



The Effectiveness of the Discovery Learning Model with a Scientific Approach to the Learning Outcomes of Mathematics Students of Class VII of Al-Azhar Paron Middle School

Inayatul Husniyah^{1*}, Arum Dwi Rahmawati², Budi Sasomo³

^{1,2,3}STKIP Modern Ngawi, Indonesia

Email: inayatulhusniyah1@gmail.com; arum.dr21@gmail.com; sasomo77@gmail.com

Article Info:

Accepted: 10 July 2024; Approve: 25 July 2024; Published: 31 July 2024

Abstract: This research was conducted at Al-Azhar Paron Middle School with the aim of finding out whether the discovery learning model with a scientific approach was more effective than conventional learning models on the mathematics learning outcomes of class VII students at Al-Azhar Paron Middle School. The research used is Quasi Experimental research with a Nonequivalent Control Group Design which consists of two research groups, namely an experimental class with a Discovery Learning learning model with a scientific approach and a control class with a conventional learning model. The population in this study were class VII students at Al-Azhar Paron Ngawi Middle School. The research sample was taken using a saturated sampling technique (sample determination when all members of the population are used as samples). The prerequisite test carried out was a normality test using the Lilliefors method and a homogeneity test was carried out to see the similarity of the variants in the two groups. Data were analyzed univariately with a significance level of 5% (0.05) for hypothesis testing using the t-test. The results of the research show that the learning outcomes of students who use the discovery learning model with a scientific approach compared to the conventional learning model are more effectively applied in class VII of Al-Azhar Middle School. The results of calculations using the t test obtained $t_{\text{count}} = 2.892$ while $t_{\text{(table)}} = 2.042$, which shows that $t_{\text{count}} > t_{\text{table}}$ at a significance level of 5% (0.05), meaning that H_0 is rejected, giving us confidence that the research hypothesis is accepted. These results can then be interpreted to mean that the application of the discovery learning model with a scientific approach is more effective than the conventional learning model on mathematics learning outcomes in class VII Al-Azhar Paron Middle School.

Keywords: *Effectiveness; Learning Model; Discovery Learning; Scientific Approach; Learning Outcomes.*

Corresponding Author: Inayatul Husniyah

This is an open access article
under the [CC BY SA](https://creativecommons.org/licenses/by-sa/4.0/) license.



1. INTRODUCTION

Education is an important thing in human life. Through education, a person can gain complex knowledge. A nation can prepare better human resources to build a better nation. One of the efforts made in building good human resources is through improving the quality of education in Indonesia

(Naibaho & Hoesein, 2021). Therefore, formative assessment is needed, namely an assessment that has three necessary components, namely feedback, peer-assessment, and self-assessment which aims to form understanding (Gloria & Sudarmin, 2018).

According to Hadi (2014), the pragmatism education paradigm sees the National Examination system as less appropriate to be applied in the education evaluation system in Indonesia because it only involves the formality of education, does not touch on more meaningful assessment results such as experience and skills in solving problems, so the government launched the Computer-Based National Assessment (ANBK) program. In educational units, the government organizes a Computer-Based National Assessment (ANBK) through AKM (Minimum Competency Assessment) which measures students' reading, writing, and arithmetic abilities. Reading and writing literacy is measured by giving students pictures, diagrams accompanied by long texts, then asking them to answer questions based on the students' analytical abilities regarding the data provided. Numeracy is given in the form of questions with pictures, diagrams, and long texts containing numbers, then students are asked to answer the questions by analyzing the numbers in the question data. The Computer-Based National Assessment (ANBK) is a program designed to assess the quality of each educational unit such as Schools, Madrasahs or equivalents at elementary and secondary levels (Setiyowati et al., 2022).

Berdasarkan hasil Asesmen Nasional Berbasis Komputer (ANBK) tahun 2023 di SMP Al-Azhar Paron, capaian kemampuan numerasi siswa berada pada peringkat menengah dengan 42,5% siswa sudah mencapai kompetensi minimum. Indikator kemampuan numerasi ini mengukur sejauh mana peserta didik mampu berpikir menggunakan konsep, prosedur, fakta, dan alat matematika untuk menyelesaikan masalah sehari-hari dalam berbagai konteks yang relevan. Meskipun hampir setengah dari siswa telah mencapai kompetensi minimum, upaya lebih lanjut masih diperlukan untuk mendorong lebih banyak siswa agar mencapai tingkat kompetensi yang diharapkan. Analisis lebih rinci menunjukkan bahwa kompetensi pada domain Aljabar memiliki skor terendah, yaitu 49,18, dibandingkan dengan domain Bilangan dan Geometri yang masing-masing memiliki skor 52,36 dan 52,64. Hal ini menunjukkan bahwa domain Aljabar memerlukan perhatian khusus untuk meningkatkan capaian numerasi siswa.

These efforts can be improved by improving the quality of learning. The quality of learning can be influenced by several factors including students, teachers, curriculum, teaching methods, and facilities and infrastructure. The learning system that occupies a structural and spearhead position is the teacher. Teachers have an important role in the learning process in implementing

educational goals. The application of learning models in learning activities is very important so that it can improve learning outcomes, because with this model teachers can create learning conditions that support the achievement of learning objectives (Naibaho & Hoesein, 2021).

Learning activities that invite students to find a new experience are very helpful for their learning outcomes, because through discovery learning, students are trained to learn independently by trying to solve the problems they face themselves so that they will get a better understanding because they are directly involved in solving the problems they are facing. Discovery learning is a learning model that in its application directs students to think critically, where in learning activities students are directed to be more active in identifying their own understanding of a problem discussed in learning activities (Naibaho & Hoesein, 2021).

The scientific approach is intended to provide students with an understanding so that they know, understand, and practice what is learned scientifically. So, in the learning process, students are taught to find out from various literature through the steps of observing, asking, trying, processing, presenting, concluding, and creating for the entire subject. Through a scientific approach, students learn based on the steps of the scientific method, so that through this study, the effect of the scientific approach on learning outcomes can be known (Putri, 2020). The results of pre-research observations in class VII of Al-Azhar Paron Middle School found several problems in the learning process. There were several students who lacked concentration when learning took place. In addition, there were several students who did not pay attention to their teachers while teaching. Student activity was also not apparent in the learning process. Students tend to be passive and only listen to what the teacher teaches so that learning in class is more in one direction. Learning in class is very dependent on the direction and control of the teacher. In addition, the teacher is the most important source of learning in learning. From the description above, the researcher is interested in conducting research on the Effectiveness of the Discovery Learning Model with a Scientific Approach on the Mathematics Learning Outcomes of Class VII Students of Al-Azhar Paron Middle School.

2. METHOD

Based on the research hypothesis, this type of research is quantitative research with a Quasi Experimental design consisting of two research groups, namely the experimental class with the Discovery Learning learning model with a scientific approach and the control class with a conventional learning model. In this study, the experimental class and the control class were not selected randomly so that the design in this study was in the form of a Nonequivalent Control Group

Design. According to Sugiyono (2014) Nonequivalent Control Group Design is the most popular approach in quasi-experiments, the experimental group and the control group were not selected randomly. The experimental group was given treatment using the Discovery learning learning model, while the control group which was the comparison group was not given treatment.

The population used in this study were all students of class VII of Al-Azhar Paron Middle School. This study uses a saturated sampling technique, determining the sample when all members of the population are used as samples (Sugiono, 2014). In this study, a sample of class VII A of 25 students will be taken as a control class and class VII B of 15 students as an experimental class at Al-Azhar Paron Middle School.

The variables in this study consist of dependent variables and independent variables. The dependent variable in this study is the learning outcomes of grade VII students in learning Mathematics on algebra material. While the independent variable in this study is the discovery learning model with a scientific approach in learning Mathematics on the main material of algebra for grade VII. The instrument used in this study is a test instrument. The test in this study uses 30 multiple choice questions. The test questions are used to measure student learning outcomes.

3. RESULTS AND DISCUSSION

Based on the results of the instrument test, it can be concluded that out of 30 questions, 16 questions meet the criteria and can be used. The questions are proven to be valid, have moderate to good discrimination power, and the level of difficulty is in the easy to moderate category. After ensuring the quality of the instrument, prerequisite tests were carried out which included normality tests and homogeneity tests. The normality test was carried out using the Liliefors test, which showed that the data in the experimental and control classes were normally distributed with an L_{count} value smaller than L_{table} . Furthermore, a homogeneity test was carried out to ensure that the research sample came from a homogeneous population, and the results showed that the data in both classes could be said to be homogeneous because F_{count} was smaller than F_{table} .

After ensuring that the data were normally distributed and homogeneous, a hypothesis test was conducted to determine the differences in learning outcomes between the experimental class and the control class. The results of the analysis showed that the average learning outcome of the control group was 74.75, while the average learning outcome of the experimental group was 84.167. With a t_{count} value of 2.892 and a t_{table} of 2.042 at a significance level of 5%, it

was found that the t_{count} was greater than the t_{table} , so H_0 was rejected and H_1 was accepted. This indicates that the use of the Discovery Learning model with a scientific approach is more effective in improving learning outcomes in Mathematics, especially in algebra material in class VII of SMP Al-Azhar Paron. This model seems to be successful in improving students' understanding of algebra material, which is caused by a more interactive and discovery-based learning method. The scientific approach applied allows students to be more active in the learning process, develop critical thinking skills, and apply mathematical concepts more contextually. Thus, the Discovery Learning model not only helps students understand the subject matter but also encourages them to be actively involved in the learning process, which ultimately results in significant improvements in learning outcomes. This finding is in line with previous studies that show that learning approaches that actively involve students tend to result in better academic achievement.

4. CONCLUSION

In the early stages before the research was conducted, the researcher collected some data from classes VII and VIII to be used as a trial of the research instrument. After obtaining a valid instrument, it was then used as a posttest for classes VII A and VII B. Based on data analysis, the calculation results obtained an average value for class VII A of 74.75 with a standard deviation (S) of 10.59 while the average value for class VII B was 84.17 with a standard deviation (S) of 8.79. From the calculation results of the posttest values of class VII A and class VII B, it is known that both classes are in normal and homogeneous conditions. The discovery learning learning model with a scientific approach was given to the experimental class, namely class VII B, while the control class (VII A) was given a conventional learning model. Based on the hypothesis that has been carried out using the t-test with $\alpha = 5\%$ and $dk = 38$, $t_{\text{count}} = 2.892$ was obtained with $t_{\text{table}} = 2.042$. Because $t_{\text{count}} > t_{\text{table}}$, then H_0 is rejected and H_1 is accepted, this means that the use of the Discovery Learning learning model with a scientific approach is more effective for learning outcomes in the Mathematics subject for class VII at Al-Azhar Paron Middle School.

REFERENCE

- Angkur, M. F. M. (2019). Penerapan Pendekatan Saintifik Pada Pendidikan Anak Usia Dini. *Jurnal Smart Paud*, 2(1), 37. <https://doi.org/10.36709/Jspaud.V2i1.5918>
- Deghe, M., Lawe, Y. U., & Awe, E. Y. (2022). Upaya Meningkatkan Aktivitas Dan Hasil Belajar Tematik Pada Tema Indahnya Keberagaman Di Negeriku Melalui Pendekatan Saintifik Pada Siswa Kelas Iv Sdi Waesia Kecamatan Golewa Kabupaten Ngada Tahun Ajaran 2019/2020.

- Jurnal Citra Pendidikan*, 2(3), 528–536. <https://doi.org/10.38048/Jcp.V2i3.655>
- Gloria, R. Y., & Sudarmin, S. (2018). Kontribusi Asesmen Formatif Dalam Tahapan Understanding By Design Terhadap Pemahaman Mahasiswa Calon Guru Biologi. *Jurnal Bioedukatika*, 6(2). <https://doi.org/10.26555/Bioedukatika.V6i2.9507>
- Hadi, S. (2014). Ujian Nasional Dalam Tinjauan Kritis Filsafat Pendidikan Pragmatisme. *Al Adzka*, 4(2). <https://doi.org/10.18592/Aladzkapgmi.V4i2.139>
- Marisya, A., & Sukma, E. (2020). Konsep Model Discovery Learning Pada Pembelajaran Tematik Terpadu Di Sekolah Dasar Menurut Pandangan Para Ahli. *Jurnal Pendidikan Tambusa*, 4(3).
- Naibaho, M. R. U., & Hoesein, E. R. (2021). Meta Analisis Model Discovery Learning Untuk Meningkatkan Hasil Belajar Ipa Siswa Sd. *Jpdi (Jurnal Pendidikan Dasar Indonesia)*, 6(1), 19. <https://doi.org/10.26737/Jpdi.V6i1.2290>
- Putri, K. E. (2020). Meta Analisis: Pendekatan Saintifik Terhadap Hasil Belajar Siswa. *Jurnal Pendidikan Dasar Nusantara*, 6(1), 127–135. <https://doi.org/10.29407/Jpdn.V6i1.14559>
- Rikmasari, R., & Rosesa, S. (2022). Model Pembelajaran Discovery Learning Sebagai Solusi Untuk Meningkatkan Hasil Belajar Pada Mata Pelajaran Ipa Siswa Sekolah Dasar. *Pedagogik (Jurnal Pendidikan Sekolah Dasar)*, 10(1), 39–46. <https://doi.org/10.33558/Pedagogik.V10i1.4606>
- Setiyowati, H., Suryati, E., & Rina, R. (2022). Analisis Pelaksanaan Asesmen Nasional Berbasis Komputer (Anbk) Di Madrasah Ibtidaiyah Negeri 9 Hulu Sungai Utara. *Al-Madrasah: Jurnal Pendidikan Madrasah Ibtidaiyah*, 6(3). <https://doi.org/10.35931/Am.V6i3.1086>
- Sulistiyono, P. I., Zakaria, P., Usman, K., & Abdullah, A. W. (2021). Deskripsi Hasil Belajar Matematika Ditinjau Dari Gaya Kognitif Siswa Kelas Viii Smp Negeri 6 Gorontalo. *Laplace : Jurnal Pendidikan Matematika*, 4(2). <https://doi.org/10.31537/Laplace.V4i2.556>