

The Effect of Constructivism Learning Approach on Students' Mathematics Learning Outcomes in Material Relations and Functions of Grade VIII SMP Negeri 11 Pematangsiantar

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ABSTRACT

The purpose of this study was to determine whether there was an effect of the influence of the constructivist learning approach on the mathematics learning outcomes class VIII students of SMP Negeri 11 Pematangsiantar. This study used a Quasi Experimental Design quantitative research method. The instrument is valid and reliable, and the results of the calculation of the data analysis obtained samples that are normally distributed and homogeneous. The hypothesis of this study is the influence of influence of the constructivist learning approach on the mathematics learning outcomes of class VIII students of smp negeri 11 pematangsiantar. Based on the results of calculations using the t test, it is found that t_{count} is 5.906 and t_{table} is 2.01537, because $t_{count} > t_{table}$ is $5,906 > 2,01537$ so H_a is accepted and H_0 is rejected, meaning that there is an influence of the influence of the constructivist learning approach on the mathematics learning outcomes of class VIII students of smp negeri 11 pematang siantar. The results of this study are expected to be useful for related parties such as teachers, students and further researchers

Keyword: constructivist, student mathematics learning outcomes

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1. INTRODUCTION

One of the efforts to foster the mentality and attitude of students in a better direction is education. Education continues to develop to form individuals who are successful and dare to face obstacles and challenges, with enough mastery of things that are not only theoretical, but must have life skills. One of the goals of education according to the National Education System Law 20 of 2003 is the goal of national education to develop the potential of students to become human beings who believe and are responsible, have knowledge and skills, are independent and responsible. (Sisdiknas, 2011 In ZOHRIANI 2014).

School which is an educational institution is a place to accommodate students and foster students so that they have skills, intelligence, and abilities. Many programs or organizations support the educational process which then on their own initiative can improve abilities, skills towards more advanced knowledge in fostering students in schools. Self-development is a means of fostering students in schools. Self-development is an educational activity outside of compulsory subjects which are an integral part of the school/madrasah curriculum (Depdiknas: 2008 In Fadli, M. 2018).

Mathematics is one of the elements in education. This means that mathematics is very important to learn because it is the initial foundation for the creation of intelligent and quality human resources. Mathematics is also one of the subjects taught in school. This subject needs to be given to all students from elementary school to university because almost all science and technology requires mathematics. This is consistent with the objectives of learning mathematics in Mathematics Learning Strategies, (Suska Press, 2008 in Suani E. 2013).

Susanto 2014 (in Annisa, F. and Marlina, M. 2019). said learning mathematics is a teaching and learning process that is regulated by the teacher so that students think creatively, which can improve the ability of students' mindsets and increase the ability to construct new knowledge as an effort to build good self-

mastery. But in fact, at this time the results of learning mathematics. From the results of observations that were made on May 19 2022, at SMP NEGERI 11 Pematangsiantar, the researcher gave a diagnostic test totaling 3 questions which made indicators to class VIII students of SMP NEGERI 11 Pematangsiantar in the form of a description.

The following questions are given to students:

1. Make a function table $f: x \rightarrow x+1$ from the set $\{0,1,2,3\}$ to the set of integers.
2. Draw a graph of the function f
3. In the same figure, graph the function $x \rightarrow x+1$ on the positive and zero sets.

From the questions above, we can see in Figure 1.1 the error data from student work below:

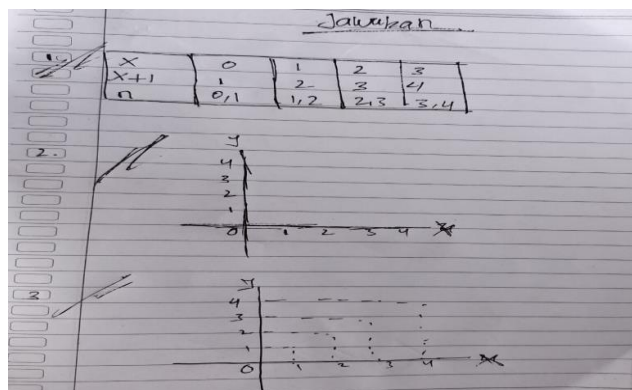


Figure 1.1 Student Learning Outcome Error Data

From the picture above, we can conclude that the results of the diagnostic tests for class VIII students show that their mathematics learning outcomes are still low. Students are still lacking in explaining a problem by providing a discussion of the given problem, and students have not been able to present a problem into a model or picture of the math problem. Therefore, the teacher as an educator must also be able to choose and determine the appropriate learning approach model so that it can attract interest and student motivation. The teaching and learning process must be able to provide opportunities for students to find their own ideas, as well as the teaching and learning process is carried out to awaken students and consciously use their own learning strategies. 1 Teachers can equip students with steps that lead students to a higher understanding, with the students' own notes, who have to climb the stairs; therefore, the teacher does not just give knowledge to students. 2 Students build their own knowledge in their minds. So, the strategy needed here is a learning approach strategy that can build or compile new knowledge in students' cognitive structures based on previous knowledge experience which is called a constructivist learning approach.

In order to optimize the knowledge of students' understanding of mathematical concepts, a learning method is needed that can link student experiences with the material being studied and can build or compile new knowledge in students' cognitive structures based on experience. Learning mathematics using a constructivist learning approach is one of the solutions to overcome the above problems. By using this learning model, it is expected that students learn actively, can foster positive collaboration and compile new knowledge in students' cognitive structures, and can improve maximum learning outcomes in learning mathematics.

Therefore, teachers can use the application of a constructivist learning approach that is expected to be able to stimulate students to think actively and critically and be able to find and apply their own ideas, provide new insights for their own advantages in achieving the process of achieving the expected learning outcomes through the method applied. Related to this, researchers are interested in conducting research to find out how the essence by using constructivist learning theory students can develop their activeness in constructing their knowledge, so that with that knowledge students are more able to master learning because it is related to the initial conceptions that students have and the experience they gain, from the environment of everyday life.

2. RESEARCH METHOD

This study uses a type of quantitative research. Quantitative research is always related to numbers, from data collection, data interpretation, to results. Likewise, the conclusions of packaging research are accompanied by tables, graphs, charts and pictures. Sugiyono (2016) said the research method can be translated as a scientific way to obtain valid data to find goals, develop and demonstrate knowledge so that in essence it can be used to solve problems in the field of education.

According to Arikunto 2020 the research design is as follows: Selecting a problem, Preliminary study, formulating a problem, formulating basic assumptions, choosing an approach, determining variables and data sources, determining and compiling instruments, collecting data, analyzing data, drawing conclusions, writing reports.

The researcher took members of the population as a sample, namely class VIII - 1 being the experimental class which consisted of 23 people and class VIII - 2 being the control class which consisted of 23 people. so, the overall sample in this study amounted to 46 people.

Table 3.2 Research Samples

No	Group	Class	Number of Students
1	Experiment	VIII – 1	23 student
2	Control	VIII – 2	23 student
Total			46 student

Collecting data is an important stage in research. Good and correct data collection techniques can produce data that has high credibility (Rahardjo, 2011), so this stage cannot go wrong and should be done carefully according to the procedure. In order to obtain accurate data, this study uses several data collection techniques such as:

- a. Observation
- b. Test
- c. Documentation

3. RESULTS AND DISCUSSION

This research was conducted at SMP Negeri 11 Pematangsiantar to determine the effect of the constructivism learning approach on the mathematics learning outcomes of class VIII students of SMP Negeri 11 Pematangsiantar by giving treatment to the experimental group using the influence of the constructivism learning approach and in the control, class using conventional learning.

Researchers used Quasi-Experimental Design using Nonequivalent Control Group Design. The research sample consisted of 46 students consisting of two classes, namely the experimental class and the control class, each class consisting of 23 students. This research process first validated the questions to the mathematics teacher and tested them on students who had studied them before being given to the experimental class and the control class, as many as 5 questions which then got the result that the questions were stated to be valid with a reliability of 0.734 with a high interpretation and can be said to be reliable. Furthermore, the results of the difficulty level test have 3 items which are currently in question numbers 1, 2, 4 and the difficult questions have 2 items in numbers 3 and 5. Furthermore, the results of the differentiating power test on the 5 questions that have been tried out show that 3 questions have a good interpretation, and 2 questions have an adequate interpretation.

Before carrying out the learning process using the influence of the constructivist learning approach, the researcher first gave a pre-test in class VIII-A (experimental) with a total of 5 questions to measure the ability of student learning outcomes in the form of essays on function material. Based on the researcher's observations on the student's pre-test answer sheet number 21 (Appendix 19) it can be explained that the score obtained by the student was 35, which did not meet the standard minimum completeness criteria (KKM).

Then after the learning process was carried out using the influence of the constructivist learning approach the researcher gave post-test questions in class VIII-A (experimental) with the same items, namely 5 items to measure the ability of student learning outcomes in the form of essays on function material. Based on the researchers' observations on the student post-test answer sheet number 21 (Appendix 19) it can be explained that students have been able to meet the criteria for student learning outcomes indicators by obtaining a score of 100. So, with this the students have met the standard minimum completeness criteria (KKM).

Furthermore, a normality test was carried out where the normality test obtained the pretest results of the experimental class, the significance value of the pretest results from Kolmogorov-Smirnov (sig) 0.159 for the significance value of the posttest results from Kolmogorov-Sminov (sig) 0.200 and while the tests of normality above were for the control class, the significance value the pretest result of Kolmogorov-Smirnov (sig) 0.200, for the significance value of the posttest result of Kolmogorov-Sminov (sig) 0.092. So, it can be concluded that the experimental and control normality tests are significant > 0.05 , so that the normality test is normally distributed.

In the homogeneity test, the experimental and control posttest values were obtained with a significant (sig) based on mean of 0.830 with a significant result of 0.05, which means that the distribution is

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homogeneous. In the t test with the results $t_{\text{count}} > t_{\text{table}}$ with df used in this study is 0.05 at $df = (n_1 + n_2 - 2)$ with $df = 44$, namely 2.01537, then $5.906 > 2.01537$. In accordance with the discussion in Chapter III If $t_{\text{count}} > t_{\text{table}}$ then H_0 is rejected and H_a is accepted, which means there is a significant difference. Conversely, if $t_{\text{count}} < t_{\text{table}}$ then H_0 is accepted and H_a is rejected which means there is no significant difference.

Paying attention to the average test scores of student learning outcomes in the two classes, the average test scores in the experimental class are higher than those in the control class, so this illustrates that learning done using a constructive learning approach has a good value effect on student learning outcomes. Where the Constructivism learning process has increased students' knowledge so that they are able to build, (appendix 12) find new things at once (appendix 19), which makes learning more student centered (student centered) in the learning process to make it more impressive and easier to remember in achieving learning objectives. In constructivism learning for children already includes the characteristics of the constructivism learning approach with function material, from the average seen from the learning outcomes and from the observations of researchers.

4. CONCLUSION.

From the explanation presented in the previous chapter, it was concluded that from the results of research conducted in class VIII SMP Negeri 11 Pematangsiantar with the material on relations and functions, it was stated that there was an effect of the constructivism learning approach on mathematics learning outcomes for class VIII students of SMP Negeri 11 Pematangsiantar compared to conventional learning, this is seen from the posttest results. The posttest average of students in the experimental class using constructivism learning was higher than the control class using lecture learning, namely the experimental class 83.91 and the control class 68.70.

From the results of the t test, $t_{\text{count}} > t_{\text{table}}$ where t_{count} is 5.906, t_{table} is 2.01537 with a significant level of 0.05 from hypothesis testing H_a is accepted, which means that there is an influence of the constructivism learning approach on the mathematics learning outcomes of class VIII students of SMP Negeri 11 Pematangsiantar.

BIBLIOGRAPHY

- Arikunto, Suharsimi. 2020, *Prosedur Penelitian Suatu Pendekatan Praktik* ed.2 Jakarta: Rineka Cipta
- Annisa, F., & Marlina, M. (2019). Penerapan Model Pembelajaran Kooperatif Tipe Index Card Match Terhadap Aktivitas dan Hasil Belajar Matematika Peserta Didik. *Jurnal Basicedu: Research Dan Learning in Elemnetary Education*, 3(4), 1047-1054.
- Berpendidikan. 2016. *Pengertian Korespondensi Satu-satu dalam Matematika dan Rumusnya. Diakses melalui laman <https://www.berpendidikan.com/2016/05/pengertian-korespondensi-satu-satu-dalam-matematika-dan-rumusnya.htm>*
- Estari, I. (2015). Pengaruh Waktu Belajar Dan Minat Belajar Terhadap Hasil Belajar Matematika. *Formatif: Jurnal Ilmiah Pendidikan MIPA*, 3(2).
- Fadillah, A. (2016). Analisis Minat Belajar Dan Bakat Terhadap Hasil Belajar Matematika Siswa. *Mathline: Jurnal Matematika Dan Pendidikan Matematika*, 1(2), 113-122.
- Fadli, M. Pengaruh Penerapan Konstruktivisme Terhadap Hasil Belajar Matematika Pada Murid Kelas Iii Min Benjara Kecamatan Bontobahari Kabupaten Bulukumba.
- Hidayati Sri, Alfiani Anita Dwi, Arifuddin Ahmad. 2018. *Pengaruh Model Pembelajaran Inkuiri Terhadap Kemampuan Pemecahan Masalah Matematika Siswa Kelas IV Madrasah Ibtidaiyah. Jurnal Pendidikan Guru MI, Jurusan Pendidikan Guru MI*, Vol 5(2), hal 262.
- Makhmuri, Andini ANtil Nesi. 2020. Pengaruh Motivasi Belajar Terhadap Hasil Belajar Matematika Kelas V SD Negeri Panca Tunggal Tahun Ajaran 2019/2020. *Jurnal Edukasi Madrasah, Ibtidaiyah*, Vol 2(1). 21-29.
- Masinambow A. Danny, Tuerah S.M Roos, & Makalisang Misye. 2021. *Peran Orang Tua Dalam Meningkatkan Motivasi Belajar Anak Pada Masa Covid-19 di SD Katolik 21 Gunung Tabor Manado. Jurnal Pendidikan Dasar*, Vol 2(2), hal 4.
- Nugroho Risky, Warmi Attin. 2022. *Pengaruh Motivasi Belajar Terhadap Hasil Belajar Matematika Siswa di SMPN 2 Tirtamulya. Jurnal Pendidikan, Matematika dan Sains*, Vol 6(2).
- Oscar Bheben, Ulfiani Hikma. 2019. *Pengaruh Kualitas Produk Terhadap Kepuasan Pelanggan Pada PT. Kiblat Pengusaha Indonesia. Jurnal Bisnis dan Pemasaran*, Vol 9(2), hal 84.

- Putra Semara.Ngr.Kt.DB, Darmayanti Komang Ni. 2019. *Kontribusi Kecerdasan Emosional dan Kebiasaan Belajar Terhadap Kompetensi Pengetahuan IPS*. *International Journal of Elementary Education*, Vol 4(1), hal 36.
- Ristiana, P., Labulan, P. M., & Berahman, B. (2018). Kemampuan Menghitung Integral Tak Tentu Dan Tentu Dari Fungsi Aljabar Sederhana Serta Penerapannya Dalam Menghitung Luas Daerah Di Bawah Kurva Siswa Kelas XII IPS SMA Syaichona Cholil Samarinda Tahun Ajaran 2017/2018. *Primatika: Jurnal Pendidikan Matematika*, 7(2), 105-114.
- Septianti, E. (2012). *KEFEKTIFAN Pendekatan Konstruktivisme Terhadap Kemampuan Koneksimatematis Mahasiswa Pada Mata Kuliah Analisis Real I*. *Online*, Diakses Tgl,2012,9
- Suani, E. (2013). Pengaruh Pendekatan Konstruktivis Terhadap Hasil Belajar Matematika Siswa SMAN 2 Siak Hulu Kampar (Doctoral dissertation, UNIVERSITAS ISLAM NEGERI SULTAN SYARIF KASIM RIAU).
- Sugiyono (2020), *Metode Penelitian Kuantitatif, Kualitatif Dan R & D* ed.2 bandung: Alfabeta
- Suparlan, S. (2019). *Teori konstruktivisme dalam pembelajaran*. *Islamika*, 1(2), 79-88
- Sutisna, Yahya. 2013. Penerapan Pendekatan Kosntruktivisme untuk Meningkatkan Hasil Belajar Siswa pada Pembelajaran IPA di Sekolah Dasar. Bandung: Universitas Pendidikan Indonesia
- Warti Elis. 2016. *Pengaruh Motivasi Belajar Siswa Terhadap Hasil Belajar Matematika Siswa di SD Angkasa 10 Halim Perdana Kusuma Jakarta Timur*. *Jurnal Pendidikan STKIP Garut*, Vol 5(2).
- Yearning Harefa. 2020, Penerapan Model Pembelajaran Konstruktivisme Dalam Meningkatkan Hasil Belajar Siswa Volume 14(2).
- Zohriani, Z. (2014). Pengaruh Model Pembelajaran Konstruktivisme Terhadap Hasil Belajar Ekonomi Pada Siswa Kelas Xi di Ma Nw Padasuka Tahun Pelajaran 2014/2015 Kabupaten Sumbawa Nusa Tenggara Barat (Doctoral Dissertation, Universitas Gunung Rinjani)