ej HEAA

THE INFLUENCE OF THE PBL LEARNING MODEL ON PROBLEM-SOLVING SKILLS IS REVIEWED FROM THE LEARNING STYLE OF STUDENTS ON THE EARTH STRUCTURE MATERIAL IN GRADE VIII JUNIOR HIGH SCHOOL

Rizal Remantoro 1 , Anis Zahrotin 2, Qurrotul Anfa 3
1,2,3) Prodi Pendidikan IPA, STKIP MODERN NGAWI, Jl. Ir. Soekarno No. 9 Grudo, Ngawi
rizal21remantoro@gmai.com

Abstract: This study aims to determine the differences in the influence of problem-based learning (PBL) models on problem-solving skills in terms of students' learning styles carried out in class VIII of SMPN 1 Geneng. The method used in this study is quantitative. The sampling technique in this study is random sampling which will later be taken two classes as experimental classes and control classes. The sample of this study was class VIIIG and class VIIIH with 32 students in class VIIIG as experimental samples and 33 students in class VIIIH as control classes with a population of 268 class VIII students. The study used several instruments collected through problem-solving skills questionnaires, learning style questionnaire sheets, observation sheets, teacher interview sheets, and problem-solving skills test instruments before and after the test. In this study the data collection technique used was ANOVA with the results of this study indicate that the problem-based learning (PBL) model affects students' problem-solving abilities. Students' problem-solving skills are influenced by their learning styles. The test results showed a Sig value level of 0.80> 0.05, this indicates that H0 is rejected and Ha is accepted. So it can be concluded that the learning model (PBL) has a different influence on problem-solving skills in terms of students' learning styles on the material on earth structure in class VIII of SMPN 1 Geneng.

Keywords: Model (Problem Based Learning), Problem-Solving Skills, Learning Style, Earth Structure.

Introduction

Education is the only effective way to improve the quality of everyone and increase everyone's potential. Especially in the modern era, or the era of globalization, this makes the development and progress of students very important to ensure a sustainable life, therefore to ensure a sustainable way of life, with high education they are able to keep up with the times (Fakhriyah, 2014). The progress of education itself will not be separated from the role of teachers because they are able to contribute knowledge in a brilliant and extraordinary era (Iswantari, 2021). One of them is that science learning is a compulsory subject at the school level, because it is important for students to create logical experiences and skills during learning (Ekantini, 2020). This learning learning about the interaction between each individual, environment, and phenomena in nature will be studied in science which is a subject in the curriculum in the first secondary school (Nur, 2022). Good learning must be able to provide an opportunity for students

to develop their potential or activeness, thus training students to think more effectively in order to increase their problem-solving capacity at school (Ichsan, 2022). The learning model also affects how successful in a learning is because if the learning model is not suitable, success in a learning will not be achieved. The PBL learning model is used by researchers in research because in this model students are required to be able to solve every problem faced successfully during learning.

According to Kelana & Wardani (2021) explained that PBL is a learning model that uses a case or problem to determine learning goals for students. Students try to independently consider some recent time back in the group to talk about and refine the information they have taken. PBL itself is not only centered on problem solving, but uses appropriate issues to expand students' information and understanding. because PBL can improve students' problem-solving skills because in learning they are asked to learn from problems because they are directly related to students' lives, so it can be concluded that PBL is a demonstration in learning to present problems as learning materials. In this case, it requires real problems because they concern events in life as an effort to prepare students to be dynamic, recognize problems, define problems, understand problems, and find solutions. PBL (Problem Based Learning) itself also affects students' problem-solving skills because there are still many students who cannot solve their problems both in the classroom and outside the lower grades, this is evidenced by the fact that there are still many students who have not been able to solve their problems, especially in science subjects.

Problem-solving skills are an important ability possessed by students, because in life everyone is always faced with different problems and requires students to always have answers to these problems (Yani & Margana, 2014). Problem-solving skills are skills that students possess so that they can have knowledge that has been previously obtained in conditions where students are required to solve problems immediately (Zahrotin et al., 2021). This ability is important for students to have because in Indonesia itself problem-solving skills are still very low, as evidenced by the fact that there are still many students who have not been able to solve problems both in the classroom and outside the classroom (Permatasari, 2014). In the observations that have been made by researchers, problem-solving skills at SMPN 1 Geneng are still low, this is proven by many students who still have difficulty solving problems. In this context, teachers must know what obstacles students experience that make them difficult to solve problems are also influenced by students' learning styles, therefore teachers are required to be able to know how each student's learning style has a different learning style that aims to solve problems in the classroom and outside the classroom.

Learning style is a way of learning that every student needs to investigate, handle, consider and obtain data more effectively. In addition, learning styles are very important because each student has a different learning style. Hamzah (2018) explained that the speed of students' information absorption is different, some are very fast, moderate, and slow, and this is also related to the way they solve problems. All students should know what learning style suits them best. According to Eminita & Astriyani (2018) explained that the absorption of student information depends on how teachers convey information to students. The way students learn can also be called learning styles. Because it can be a way for a person to store information by organizing and preparing the information to be obtained (Papilaya & Huliselan, 2016). Most students do not know what learning style is suitable for them, so according to researchers, a suitable learning style will

produce cold results, especially on the material they want to learn, when students know how their learning style will make it easier for them to learn. The material in this study is the structure of the earth because in this material students are required to be able to understand the material in theory and practice so that students are able to solve the problems given by the teacher.

The earth structure material was chosen for junior high school/MTs science learning class VIII because it is suitable for the learning model to be applied. Aiming to improve students' problem-solving skills, the learning model used prioritizes problem solving. Students have many opportunities to be actively involved in problem-solving related to the various ideas in this material. Knowledge of the structure of the Earth is essential because it includes many things that students must understand. Since this material helps students understand environmental phenomena, it can be used in learning. The influence of PBL on students' ability to solve science problems at SMPN 1 Geneng is also the focus of research. The results of this research are expected to offer a platform that can help improve students' ability to cope with problems at home and at school

Methods

This study applies a quantitative approach as the basic foundation of the research method. Through a random sampling process, 65 students were selected who were then grouped into two groups: the VIIIG experimental class and the VIIIH control class. Problem-solving ability questionnaires, learning style questionnaires, and observation sheets and teacher interviews help with data processing with one-way ANOVA techniques. The purpose of this study is to find out how the problem-based learning model (PBL) has an impact on the problem-solving ability of students in grade VIII of SMPN 1 Geneng. The experimental class uses the PBL model, while the control class uses a direct learning (DL) approach.

Results and Discussion

According to the statistical analysis conducted by the researchers, the results showed that the problem-solving skills of students in the experimental class and the control class were different. The results of the pretest and posttest, which consisted of ten description questions, for the experimental and control classes show the results that can be seen in the following table showing the results of the pretest and posttest of this study.

Table of Descriptive Statistical Test Results

Descriptive Statistics					
	N	Min	Max	Average	Std. Deviation
Pre-test experiments	32	42	72	56,44	8,766
Pretest Control	33	44	73	54,06	6,466
Post-test experiments	32	74	88	80,44	3,784
Posttets Control	33	70	86	74,39	4,344

Descriptive Statistics					
	N	Min	Max	Average	Std. Deviation
Valid N (*Listwise*)	32				

The data from the descriptive statistical test results above are known for the problem-solving skills of class VIIIG (experiment) and class VIIIH (control) with data on the *results of the pretest* of the experimental class (VIIIG) with a total of 32 students obtained the highest score (Max) 72, the lowest score (Min) 42, the mean (mean) 56.44 and the standard deviation of 8.66. Meanwhile, after being given the PBL *(Problem Based Learning) model* treatment, the data on *the results of the posstest* results were obtained with a total of 32 students, the highest score of 88, the lowest score of 74, the mean of 80.44 and the standard deviation of 3.784. While the data in the control class (VIIIH) was obtained *pretest results* based on scores with a total of 33 students, results were obtained with details of the largest score (Max) 73, the smallest score (Min) 44, the average (mean) 54.06 and the standard deviation of 6,466 and after being treated with the DL *(Discovery Learning) model,* the data obtained the *poststest* results With a total of 33 students, the highest score was 86, the lowest score was 70, the average (mean) was 74.39 and the standard deviation was 4.344. After the pretest *and* posttest *results in the average of the experimental class and the control class which can be seen in the table below*
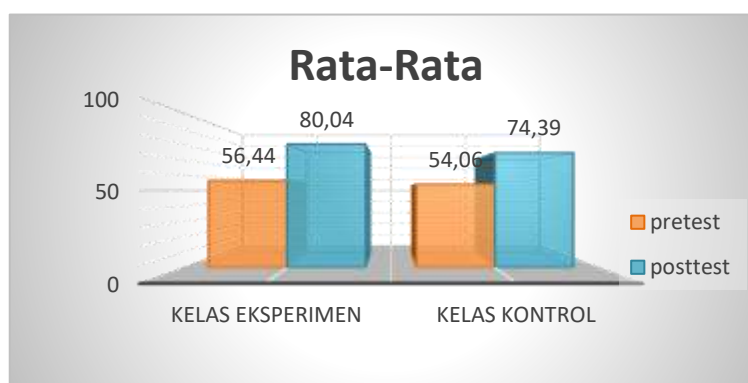

Diagram of the average results of pretest and posttest

From the diagram above, it is clear that students in the experimental class experienced an increase in the average score of problem-solving skills of 24.00, while students in the control class experienced an increase in scores of 18.35. Based on these calculations, it can be concluded that the PBL (Problem Based Learning) learning model has more influence on problem-solving skills than the DL (Discovery Learning) learning model. Furthermore, it was known that the pretest and posttest data came from the same population (homogeneous data), and hypothesis tests were carried out using a one-way analysis of the variance test of the same cell. To find out whether there is a variation in the application of the learning model to problem-solving abilities based on students' learning styles, hypothesis testing is carried out. The table below displays the results of the *single-way analysis variance test of the same cell*. Table of Anava *Pretest, Postest* and Learning Style Test Results.

ANAVA						
		Sum of Squares	Df	Mean Square	F	Mr.
POSTTEST	Between Groups	91,586	2	45,793	2,629	,080
	Within Groups	1079,860	62	17,417		
	Total	1171,446	64			

The results of the table show that students' skills in solving problems involving components of the earth's structure have a significance value of 0.080, which is greater than 0.05. This confirms that Ha is accepted and H0 is rejected. Therefore, judging from the learning style of students at SMPN 1 Geneng, it can be concluded that the average problem-solving skills of students in the experimental class and control class have an effect on the overall problem-solving skills. From the results of the Anova test shown in the table, it can be seen that there is a difference in the influence of the PBL (Problem-Based Learning) learning model reviewed from the student's learning style in the context of problem-solving skills, where Ha is accepted and H0 is rejected. Observation of problem-solving skills can be seen from the results of the pretest and posttest of the two classes, namely the experimental class (VIIIG) and the control class (VIIIH). This confirms that the PBL (Problem Based Learning) learning model has an influence on students' problem-solving skills reviewed by their learning styles, especially in the material of the earth structure in grade VIII of SMPN 1 Geneng.

DISCUSSION

The purpose of this study is to find out how the problem-based learning model, or PBL, has an impact on problem-solving skills reviewed from the learning style on the earth's structure material. This study uses two sample classes; 32 students are in the experimental class and 33 students are in the control class, all students from SMPN 1 Geneng grade VIII. This study is a type of experimental research using two classes: one class as an experimental class (VIIIG) and one class as a control class (VIIIH). Pretest and Posttest are given to each class by the researcher to get more accurate results. This was done to compare the two classes with the state before the treatment. This study does this by providing teaching with a problem-based learning model (PBL) to find out if there is a difference

In the first meeting, a pretest was carried out to find out the students' initial ability to see how students' problem-solving skills were in both the experimental class and the control class, in the second meeting in each class was given the treatment of the PBL *(Problem Based Learning) learning model* in the experimental class while the control class was given the usual treatment so that it could be compared. After the third meeting in each class was given a final test *(posttest)*, this aimed to see how the problem-solving skills in both classes after being treated to find out if there was an influence of the PBL *(problem-based learning)* learning model on problem-solving skills. This study also used several supporting instruments, namely teacher observation sheets, problem-solving skills questionnaires, learning style questionnaires, and teacher interview sheets.

Teacher observation sheets are used to see how the PBL learning model is *(Problem Based Learning)* whether or not it affects problem-solving skills. This is also used by researchers in carrying out research, besides that teachers can also find out whether the model used is suitable or not. In addition to the observation sheet, this research also uses a problem-solving skills questionnaire, this questionnaire is given before doing the *pretest* and *posttest* This aims to see how the problem-solving skills in the experimental and control classes are still low or not, this is also in line with the opinion of Memnun (2012) who stated that each student has different problem-solving skills, this is because there are still many students who have not been able to overcome the problems faced during the learning process. Therefore, the main priority and goal of education today is how to improve student problem solving, especially in science subjects. Problem-solving skills are skills that students must have to apply previously acquired knowledge in conditions where students are required to solve problems on the fly (Zahrotin et al., 2021). Because problem-solving skills also greatly influence students in achieving learning success.

Based on the data that has been collected and the analysis of the data in this study, the results show that the existing data is normally distributed and homogeneous. This is because in the treatment given and the test results carried out, there is a significant difference in students' problem-solving skills. So in this case Ho was rejected and Ha was accepted. The acquisition *of posttest* score data also showed an increase after being treated with the PBL *(problem based learning) model*. Based on the above results, it can be concluded that the PBL *(problem-based learning)* model is effective on students' problem-solving skills in science learning in grade VIII at SMPN 1 Geneng. This is evidenced by the increase in students' problem-solving skills from a learning style. Because students' problem-solving skills increase after being given the PBL *(problem-based learning) model,* This is in accordance with research conducted by Rokhimah & Rejeki, (2018) said that problem-solving skills are also influenced by learning styles, because if students do not know what their learning style is, students will have difficulty solving their problems both in learning and outside of learning

Conclusion

Based on the above research, it can be concluded that the PBL (Problem Based Learning) model affects students' problem-solving skills. This conclusion was drawn based on the results of hypothesis tests using Anava. Anava's results showed a sig value of more than 5% or $0.080 > 0.05$ This shows that H0 is rejected and Ha is accepted, which means that it can be concluded that the PBL (problem based learning) learning model is influential and better in the learning process than the use of the Discovery Learning learning model on problem-solving skills in science learning.

References

[1]. Chania, Y., Haviz, M., & Sasmita, D. (2017). Chania,Y., Haviz, M., & Sasmita, D. 2016. Hubungan Gaya Belajar dengan Hasil Belajar Siswa pada Pembelajaran Biologi Kelas X SMAN 2 Sungai Tarab Kabupaten Tanah Datar. Journal of Sainstek hal: 76-84. ISSN: 2085-8019. *Sainstek : Jurnal Sains Dan Teknologi*, 8(1), 77. https://doi.org/10.31958/js.v8i1.443

[2]. Ekantini, A. (2020). Efektivitas Pembelajaran Daring pada Mata Pelajaran IPA di Masa Pandemi Covid-19: Studi Komparasi Pembelajaran Luring dan Daring pada Mata Pelajaran IPA SMP. *Jurnal Pendidikan Madrasah*, 5(2), 187–194. https://doi.org/10.14421/jpm.2020.52-04

[3]. Fakhriyah, F. (2014). Penerapan problem based learning dalam upaya mengembangkan kemampuan berpikir kritis mahasiswa. *Jurnal Pendidikan IPA Indonesia*, *3*(1), 95–101. https://doi.org/10.15294/jpii.v3i1.2906

[4]. Iswantari, I. (2021). Implementasi Model Pembelajaran Berbasis Proyek untuk Meningkatkan Hasil Belajar IPA. *Jurnal Paedagogy*, *8*(4), 490. https://doi.org/10.33394/jp.v8i4.4126

[5]. Kelana, J. B., & Wardani, D. S. (2021). Model Pembelajaran IPA SD. In *Edutrimedia Indonesia* (Issue February). https://www.google.co.id/books/edition/MODEL_PEMBELAJARAN_IPA_SD/kxAeEAA AQBAJ?hl=id&gbpv=1&dq=pembelajaran ipa&pg=PP1&printsec=frontcover&bsq=pembelajaran ipa

[6]. Nurcahyani, D. (2014). Pengaruh Penerapan Pendekatan Pemecahan Masalah Terhadap Pemahaman Konsep Pada Pembelajaran Kimia. *Skripsi*.

[7]. Papilaya, J. O., & Huliselan, N. (2016). Identifikasi Gaya Belajar Mahasiswa. *Jurnal Psikologi Undip*, *15*(1), 56. https://doi.org/10.14710/jpu.15.1.56-63

[8]. Purwanto, R. (2021). Kepemimpinan Visioner Kepala Sekolah Terhadap Mutu dan Kualitas Sekolah di SD Negeri Soko. *Jurnal Pendidikan Dan Teknologi Indonesia*, *1*(4), 151–160. https://doi.org/10.52436/1.jpti.26

[9]. Rahmatika, Khairiani, & Nurul Akmal. (2022). Analisis Kemampuan Pemecahan Masalah Matematika Ditinjau Dari Gaya Belajar Siswa. *Ar-Riyadhiyyat: Journal of Mathematics Education*, *3*(1), 10–20. https://doi.org/10.47766/arriyadhiyyat.v3i1.497

[10]. Ramadhani, D. A., & Muhroji, M. (2022). Peran Guru dalam Meningkatkan Motivasi Belajar pada Peserta Didik di Sekolah Dasar. *Jurnal Basicedu*, *6*(3), 4855–4861. https://doi.org/10.31004/basicedu.v6i3.2960

[11]. Yulistiana, & Setyawan, A. (2020). Analisis Pemecahan Masalah Pembelajaran IPA menggunakan Model Problem Based Learning SDN Banyujuah 9. *Prosiding Nasional Pendidikan: LPPM IKIP PGRI Bojonegoro*, 590–597.

[12]. Zahrotin, A. (2021). Analisis Kemampuan Pemecahan Masalah Fisika Pada Materi Gerak Parabola SMA. *Proceeding of Integrative Science Education Seminar Vol. 1, 2021*, *1*, 575–580. https://prosiding.iainponorogo.ac.id/index.php/pisces