

The Effect Of Discovery Learning Model On The Student Learning Competence With Different Initial Abilities At Grade VIII MTsN 2 Padang City

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Abstract - This study aims to determine the effect of discovery learning and initial abilities on the student learning competence at grade VIII. This is a quasi-experimental research with a 2 X 2 factorial design. The population of this research was all students of grade VIII MTsN 2 Padang in the 2020/2021 school year. The sample was chosen by using the purposive sampling technique which the class was selected randomly. The results of the study indicated that (1) the Discovery Learning model had an effect on learning competence in the there am of students' knowledge, both for students with high initial abilities and students with low initial abilities. (2) There was no interaction between the Discovery Learning model and the students' initial abilities in affecting the learning competence in the realm of knowledge. (3) The Discovery Learning model affected the learning competence in the realm of students' attitude, both for students with high initial abilities and students with low initial abilities. (4) The Discovery Learning model had an effect on learning competence in the realm of students' skills, both for students with high initial abilities and students with low initial abilities.

Keywords - Discovery Learning, Initial Ability, Learning Competence

I. INTRODUCTION

Learning is a process of interaction between teachers and students, students and other students, and students and the learning environment. This interaction process needs to be designed so that it can achieve optimal results in accordance with the expected learning objectives. Learning objectives can be achieved with mature readiness by teachers as messengers and students as responders and constructors of knowledge [1].

Mastery of science is needed by students in solving problems in life. Natural science (IPA) is one of the subjects that examine life. Based on the results of the questionnaire analysis of student responses at MTsN 2 Padang on March 3, 2020, 70% of the students had an interest in learning science. Interest includes the characteristics of a scientific attitude that has a high intensity. If someone is interested in something, they will take concrete steps to achieve it [2]. Based on the results of the questionnaire analysis, it was also known that the students' interest in learning has not been supported by the implementation of learning that is in accordance with the learning needs of students. This caused students to be passive and had difficulty in understanding the material being studied.

Based on the results of interviews with teachers, it was known that the material that was difficult for students to understand was about the respiratory system and the excretory system. In this material, they are required to be able to analyze the organs involved, their functions, processes/mechanisms and disorders. The low learning outcomes can be influenced by the implementation of learning that has not been effective [3]. The implementation of learning carried out by teachers was to use methods and models that were not yet innovative. Teachers also tend to use the lecture method in the implementation of learning. This is not in accordance with the desires and learning needs of students. There were 78.13% of that students that stated that they were happy if the teacher did not explain the material using the lecture method.

A good learning model is a model that is adapted to the material to be delivered, the condition of the students, available facilities, and mastery of competencies [4]. The learning model that can involve students in the process of discovering a concept by developing their thinking skills is the Discovery Learning model. The Discovery Learning model encourages students to learn independently so that they can change the learning conditions from passive to be active [5].

In guiding students in the learning process, the teacher must first know the initial abilities of the students [6]. Initial ability is a characteristic of students that will affect the effectiveness of the learning model. Learning models and initial abilities are two very important things to be considered by teachers before starting the learning process [7]. Based on this background description, a research entitled "The Effects of Discovery Learning Models and Initial Ability on the Student Learning Competence with Different Initial Abilities at Grade VIII MTsN 2 Padang" was conducted.

II. METHODS

This was a quasi-experimental study with a 2 X 2 factorial design. The population of this research was all of the students grade VIII MTsN 2 Padang in the 2020/2021 school year. The sample was taken by using the purposive sampling technique which the class was chosen randomly. Based on random results, the experimental class was class VIII 6 and the control class was class VIII 7. The instrument used was a test instrument in the form of a final test to assess knowledge competence and a non-test instrument in the form of an observation sheet to assess attitude and skill competences. The data analysis technique used was *t* test for knowledge competence and *u* test for attitude and skill competences.

III. RESULTS AND DISCUSSION

a. Results

The average learning competence in the realms of knowledge, attitudes, and skills based on initial abilities in the experimental class obtained a higher average score than the control class. This showed that the competence of the knowledge realm in the experimental class using the discovery learning model was higher than the control class by following conventional learning based on high and low initial abilities. The test results given to the two classes also showed a difference in the standard deviation of the two classes which the standard deviation of the experimental class was better than the standard deviation of the control class.

1) Testing Requirements Analysis

a) Normality Test

The normality test was carried out using the Kolmogorov-Smirnov test using *SPSS 16*. The test criteria was to accept H_0 if the value of Sig. > from the real level ($\alpha = 0.05$). Based on the table obtained the value of Sig. experimental and control classes were 0.076 and 0.661. It means that the value of Sig. > significant level ($\alpha = 0.05$), so the data is normally distributed. Each sample class in the normality test was divided into two groups: students who have high initial abilities and students who have low initial abilities. The normality test data based on initial ability are presented in Table 1.

Table 1. Normality Test of Knowledge Competence Based on Initial Ability

Class	Initial Ability	Sig.	Information
Exsperiment	High	0,378	Normal
	Low	0.094	Normal

Control	High	0,102	Normal
	Low	0.142	Normal

Based on Table 1, the normality test of the experimental and control classes based on high and low initial abilities obtained the value of Sig. > significant level ($\alpha = 0.05$), so the data is normally distributed.

b) Homogeneity Test

The homogeneity test was carried out by using the Levene test using *SPSS 16*. The test criteria were to accept H_0 if the value of Sig. > from the real level ($\alpha = 0.05$). The test results obtained the value of Sig. experimental and control classes was 0.242. It means that the value of Sig. > significant level ($\alpha = 0.05$), so the data is homogeneous. Each sample class in the homogeneity test was divided into two groups: students who have high initial abilities and students who have low initial abilities. The homogeneity test data based on initial ability are presented in Table 2.

Table 2. Homogeneity Test of Knowledge Realm Competence Based on Initial Ability

Initial Ability	Class	Sig.	Information
High	Exsperiment	0.975	Homogen
	Control		
Low	Exsperiment	0.238	Homogen
	Control		

Based on Table 2, the homogeneity test of the experimental and control classes based on high and low initial abilities obtained the value of Sig. > significant level ($\alpha = 0.05$), so the data is homogeneous.

2) Data Analysis

Based on the analysis requirements test, the data obtained were normally distributed and had homogeneous variants so that they met the requirements to continue testing the hypothesis. The t test was used as a hypothesis test on the competence of the realm of knowledge and hypothesis testing based on high and low initial abilities. Meanwhile, testing the competence hypothesis in the realms of attitude and skill was by using the Mann Whitney U test. The results of the calculation of this hypothesis test can be seen in Table 3.

Table 3. The results of the calculation of the hypothesis test.

Hypothesis	Sig.	Conclusion
First (Knowledge)	0,000	H_1 Accepted
Second (High Ability)	0,000	H_1 Accepted
Third (Low Ability)	0,000	H_1 Accepted
Fourth (Attitude)	0,000	H_1 Accepted
Fifth (High Ability)	0,000	H_1 Accepted

Sixth (Low Ability)	0,000	H ₁ Accepted
Seventh (Skill)	0,000	H ₁ Accepted
Eighth (High Ability)	0,000	H ₁ Accepted
Ninth (Low Ability)	0,000	H ₁ Accepted
Tenth (Interaction)	0,297	H ₀ Accepted

b) Discussion

1. Achievement Competence of Knowledge Realm

Based on the results of research that has been carried out on the realm of knowledge Competence, it is found that the Discovery Learning model can improve the student learning competence. From the average value of student learning outcomes, it was found that the experimental class got a higher score than the control class. The average value of the experimental class was 86.71 while the control class was 80.28.

This difference in value occurred because the Discovery Learning model applied to the experimental class was based on constructivist learning theories [8]. In the control class, the student learning competence in the realm of knowledge was lower than in the experimental class. The students in the control class were not very active in the learning process because it was difficult for them to understand the material and the difficulty in responding to the questions asked. This was due to learning that did not link the material with examples that were close to the environment so that the students became less interested and passive in the learning process.

In addition, the learning outcomes obtained by the students are influenced by the initial abilities possessed by students [9]. Initial ability describes the readiness of students to accept the lessons that will be delivered by the teacher. Initial ability is also a capital for students in carrying out learning activities and has a positive impact on the process of obtaining further knowledge [10].

Based on the initial abilities of students, it can be proven that the students who were treated with the Discovery Learning model achieved better learning outcomes than the conventional learning, both at high initial abilities and low initial abilities. Based on high initial abilities, the experimental class had an average 91, 56 and the control class had an average 84.31. Based on the low initial ability, the experimental class had an average 81.87 which was higher than the control class which had an average 76.25. Therefore, it can be concluded that the Discovery Learning model is effectively used in learning.

2. Achieving Learning Competence on the Attitude Realm

Attitude is defined as an action that reflects one's feelings in response to an object. The aspects of attitude observed during the research were *thorough*, *disciplined*, and *responsible*. Based on the results of the attitude competence assessment of the sample class, it can be seen that learning with the Discovery Learning model (experimental class) had higher attitude competence than the class that applied the conventional learning model (control class). The competence of the attitude realm of the students from the experimental class obtained an average score 2.91 with good criteria. Meanwhile, the competence of the attitude realm in the control class obtained an average value 2.32 with sufficient criteria.

Based on the initial abilities possessed by students, an analysis of the effects of the discovery learning model on the initial abilities of students in attitude competence was carried out. The high initial ability of the experimental class had an average 3.05 with good criteria and the control class had an average 2.42 with good criteria. However, the low initial ability of the experimental class had an average 2.77 with sufficient criteria, and the control class had an average 2.22 with sufficient criteria. Based on this, it

can be proven that the students who were treated with the Discovery Learning model achieved better learning outcomes in attitude competence than conventional learning, both at high initial abilities and low initial abilities.

3. Achieving Learning Competence in the Skill Realm

In this study, the competence of skill realm assessed were skills in making posters about the material being studied. The aspects in making posters that were assessed included *the content of the text*, *design*, and *images* presented. The assessment of the student learning outcomes in the skill realm conducted by the observer at each meeting showed that the data on the competence of the students in the experimental class was better than the competence of the students in the control class.

The competence of the students' skill realm using the Discovery Learning model as a whole obtained an average score 3.34 with good criteria. Nevertheless, the competence of the skill realm in the control class obtained an average score 2.22 with sufficient criteria. The high acquisition of competence in the realm of skill in the experimental class showed that learning using the discovery learning model had a significant positive effect on students.

Based on the initial abilities of the students, an analysis of the effects of the Discovery Learning model on the students' initial abilities in skill realm competence was carried out. The high initial ability of the experimental class had an average 3.35 with good criteria and the control class had an average 2.27 with sufficient criteria. Meanwhile, the low initial ability of the experimental class had an average 3.33 with good criteria, and the control class had an average 2.19 with sufficient criteria. Based on this, it can be proven that the students who were treated with the Discovery Learning model achieved better learning outcomes in attitude realm competence than conventional learning, both at high initial abilities and low initial abilities.

IV. CONCLUSION

The Discovery Learning model had an effect on the learning competence in the realms of knowledge, attitudes, and skills of the students with high and low initial abilities. Furthermore, there was no interaction between the Discovery Learning model and the initial ability of learning competence in the realm of knowledge of the students grade VIII MTsN 2 Padang.

REFERENCES

- [1] Lufri. 2007. Strategi Pembelajaran, Teori, Praktek dan Penelitian. Padang: UNP.
- [2] Anderson, L. W., & Krathwohl, D. R. 2001. Taxonomy For Learning, Teaching And Assessing: A Revision Of Bloom's Taxonomy Of Educational Objectives. New York, NY: Longman.
- [3] Aunurrahman. 2014. Belajar dan Pembelajaran. Bandung: Alfabeta.
- [4] Haeruman, L. D., Rahayu, W., & Ambarwati, L. 2017. Pengaruh Model Discovery Learning Terhadap Peningkatan Kemampuan Berpikir Kritis Matematis Dan Self-Confidence Ditinjau Dari Kemampuan Awal Matematis Siswa SMA Di Bogor Timur. Jurnal Penelitian dan Pembelajaran Matematika, 10(2), 157-168.
- [5] Ott, L. E., Carpenter, T. S., Hamilton, D. S., LaCourse, D.R. 2018. Discovery learning: Development of a unique active learning environment for introductory chemistry. Journal of the Scholarship of Teaching and Learning, 18(4), 161-180.
- [6] Uno, H. B. 2011. Teori Motivasi dan Pengukurannya: Analisis di Bidang Pendidikan. Jakarta: Bumi aksara.
- [7] Danial, M., Gani, T., dan Husnaeni. 2017. Pengaruh Model Pembelajaran dan Kemampuan Awal terhadap Kemampuan Berpikir Kritis dan Pemahaman Konsep Peserta Didik. Journal of Educational Science and Technology, 3(1), 18- 32.
- [8] Anyafulude, J. C. 2013. Effects of Problem-Based and Discovery-Based Instructional Strategies on Students' Academic Achievement in Chemistry. Journal of Educational and Social Research. 3(6), 105-111.
- [9] Setyowati, Y. 2012. Pengaruh Motivasi dan tanggung jawab Belajar Siswa Terhadap Prestasi Belajar Matematika. Skripsi. Universitas Muhammadiyah Surakarta. Surakarta
- [10] Dochy, F.J.R.C, 1996. Alternatives in Assessment of Achievements, Learning Processes and Prior Knowledge. New York : Springer Science + Business Media.