an objective test instrument. The test is given individually to determine student learning outcomes. This objective test contains 15 questions with options a, b, and c. Furthermore, the data is measured by measuring instruments of learning outcomes, namely the validity of test items, content validity, reliability, difficulty level, and discriminating power.

Based on the content validity test, the results obtained were 15 valid questions. The reliability test results with the KR 20 formula get the result  $r_{11} = 0.87$  in the very high category. Then proceed with the test of difficulty, which gets the results of 4 questions in the medium category and 11 questions in the easy category. Furthermore, the last is the test of discriminating power which produces two items in the very good category, 8 in the good category, and 5 in the fairly good category. The data analysis is converted using descriptive analysis, which includes the mean (average value), mode, median (middle value), and standard deviation. Data processing uses the help of IMB SPSS Software 25. Before testing for concluding, a prerequisite test is carried out, including a test for normality of data distribution and a test for homogeneity of variants—hypothesis testing using the t-test or Independent Sample T-Test. The normality test results at a significance level of 5% are generated > 0.05. Then the data is said to be normal. If the results of the normality test are fulfilled, then it is continued with a homogeneity test with a significance level of 5% > 0.05, then the data is said to be homogeneous. Both prerequisite tests are met, then proceed with hypothesis testing using the t-test to decide on this t-test, namely if the sig. (2-tailed)

value  $<0.05$ , then  $H_0$  is rejected and  $H_1$  is accepted. Vice versa, if the value of sig. (2-tailed)  $> 0.05$ , then  $H_0$  is accepted, and  $H_1$  is rejected. So, the guided inquiry learning model assisted by audiovisual media influences the mathematics learning outcomes of third-grade students in Cluster II Rendang District in the 2022/2023 Academic Year.

### 3. RESULT AND DISCUSSION

#### Result

Based on the results of data analysis of mathematics learning outcomes for third-grade students in the experimental group and the control group, the results can be seen in Table 2.

**Table 2.** Description of the Data on Mathematics Learning Outcomes of the Experimental Group and the Control Group

Statistic	Experiment Group	Control Group
Mean	72.42	49.75
Median	73.00	47.00
Standard Deviation	13.35	18.46
Minimum Value	47.00	20.00
Maximum Value	100.00	93.00

Based on the data in Table 2, it can be seen that the experimental class group values include mean = 72.42, median = 73, standard deviation = 13.35, minimum value = 47, and maximum value = 100, higher than the value of control class group, namely mean = 49.73, median = 47, standard deviation = 18.46, minimum value = 20 and maximum value = 93. By the results of the analysis of the data description, the average results of the experimental class learning outcomes applied to the media-assisted guided inquiry learning model audiovisual of 72.42 are higher than the average value produced by the control class group with the application of conventional learning models of 49.75. After the data description, the test is continued with the prerequisite test, namely the normality test of data distribution and the homogeneity of variance test for both the experimental and control classes. In more detail, the normality test results are presented in Table 3.

**Table 3.** Results of the Normality Test for the Distribution of Experimental Group Data and the Control Group

Class Group	Signification	
	Kolmogorov - Smirnov	Shapiro Wilk
Experiment Class Group	0.200	0.218
Control Class Group	0.200	0.534

The normality test results showed that the significance value of the control and experimental classes in the Kolmogorov - Smirnov and Shapiro-Wilk calculations is greater than 0.05 ( $> 0.05$ ). Kolmogorov - Smirnov calculations yielded  $0.200 > 0.05$  in the experimental and control groups and Shapiro Wilk in the experimental group with results of  $0.218 > 0.05$  and Shapiro Wilk in the control group with results of  $0.534 > 0.05$  so that both data were normally distributed. After the normality test results are normally distributed, it is continued with the homogeneity test. The results of the homogeneity test show that the homogeneity value of the variance is 0.105, so it is greater than 0.05 ( $0.105 > 0.05$ ), so it can be stated that the data distribution of students' mathematics learning outcomes is homogeneous. After doing the descriptive and prerequisite tests, the test is continued to the hypothesis test, namely the t-test. The result obtained is 0.000 on sig (2-tailed). The basis for decision making, namely the basis for decision-making in this t-test, namely, if the value of sig. (2-tailed)  $<0.05$ , then  $H_0$  is rejected and  $H_1$  is accepted. Vice versa, if the value of sig. (2-tailed)  $> 0.05$ , then  $H_0$  is accepted, and  $H_1$  is rejected. Based on the results of the hypothesis testing that has been done, the results obtained are sig. (2-tailed) is less than 0.05 ( $0.000 <0.05$ ), meaning that  $H_0$  is rejected and  $H_1$  is accepted. Therefore, it can be concluded that implementing the guided inquiry learning model assisted by audiovisual media significantly affects the mathematics learning outcomes of third-grade students at SD Gugus II Rendang, Rendang District.

#### Discussion

Based on the data analysis above, it is obtained that the results of learning mathematics in the third-grade students of SD N 1 Rendang as the experimental group and SD N 2 Rendang as the control



class have significant differences. These results then indicate that the application of the learning model has an influence or impact that is quite efficient in improving learning outcomes, especially in mathematics (Amijaya et al., 2018; Fitriansyah et al., 2021). The use of the student-guided inquiry model is more oriented toward instructions and guidance by the teacher in discovering and understanding each learning concept (Arif et al., 2021; Fa'idah et al., 2019). The guided inquiry model is a learning model that refers to discovery activities and investigations and explains the relationship between objects and events (Fitriansyah et al., 2021; Lovisia, 2018; Suryantari et al., 2019). Students will be directly confronted with a problem with the aim of students getting real experience and remembering the material being studied better (Agustina et al., 2020; Chotimah et al., 2018). The results showed that the experimental class group experienced a fairly rapid increase in learning outcomes. These results are because students can be actively involved in the learning process so that students can well understand the concepts in the learning, while the teacher is only a mentor or supervisor (Arif et al., 2021; Fa'idah et al., 2019; Lestari & Premono, 2019). The students' activeness in the class can be seen from applying each stage of the guided inquiry learning syntax. How do students interact with their group mates? Learning mathematics is very suitable to be applied using the inquiry learning model. This is because the inquiry model can train students to be more actively involved in learning activities using critical thinking and analysis to find answers to their problems (Fajriah et al., 2017; Nurmayani et al., 2018).

The guided inquiry learning model's teaching and learning process requires students to find concepts through the necessary directions from a teacher. The clues are generally in the form of a leading question. In addition to asking questions, the teacher can provide the necessary explanations for conducting experiments, such as explaining how to continue the experiment (Shabrina & Diani, 2019; Siahaan et al., 2020). More guidance is given in the early stages and less over time. The learning process using this model focuses more on student activity. In other words, the guided inquiry learning model places students as learning subjects. In the learning process, students not only act as recipients of lessons through the teacher's explanation but also find their concepts from the lesson. Applying the guided inquiry learning model assisted by audiovisual media in mathematics can improve student learning outcomes, especially in folding and flat rotation symmetry (Rifmasari & Nuvus, 2021; Suastika & Lestari, 2021). With the help of audiovisual media, students can see directly each stage of the process of discovering folding and rotating symmetries in plane shapes (Darihastining et al., 2020; Khoiriyah et al., 2021; Pratama et al., 2018). The use of audiovisual media in this experimental class is considered appropriate considering the enthusiasm and motivation of students, who tend to be very enthusiastic about participating in learning activities (Himawan, 2022; Wahyuni et al., 2019). The selection of this media is an innovation in learning activities and is one of the positive impacts of the influence of technology in the world of education (Saputro et al., 2021; Setiyawan, 2021). The results obtained in this study align with previous research results, which also revealed that the use of audiovisual media can improve second-grade reading skills (Saputro et al., 2021). Other studies reveal that using the guided inquiry learning model assisted by concrete object media positively affects scientific attitudes and students' science learning outcomes (Suryantari et al., 2019). Further research revealed that the inquiry method could significantly increase students' motivation and social science learning outcomes in the fourth grade of elementary school (Rahmadani, 2018). Based on some of the results of these studies, the guided inquiry learning model and audiovisual media can positively influence student learning processes.

#### 4. CONCLUSION

Based on the results of data analysis and discussion, it can be concluded that there is an influence of the guided inquiry learning model assisted by audiovisual media on the mathematics learning outcomes of third-grade elementary school students. In addition, the guided inquiry learning model is also very helpful for teachers in conveying information, and learning objectives are achieved and integrated with audiovisual media based on images and sounds.

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