JURNAL
Pendidikan, Sains, Sosial dan Agama
SEKOLAH TINGGI AGAMA BUDDHA NEGERI RADEN WIJAYA WONOGIRI

The Effect Of The Discovery Learning Model On Students' Understanding Of Mathematical Concepts In Grade VIII

Mutiara Sani Rumapea[1] , Christa Voni Roulina Sinaga[2], Rick Hunter Simanungkalit[3]
Pendidikan Matematika, Universitas HKBP Pematang Siantar, Pematang Siantar, Indonesia
mutiararumapea2@gmail.com

Article History:
Received: 6 January 2025 ***Revised: 6 August 2025*** ***Published: 10 December 2025***

Abstract

This study aims to determine the effect of the Discovery Learning model on students' mathematical conceptual understanding in grade VIII of SMP Negeri 4 Pematangsiantar. The sample of this study was class VIII-10 consisting of 30 students. The research instruments were a questionnaire and a test. The questionnaire was used to identify the implementation of the Discovery Learning model, while the test was used to measure students' conceptual understanding of linear equations. The instruments consisted of 20 questionnaire items and 4 test items, which had been validated and declared reliable. The research design employed a one-shot case study. Data analysis included prerequisite tests (normality and linearity) and simple linear regression analysis. The results of the study showed the regression equation Y=6.571+0.411XY = 6.571 + 0.411X. The significance test revealed that tcount>ttablet_{count} > t_{table} (8.194 > 2.048) and sig. value < 0.05 (0.000 < 0.05), indicating a significant effect of the Discovery Learning model on students' mathematical conceptual understanding. The contribution of variable X (Discovery Learning model) to variable Y (mathematical conceptual understanding) was 70.6%..

Keywords: Learning Model, Discovery Learning, Mathematical Conceptual Understanding

INTRODUCTION

Education is a conscious and planned effort to create a learning atmosphere and learning process so that students actively develop their potential to possess spiritual and religious strength, self-control, personality, intelligence, noble character, and the skills needed by themselves, society, the nation, and the state (Law No. 20 of 2003). To achieve the goals of education, a learning process is necessary for various fields of study in schools, one of which is Mathematics (Safitri & Mediatati, 2021).

Mathematics is a universal science and until now has been the basis for the development of modern technology. Mathematics also plays a very important role in various sciences and contributes to the development of human thought. Mathematics learning must be taught so that students acquire analytical, logical, systematic, critical and creative thinking skills, as well as collaborative skills. The objectives of mathematics learning according to Permendiknas No. 22 of 2006 include: (1) Students have the ability to understand mathematical concepts; (2) Students can use reasoning on a pattern and nature;

(3) Students are able to solve problems; (4) Students are able to communicate an idea with symbols, diagrams, tables or other media in a problem; (5) Students can have an attitude of appreciating the function of mathematics in everyday life.

Based on the 2022 Program for International Student Assessment (PISA) announced on December 5, 2023, Indonesia ranked 68th out of 108 countries with a score of 397. Meanwhile, in the 2015 Trends in International Mathematics and Science Study (TIMSS), Indonesia ranked 44th out of 49 countries. These findings indicate that Indonesian students' mathematical abilities are still relatively low, so strategic and sustainable efforts are needed to improve the quality of mathematics learning at various levels of education. The low quality of education in Indonesia is also caused by students' lack of ability related to understanding mathematical concepts. According to Khairani, Maimunah, and Roza (2020), the low level of mathematical concept understanding is one of the factors causing the low quality of students' mathematics learning outcomes (Prasasti, Koeswanti, & Giarti, 2019) .

Dini et.,al (FAJRI, 2019) said that the ability to understand mathematical concepts is a very important ability to be mastered so that students can understand the concept of a material flexibly and precisely in understanding the different steps of the material and can use it efficiently. According to Rahayu, et al (Hi Rahman, Latif, & Saban, 2022) The ability to understand mathematical concepts is the ability of students when remembering ideas and being able to explain them using their language, applying them to a problem, connecting each concept they have (Astari, Suroso, & Yustinus, 2018) . This is in accordance with (Sayekti, 2020), Understanding mathematical concepts is an ability to capture and digest ideas then express them again in the form of mathematical expressions, create problem-solving algorithms in their own language, and apply concepts according to the knowledge they know. Therefore, understanding concepts is very fundamental in learning mathematics to make it more meaningful (Ana, 2018).

According to Rahayu et al., (Simanjuntak, Siregar, & Lumbangaol, 2019) the indicators used to measure mathematical understanding abilities are as follows: re-explaining a concept, grouping several objects according to certain properties according to the concept, presenting examples and non-examples of a concept, displaying a concept in various forms of mathematical representation, developing necessary or sufficient conditions for a concept, using and utilizing and selecting certain procedures or operations, applying problem-solving concepts or algorithms.

The ability to understand concepts is highly emphasized, one of which is in the Straight Line Equation material. This is because the Straight Line Equation is an initial concept where students can develop the concept of functions that have been studied previously (Oktari & Desyandri, 2020) . Based on the expected objectives in the curriculum, students can determine the equation of a line from two points whose coordinates are one or several points that are on a line whose equation is known. In reality, achieving this goal is not simple (Suyani, Astawan, & Renda, 2020) . The problems students face in understanding the concept of straight line equations are: 1) students are less precise in determining

formulas or are reversed in solving problems, 2) students do not understand the use of Straight Line Equation formulas in solving various problems because so far they have only memorized them, and 3) students do not understand real problems using Straight Line Equations in everyday life. This can be seen from the observation results at SMP Negeri 4 Pematang Siantar in grade VIII-7 students in answering mathematical concept understanding test questions held on April 30, 2025, it was seen that students were not yet able to solve mathematical problems where students could not state a concept correctly so that the students' answers were wrong (Astuti, Idrus, & Yennita, 2018) . This can be seen in the following picture:

Based on the answer given by one of the students is an answer that is still not quite right. In question 1, the student is able to re-explain the concept according to indicator 1 by explaining the meaning of the gradient of a line. In question 2, the student has been able to provide examples and non-examples according to the 3rd indicator of understanding mathematical concepts, namely determining the gradient of a line parallel to the y-axis and not parallel to the y-axis, but has not been precise in determining the position of the specified point. In question 3, the student has not been able to present the concept in various forms of mathematical representation according to the 4th indicator, from the calculation to determine the gradient is still not appropriate. The student has not been able to distinguish which formula for the gradient of a parallel line with the gradient of a perpendicular line so that the results are not exactly as requested. In question 4, the student has not been able to classify objects according to certain properties (according to the concept) according to the 2nd indicator because in distinguishing which formula for the gradient of a perpendicular line with the gradient of a parallel line so that the results are less precise. In question 5, students have not been able to apply concepts or problem-solving algorithms related to everyday life according to indicator 5 where students have not been able to calculate fractions in solving the problem of calculating the slope of a ladder. It can be concluded from working on the initial test questions that one student's mathematical concept understanding ability is still in the low category (Mariza & Fachrurazi, 2019).

From the initial test, data was obtained from 32 students, that there were only 6 students with a percentage of 18.75% of students who could classify objects based on whether or not the requirements that form the concept were met, only 9 students with a percentage of 28.12% of students who could give examples and non-examples of the concept, 4 students with a percentage of 12.5% of students who could present concepts in various mathematical representative forms and 2 students with a percentage of 6.25% of students who could apply concepts or algorithms to solve problems in everyday life. From the test results, researchers can conclude that the ability to understand mathematical concepts of class VIII-7 students at SMP Negeri 4 Pematangsiantar is still relatively low (Jain et al., 2020).

In mathematics instruction, teachers still don't utilize a variety of existing learning models. As a result, students remain inactive during the learning process and simply listen

to the teacher's explanations. Students need a more varied learning model that teachers haven't previously used. This will make learning more engaging and help students actively understand mathematical concepts, as teachers have a wider choice of innovative learning models to choose from.

One solution to address students' low ability to understand mathematical concepts effectively is to use innovative learning designs and models. This should involve students directly observing mathematical problems and discovering concepts for themselves.

According to (Simarmata, Sinaga, & Syahputra, 2022), the discovery learning model is a learning model that provides opportunities for students to discover information in the form of concepts and principles in a mental process, which is carried out through experimental activities of knowledge that was previously unknown but partially or completely discovered independently. Students hone their ability to understand mathematical concepts, discovering mathematical patterns and structures themselves through discussions with group members using previous student experiences and teacher guidance.

According to Syah (Hulu & Mendrofa, 2023) the steps of the discovery learning model are as follows: stimulation or providing stimulation (stimulation), problem statement or identification (problem statement), data collection (data collection), data processing (data processing), verification (verification), drawing conclusions or generalizations (generalization).

This is in accordance with Ani's opinion (Mangunsong & Mukhtar, 2022), which states that the relationship between the Discovery Learning model and students' mathematical concept understanding is found in steps three, four, and six. The third step is data collection, and after the data is collected, it is hoped that it can provide examples and non-examples of a concept. In the next stage, students process the collected data and are expected to develop their knowledge of the material being studied by providing various forms of problems, thus students can apply problem-solving concepts. Meanwhile, in the final stage, students are encouraged to draw conclusions about the material they have learned so that they can later restate a concept according to their own understanding (Laila, 2020).

Several studies have shown that learning using the Discovery Learning model can influence students' understanding of mathematical concepts. One of them is the results of research conducted by Verawaty, which states that the ability to understand mathematical concepts of students who participated in the Discovery Learning model is higher than the ability to understand mathematical concepts of students who participated in conventional learning. Therefore, it can be concluded that the Discovery Learning model has a positive effect on the ability to understand mathematical concepts of eighth-grade students at SMP Negeri 4 Pematangsiantar.

In addition to the learning model used influencing student comprehension, student perception is also crucial in determining their mathematical concept comprehension during

learning activities. According to Nurdin (Khofifah, Supriadi, & Syazali, 2021), student perception of mathematics is a process of organizing and interpreting mathematical components, involving the individual as a whole, resulting in a unique response to those components.

According to Retnoningsih (Rusinta, Hambali, & Winarni, 2019) students' perception of mathematics learning is the process of information entering through students' sensory organs which is processed in the brain during the mathematics teaching and learning process, students' perception of mathematics learning is thought to be influenced by mathematics learning, the process of receiving information through the sensory organs into the human brain which is processed by the nerves and central nervous system in every mathematics learning in class and students' attention to mathematics learning. From the explanation above, it is found that mathematical perception is a direct response or individual interpretation of the components of mathematics which will produce different responses to the components of mathematics. Good perception can be a driving force for students to learn, and vice versa. Perception is related to learning, including mathematics learning (Simamora, Saragih, & Hasratuddin, 2022) .

This is the basis for the researcher's interest in conducting research with the title "The Influence of the Discovery Learning Model on the Understanding of Mathematical Concepts of Class VIII Students of SMP Negeri 4 Pematangsiantar".

METHOD

This type of research is quantitative research using an experimental method. Experimental methods in quantitative research are used to determine the effect of certain treatments on others. Experimental methods can be defined as methods that involve administering a specific treatment to a group of people, then evaluating the results of that treatment (Rusinta et al., 2019).

The research design used in this study is pre-experimental with a one-shot case study design (single case study) where one experimental class group becomes the research subject. In the experimental group, treatment is applied in the form of the application of the discovery learning model which is considered successful. After the treatment, a post-test evaluation is carried out and conclusions will be drawn from the measurement results. This research was conducted at SMP Negeri 4 Pematangsiantar located at Jalan Kartini No. 4, Proklamasi, West Siantar District, Pematangsiantar City, North Sumatra Province. This research will be conducted in the odd semester of 2025/2026. The reason for this research being conducted at SMP Negeri 4 Pematangsiantar is because the research title has never been studied at that school. The research time was carried out for ± 1 month in the odd semester of the 2025/2026 academic year. is a generalization area consisting of objects/subjects that have certain qualities and characteristics determined by researchers to be studied and then conclusions drawn". According to Sugiyono (Nawir, 2022) "a sample is part of the number and characteristics possessed by the population". According to Arikunto (2015) said that "if we only study a portion of the population, then the research is

called sample research. A sample is a portion or representative of the population being studied". So the researcher took a sample in class VIII-7 with a total of 30 students at SMP N 4 Pematangsiantar in the 2025/2026 Academic Year.

Independent variables, or more commonly referred to as free variables, are defined by Sugiyono (Nurilhaq & Tabroni, 2022), as "independent variables are variables that influence or cause changes in or the emergence of dependent variables." Therefore, the independent variable in this study is the Discovery Learning model (X).

According to Sugiyono (Sitompul, Situmorang, & Ginting, 2023) , "a dependent variable is a variable that is influenced or that is the result of the independent variable." Therefore, the dependent variable in this study is the ability to understand mathematical concepts (Y).

Data collection techniques are the methods researchers use to obtain research data from respondents. According to Arikunto (Ujud, Nur, Yusuf, Saibi, & Ramli, 2023) , "A questionnaire is a series of written questions used to obtain information from respondents in the form of reports about their personality or things they know." According to Sugiyono (Simangunsong & Pane, 2021) , "A questionnaire is a data collection technique carried out by providing a set of written questions or statements to respondents to answer." Questionnaires are an efficient data collection technique if researchers know for certain the variables being measured and what to expect from respondents. In addition, questionnaires are also suitable for use when the number of respondents is quite large and spread over a wide area. In this study, the author used a Likert scale.

According to Sugiyono (Saputra, Sudargo, & Endahwuri, 2021) , "The Likert scale is used to measure the attitudes, opinions, and perceptions of an individual or group of people regarding social phenomena." With the Likert scale, the variables to be measured are broken down into variable indicators. These indicators are then used as a starting point for compiling instrument items that can be statements or questions about whether a variable (the Project Based Learning model) affects another variable (students' critical thinking skills in economics) (Kurniaman, Noviana, & Marwan, 2021). Sugiyono PD (Farokhah, Herman, & Jupri, 2019) explains

RESULTS AND DISCUSSION

Description of Research Results

The implementation of the research entitled "The Effect of Discovery Learning Model on Students' Understanding of Mathematical Concepts on the Material of Straight Line Equations of Class VIII of SMP Negeri 4 Pematangsiantar" which was carried out in the odd semester of the 20225/2026 Academic Year has been carried out well. The research was conducted for less than four weeks in August 2025 at SMP Negeri 4 which is located at Jalan Kartini No. 4, Banjar, Kec. West Siantar, Pematangsiantar. The research was conducted in classes VIII-10 totaling 30 students with the topic of straight line equations.

The instruments used in this study were a mathematical concept comprehension test consisting of 4 questions and a student perception questionnaire consisting of 20 statements.

The instrument was piloted on students after being given to a validator to determine whether it was suitable for use. The instrument validators were a Mathematics Education lecturer, Lois Eunike Tambunan, M.Pd., and a Mathematics teacher at SMP Negeri 4 Pematangsiantar, Ezza Ismi Rusdi, S.Pd. The instrument trial was conducted to meet the criteria of validity, reliability, difficulty level, and question discrimination (Gupta et al., 2021).

After the instrument has met the criteria of validity, reliability, and the level of difficulty and the distinguishing power of the questions, the instrument was tested on the trial class. The instrument trial data was tested for validity, reliability, difficulty level, and question distinguishing power. After the test was carried out on the instrument, the test was given to the students studied and then a student perception questionnaire was given. After the data was successfully obtained, data analysis was carried out. The data analysis tests used were: normality test, linearity test, simple linear regression analysis and T test and ended with a determination coefficient test in order to determine the magnitude of the influence of variable X and variable Y.

Research Instrument Test Results

Instrument testing was used to determine the feasibility and quality of the instruments. The instruments tested were a student perception questionnaire and a mathematical concept understanding test. The results of the trial tests were then tested for validity, reliability, difficulty level, and discriminatory power for the mathematical concept understanding test. The student perception questionnaire was tested for validity and reliability.

The research instruments used in this study were questionnaires and tests, with the questionnaire consisting of 20 statement items and the test consisting of 4 descriptive questions containing five indicators of mathematical concept understanding. The questionnaire and test were submitted to 2 (two) validators, namely Mrs. Lois Eunike Tambunan, M.Pd. (Lecturer at HKBP Nommensen University Pematangsiantar in the field of Mathematics Education) and Ezza Izmi Rusdi, S.Pd. (Mathematics teacher at SMP Negeri 4 Pematangsiantar) to determine whether the questionnaire and test were suitable for use in research.

The purpose of this study was to determine whether the Discovery Learning model had an effect on the understanding of mathematical concepts of eighth-grade students at SMP Negeri 4 Pematangsiantar. The data in this study were the results of the students' mathematical concept understanding test and the student perception questionnaire.

The mathematics material taught in this study was Straight Line Equations. After being given treatment in the form of the Discovery Learning model, a questionnaire was given to students to implement the model which would be filled out by students. After that, to see the understanding of mathematical concepts, a mathematical concept understanding test was given that had been previously tested in grades IX-10. In this study, researchers obtained data from the results of the student questionnaire implementing the model and

the mathematical concept understanding test conducted in grades VIII-10. The questionnaire was used to see whether students had implemented the Discovery Learning model according to the steps, while the mathematical concept understanding test was questions given after implementing the Discovery Learning model. The results of the model implementation questionnaire and the results of the mathematical concept understanding test were used to determine whether the Discovery Learning model had an effect on mathematical concept understanding (SARI, 2021) .

The research instruments used in this study were a student questionnaire implementing the model consisting of 20 statements and a mathematical concept understanding test consisting of 4 essay-shaped questions. The researcher conducted a trial of the Discovery Learning model implementation questionnaire and the mathematical concept understanding test that would be used to collect data on the sample. After the trial was carried out, the next step was to take data on the model implementation questionnaire scores and mathematical concept understanding test scores using the questions that had been tested. Then, classes VIII-10 used as sample classes were given treatment using the pDiscovery Learning model with the Straight Line Equation material. The data on the student questionnaire scores implementing the Discovery Learning model and the mathematical concept understanding test scores obtained using the SPSS 21.0 program are presented in Table.

Table 1. Results of Model Implementation and Understanding of Mathematical Concepts

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Standard Deviation
Questionnaire (X)	30	70	95	85.87	5,600
Descriptive Test (Y)	30	22	32	28.73	2,741
Valid (listwise)	N30				

In the table, the student questionnaire implemented the *Discovery Learning model* with a minimum score of 70 and a maximum score of 95. The average value of the student questionnaire implemented the model was 85.87. This shows that students have followed the steps of the *Discovery Learning model* well. The minimum score for Mathematical Concept Understanding is 22 and the maximum score is 32. The maximum score for the Mathematical Concept Understanding test is 32 with a conversion of 100 for a score of 32. The average value of students' Mathematical Concept Understanding based on the test results is 28.73 with a conversion of 89.78. Based on the average value, it can be concluded that students have obtained adequate test results.

t-Test Analysis

The regression coefficient is tested using the t-test. Assuming other variables are constant, this test is used to assess the significance of the independent variable on the dependent variable.

Table 2. Test Results with t-Test

Coefficients [a]					
	Unstandardized Coefficients		Standardized Coefficients		
Model	B	Std. Error	Beta	t	Sig.
(Constant)	6,571	4,318		-1,522	.139
Discovery Learning Model	.411	.050	.840	8,194	.000
a. Dependent Variable: Understanding Mathematical Concepts					

H_0: $\beta = 0$: There is no influence of *the Discovery Learning Model* on the understanding of mathematical concepts of class VIII students of SMP Negeri 4 Pematangsiantar.

H_a: $\beta \neq 0$:There is an Influence of *the Discovery Learning Model* on the Understanding of Mathematical Concepts of Class VIII Students of SMP Negeri 4 Pematangsiantar.

From Table 4.14, the sig. value is obtained. For the influence of variable X on variable Y is 0.000 < 0.05. Given n = 30, then df = n - k = 30-2 = 28. With df = 28 then $t_{hitung} > t_{tabel}$ = 8.194 > 2.048. So based on the significant value of 0.139 and the value of 8.194, the hypothesis is accepted, namely there is a positive influence of the H_a *Discovery Learning* model on students' mathematical concept understanding.

Coefficient of Determination Test

Table 3. R square

Model Summary [b]				
Model	R	R Square	Adjusted R Square	Standard Error of the Estimate
1	,840 [a]	,706	,695	1.51329

Based on the table, the correlation value/level of relationship between variables (R) is 0.840. Meanwhile, the coefficient of determination (R square) is 0.706, so the percentage coefficient of determination can be formulated as follows:

KD = 0.706 X 100%

KD = 70.6%

The percentage of the coefficient of determination shows that the contribution of the variance of variable X (*Discovery Learning model) to variable Y (Mathematical Concept Understanding) is 70.6%. Based on the results of the calculation of the coefficient of determination, it shows that the Discovery Learning* model has an influence of 70.6% on students' Mathematical Concept Understanding.

Discussion

This research was conducted at SMP Negeri 4 Pematangsiantar, involving classes VIII-10 as the research sample. They were given the *Discovery Learning model* and given a mathematical concept understanding test. The questionnaire and test were pre-tested on the pilot class before being administered to the sample class (Rachma & Winanto, 2024) .

Pretesting questionnaires and tests before conducting research is highly recommended. This aims to determine whether statements or questions align with research guidelines. In this study, students in grades IX-10 were the pilot class, conducting the questionnaire model and testing their understanding of mathematical concepts.

Then, validity, reliability, difficulty level, and question discrimination tests were conducted. Based on the trial of the student questionnaire implementing the model and the mathematical concept understanding ability test that had been carried out with the number of trial students, N = 32 and a significance level of 5% obtained r_{tabel}= 0.349. From the results of the validity test calculation on the model implementation questionnaire and the mathematical concept understanding test, 20 model implementation questionnaires and 4 mathematical concept understanding essay questions were declared valid.

Then, for the decision-making criteria in the Cronbach's Alpha technique, if the calculated r value is > 0.60, then the model implementation questionnaire and the mathematical concept understanding test are said to be reliable, so the questionnaire and test can be used in research. From the results of the reliability test that has been carried out, the Cronbach's Alpha value for the questionnaire was 0.804. A value of 0.804 > 0.60 can be concluded that this questionnaire is reliable. Meanwhile, the results of the reliability test from the test obtained a Cronbach's Alpha value of 0.759. Because 0.759 > 0.60, it can be concluded that this test is reliable. Furthermore, the calculation of the difficulty level test shows that there are 3 questions that are said to be medium, and 1 question is categorized as easy. Then, for the discriminating power, it shows that there are 3 questions categorized as having sufficient question discriminating power and 1 question is categorized as having good question discriminating power (Rusmalinda & Syaifudin, 2022).

After knowing that the student questionnaire implementing the model and the mathematical concept understanding test that had been tested had met the research standards, then the researcher conducted research with the research standard stage, then the researcher conducted research with the initial stage of providing treatment to the sample class using the *Discovery Learning learning model* . After completing the learning using the

model, a student perception questionnaire was given when carrying out learning activities with the *discovery learning model* to find out that students had implemented the learning model. After giving the questionnaire, the researcher gave a mathematical concept understanding test on the Straight Line Equation material to find out the level of students' mathematical concept understanding after being given the treatment.

After obtaining the model implementation scores and the mathematical concept understanding test scores, the data were analyzed. The calculation results showed an average score of 85.87 for the *discovery learning model implementation* and 28.73 for the learning outcomes, with a conversion value of 89.78.

There are normality tests and linearity tests as prerequisites before hypothesis testing. The normality test uses the Kolmogorov-Smirnov model in the SPSS 21.0 program with a sig value criterion > 0.05. The normality test of the *discovery learning model implementation data* obtained a significant result (Sig.) of 0.747 > 0.05, indicating that *the discovery learning model implementation data* is normally distributed. Meanwhile, the significant result (Sig.) of the mathematical concept understanding data is 0.509 > 0.05, indicating that the learning outcome data is normally distributed (Marlina, 2021).

After conducting the normality test, the researcher conducted a linearity test. In this linearity test using the SPSS 21.0 program, the significant result (Sig.) for the Deviation from Linearity row was 0.683 > 0.05, indicating a linear relationship between the independent variable (X) and the dependent variable (Y). Therefore, it can be concluded that there is a linear relationship between the *Discovery Learning model* and students' Mathematical Concept Understanding (Pramesti, Probosari, & Indriyanti, 2022).

Furthermore, the researcher conducted a hypothesis test consisting of a simple linear regression test and a t-test. Based on the simple linear regression test, the regression equation Y = 6,571 + 0.411X was obtained, meaning that for every 1 additional score of the *Discovery Learning model implementation* , the Mathematical Concept Understanding would increase by 0.411 (Tambunan, Sinaga, & Hutauruk, 2021) . The influence of the *Discovery Learning* model on students' Mathematical Concept Understanding. Furthermore, the R Square value was 0.706, so that the contribution of the variance of the X variable (*Discovery Learning model*) to the Y variable (Mathematical Concept Understanding) of the two-variable linear equation system material was 70.6% (Tyas, Kusmiyati, & Faizin, 2023) .

Furthermore, the final hypothesis test is the t test. The sig. value obtained for the influence of variable X on variable Y is 0.000 < 0.05. Given n = 30, then df = nk = 30-2 = 28. With df = 28, then t_{tabel} delngan α = 5%is 2.048. Therefore, the value obtained t_{hitung} > t_{tabel} = 8.194 > 2.048. So based on the significance value (sig.) and the value t_{hitung} , the hypothesis H1 is accepted, namely there is an influence of the *Discovery Learning model* on students' understanding of mathematical concepts in the material of straight line equations (Setiaji, Koeswanti, & Giarti, 2018) .

Based on the description above, it can be concluded that there is an influence of the *Discovery Learning model* on students' understanding of mathematical concepts in linear

equations. The hypothesis stating that there is an influence of the *Discovery Learning model* on students' understanding of mathematical concepts in grade VIII on the material of linear equations is accepted as true or H1 is accepted.

CONCLUSION

Based on the results of data analysis and discussion, it can be concluded that there is a positive and significant influence of the use of the *Discovery Learning model* on the understanding of mathematical concepts of class VIII students of SMP Negeri 4 Pematangsiantar. This influence is shown through the regression equation Y = 6.571 + 0.411X, with a b value = 0.411. By means of the t-test, namely t-count > t-table (8.194 > 2.048) that is significant and by using the coefficient of determination it can be seen that the influence is 70.6%.

Suggestion

Based on the results of this study, the researcher would like to provide the following suggestions:

1. For Teachers. By understanding that the *Discovery Learning model* influences students' understanding of mathematical concepts, teachers are expected to choose a learning model that best suits the characteristics of the students they teach, thereby creating a more active, effective, and efficient learning process. Therefore, selecting the *Discovery Learning model* can be an alternative in the classroom learning process.
2. For Students. By understanding how *the Discovery Learning model* influences the understanding of mathematical concepts, students are expected to expand their collection of problems, from the simplest to the most varied. Pay close attention while the teacher is teaching. Determine effective and efficient learning methods, and students should be actively involved in the learning process to ensure a smooth learning process.
3. For Further Researchers. For further researchers who wish to conduct the same research, it is recommended to develop this research by preparing other material presentations and optimizing time to improve students' understanding of mathematical concepts

REFERENCE

Ana, N. Y. (2018). Penggunaan Model Pembelajaran Discovery Learning Dalam Peningkatan Hasil Belajaran Siswa Di Sekolah Dasar. *Jurnal Imiah Pendidikan Dan Pembelajaran*, *2*(1). Https://Doi.Org/10.23887/Jipp.V2i1.13851

Astari, F. A., Suroso, S., & Yustinus, Y. (2018). Efektifitas Penggunaan Model Discovery Learning Dan Model Problem Based Learning Terhadap Hasil Belajar Ipa Siswa Kelas 3 Sd. *Jurnal Basicedu*, *2*(1), 1–10.

Astuti, T. I., Idrus, I., & Yennita, Y. (2018). Penerapan Model Pembelajaran Discovery Learning Untuk Meningkatkan Hasil Belajar Pada Materi Biologi Siswa Smp. *Diklabio: Jurnal Pendidikan Dan Pembelajaran Biologi*, *2*(1), 5–9.

Https://Doi.Org/10.33369/Diklabio.2.1.5-9

Fajri, Z. (2019). Model Pembelajaran Discovery Learning Dalam Meningkatkan Prestasi Belajar Siswa Sd. *Jurnal Ika Pgsd (Ikatan Alumni Pgsd) Unars*, *7*(2), 1. Https://Doi.Org/10.36841/Pgsdunars.V7i2.478

Farokhah, L., Herman, T., & Jupri, A. (2019). Sekolah Dasar Menggunakan Model Project Based Learning Dan Model Project Based Learning Dengan Teknik Mind Map. *Algoritma Journal Of Mathematics Education (Ajme)*, *1*(1), 1–13.

Gupta, R., Srivastava, D., Sahu, M., Tiwari, S., Ambasta, R. K., & Kumar, P. (2021). Artificial Intelligence To Deep Learning: Machine Intelligence Approach For Drug Discovery. *Molecular Diversity*, *25*, 1315–1360.

Hi Rahman, M., Latif, S., & Saban, M. M. (2022). Implementasi Model Discovery Learning Untuk Meningkatkan Kemampuan Literasi Sains Siswa Kelas Xi Man 2 Halmahera Utara. *Jurnal Pendidikan Fisika*, *10*(2), 259. Https://Doi.Org/10.24127/Jpf.V10i2.5660

Hulu, B. A. A., & Mendrofa, R. N. (2023). Pengembangan Modul Berbasis Etnomatematika Menggunakan Metode Discovery Learning Pada Materi Matematika Smp. *Jurnal Review Pendidikan Dan Pengajaran (Jrpp)*, *6*(3), 283–291.

Jain, A., Patel, H., Nagalapatti, L., Gupta, N., Mehta, S., Guttula, S., Mujumdar, S., Afzal, S., Sharma Mittal, R., & Munigala, V. (2020). Overview And Importance Of Data Quality For Machine Learning Tasks. *Proceedings Of The 26th Acm Sigkdd International Conference On Knowledge Discovery & Data Mining*, 3561–3562. Https://Doi.Org/10.1145/3394486.3406477

Khofifah, L., Supriadi, N., & Syazali, M. (2021). Model Flipped Classroom Dan Discovery Learning Terhadap Kemampuan Pemahaman Konsep Dan Pemecahan Masalah Matematis. *Prisma*, *10*(1), 17–29. Https://Doi.Org/Https://Doi.Org/10.35194/Jp.V10i1.1098

Kurniaman, O., Noviana, E., & Marwan, A. (2021). Penggunaan Media Graphic Organizer Untuk Meningkatkan Kemampuan Siswa Dalam Berpikir Kritis Dalam Membaca. *Else (Elementary School Education Journal): Jurnal Pendidikan Dan Pembelajaran Sekolah Dasar*, *5*(1), 79–87. Https://Doi.Org/Https://Doi.Org/10.30651/Else.V5i1.7117

Laila, R. (2020). Meta Analisis Pengaruh Model Discovery Learning Terhadap Literasi Sains Siswa. *Jurnal Penelitian Pembelajaran Fisika*, *6*(2). Https://Doi.Org/10.24036/Jppf.V6i2.108662

Mangunsong, S. A. N., & Mukhtar, M. (2022). Pengaruh Model Pembelajaran Problem Based Learning Dan Discovery Learning Dengan Berbantuan Aplikasi Geogebra Terhadap Hasil Belajar Siswa Kelas Vii Smp. *Humantech: Jurnal Ilmiah Multidisiplin Indonesia*, *2*(1), 145–154. Https://Doi.Org/Https://Doi.Org/10.32670/Ht.V2i1.2649

Mariza, M., & Fachrurazi, F. (2019). Meningkatkan Hasil Belajar Matematika Siswa Pada Materi Jarak, Waktu Dan Kecepatan Melalui Model Guided Discovery Learning Di Sd Negeri 24 Peusangan. *Jupendas: Jurnal Pendidikan Dasar*, *8*(2), 26–31.

Https://Doi.Org/Mariza, M., & Fachrurazi, F. (2021) Meningkatkan Hasil Belajar Matematika Siswa Pada Materi Jarak, Waktu Dan Kecepatan Melalui Model Guided Discovery Learning Di Sd Negeri 24 Peusangan. Jupendas: Jurnal Pendidikan Dasar, 8(2), 26-31

Marlina, Y. (2021). Peningkatan Hasil Belajar Ips Melalui Model Guided Discovery Learning Dalam Materi Kerja Sama Pada Siswa Kelas V Sd Negeri 133 Halmahera Selatan. *Jurnal Pendidikan Dasar*, *3*(1), 53–61.

Nawir, M. (2022). Pengaruh Model Pembelajaran Discovery Learning Berbantuan Media Animasi Kinemaster Terhadap Minat Dan Hasil Belajar Ips. *Cendekiawan*, *4*(2), 154–164.

Nurilhaq, I., & Tabroni, I. (2022). The Use Of The Discovery Learning Model In Improving The Quality Of Learning Of The Qur'an Hadith. *Proceeding International Conference On Innovation In Science, Education, Health And Technology*, *1*(1), 133–142. Https://Pedirresearchinstitute.Or.Id/Index.Php/Iciseht/Article/View/193

Oktari, N., & Desyandri, D. (2020). Pengaruh Model Discovery Learning Terhadap Hasil Belajar Tematik Terpadu Tema 8 Kelas V Sd. *E-Journal Pembelajaran Inovasi, Jurnal Ilmiah Pendidikan Dasar*, *8*(4), 87–96.

Pramesti, D., Probosari, R. M., & Indriyanti, N. Y. (2022). Effectiveness Of Project Based Learning Low Carbon Stem And Discovery Learning To Improve Creative Thinking Skills. *Journal Of Innovation In Educational And Cultural Research*, *3*(3), 444–456. Https://Doi.Org/10.46843/Jiecr.V3i3.156

Prasasti, D. E., Koeswanti, H. D., & Giarti, S. (2019). Peningkatan Keterampilan Berpikir Kritis Dan Hasil Belajar Matematika Melalui Model Discovery Learning Di Kelas Iv Sd. *Jurnal Basicedu*, *3*(1), 174–179.

Rachma, D. M., & Winanto, A. (2024). *Impelementasi Model Discovery Learning Untuk Meningkatkan Komunikasi Matematis Siswa Kelas V Di Sdn Sidorejo Lor 03*. *7*(2), 1–7.

Rusinta, D., Hambali, D., & Winarni, E. W. (2019). Pengembangan Bahan Ajar Buku Cerita Berbasis Discovery Learning Pada Materi Ipa Konsep Perpindahan Panas Di Kelas V Sekolah Dasar. *Jurnal Pembelajaran Dan Pengajaran Pendidikan Dasar*, *2*(2), 199–209. Https://Doi.Org/10.33369/Dikdas.V2i2.11963

Rusmalinda, R., & Syaifudin, A. (2022). Keefektifan Model Discovery Learning Dengan Team Assisted Individualization (D-Tai) Terhadap Keterampilan Kolaborasi Peserta Didik. *Al-Ikmal: Jurnal Pendidikan*, *1*(1), 59–76. Https://Journal.Iaidalampung.Ac.Id/Index.Php/Al-Ikmal/Article/View/26

Safitri, W. C. D., & Mediatati, N. (2021). Penerapan Model Discovery Learning Dalam Pembelajaran Ipa Untuk Meningkatkan Kemampuan Berpikir Kritis Dan Hasil Belajar Siswa Sekolah Dasar. *Jurnal Basicedu*, *5*(3), 1321–1328. Https://Doi.Org/10.31004/Basicedu.V5i3.925

Saputra, A. W. R., Sudargo, S., & Endahwuri, D. (2021). Efektivitas Model Pembelajaran Discovery Learning Dan Group Investigation Berbantu E-Book Terhadap Hasil Belajar

Siswa (Studi Kasus Sma Negeri 5 Semarang Tahun 2020). *Imajiner: Jurnal Matematika Dan Pendidikan Matematika*, *3*(6), 465–476. Https://Doi.Org/10.26877/Imajiner.V3i6.7894

Sari, D. N. (2021). Pengaruh Penggunaan Discovery Learning Dengan Scramble Terhadap Keaktifan Belajar Dan Hasil Belajar Matematika Siswa Kelas X Sma N 1 Klego Kabupaten Boyolali Semester Ii Tahun Pelajaran 2020 / 2021. *Secondary: Jurnal Inovasi Pendidikan Menengah*, *1*(3), 136–149. Https://Doi.Org/10.51878/Secondary.V1i3.320

Setiaji, R., Koeswanti, H. D., & Giarti, S. (2018). Perbedaan Penggunaan Discovery Learning Dan Problem Solving Terhadap Hasil Belajar Ipa Siswa Kelas 4 Sd Gugus Cokro Kembang Jenawi Karanganyar. *Jurnal Basicedu*, *2*(1), 11–18.

Simamora, R. E., Saragih, S., & Hasratuddin, H. (2022). Improving Students' Mathematical Problem Solving Ability And Self-Efficacy Through Guided Discovery Learning In Local Culture Context. *International Electronic Journal Of Mathematics Education*, *14*(1), 61–72. Https://Doi.Org/10.12973/Iejme/3966

Simangunsong, A. D. B., & Pane, E. P. (2021). Pengembangan Modul Kimia Dasar Berbasis Discovery Learning Pada Materi Stoikiometri. *Edukatif: Jurnal Ilmu Pendidikan*, *3*(6), 4415–4425. Https://Doi.Org/Https://Doi.Org/10.31004/Edukatif.V3i6.1472

Simanjuntak, M. P., Siregar, L., & Lumbangaol, Y. T. (2019). Penerapan Discovery Learning Terhadap Hasil Belajar Ipa Siswa Smp. *Jurnal Inovasi Pembelajaran Fisika (Inpafi)*, *7*(4), 25–33. Http://Digilib.Unimed.Ac.Id/Id/Eprint/43273

Simarmata, S. M., Sinaga, B., & Syahputra, H. (2022). Analisis Kemampuan Pemahaman Konsep Matematika Siswa Dalam Penerapan Model Discovery Learning Berbantuan Matlab. *Jurnal Cendekia : Jurnal Pendidikan Matematika*, *6*(1), 692–701. Https://Doi.Org/10.31004/Cendekia.V6i1.1227

Sitompul, H. S., Situmorang, I., & Ginting, Y. F. B. (2023). Application Of Discovery Learning Model To Improve Learning Outcomes In Materials Of Changing Objects In Class V. *Cendikia: Media Jurnal Ilmiah Pendidikan*, *13(6)*, 976–982.

Suyani, K., Astawan, I. G., & Renda, N. T. (2020). Pengembangan Perangkat Pembelajaran Model Discovery Learning Berbasis Lingkungan Pada Mata Pelajaran Ipa Siswa Kelas Iv Sekolah Dasar. *Jurnal Ilmiah Pendidikan Profesi Guru*, *3*(3), 512. Https://Doi.Org/10.23887/Jippg.V3i3.29450

Tambunan, L., Sinaga, S. J., & Hutauruk, A. J. B. (2021). Perbedaan Kemampuan Penalaran Matematis Menggunakan Model Pembelajaran Problem Based Learning Dengan Discovery Learning Pada Materi Aritmatika Sosial. *Attractive : Innovative Education Journal*, *4*(2), 271–280.

Tyas, W., Kusmiyati, K., & Faizin, A. (2023). Pengaruh Penggunaan Model Discovery Learning Terhadap Hasil Belajar Menulis Teks Anekdot Siswa Kelas X Sma Dr. Soetomo. *Sebasa*, *6*(2), 431–446. Https://Doi.Org/10.29408/Sbs.V6i2.21319

Ujud, S., Nur, T. D., Yusuf, Y., Saibi, N., & Ramli, M. R. (2023). Penerapan Model

Pembelajaran Discovery Learning Untuk Meningkatkan Hasil Belajar Siswa Sma Negeri 10 Kota Ternate Kelas X Pada Materi Pencemaran Lingkungan. *Jurnal Bioedukasi*, *6*(2), 337–347. Https://Doi.Org/10.33387/Bioedu.V6i2.7305