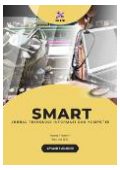

SMART : Jurnal Teknologi Informasi dan Komputer
Available online at https://journal.bengkuluinstitute.com/index.php/smart
Vol. 2 No. 1, January-June 2023, pages: 23-28
ISSN: 2963-6388
http://dx.doi.org/10.58222/smart.v1i2.185

Analysis of Problem-Based Learning Models in Mathematics Using Two Variables

Analisis Model Pembelajaran Berbasis Masalah pada Mata Pelajaran Matematika Menggunakan Dua Variabel

Andi Saputa Mandopa [a]

Article history:

Submitted: 25 April 2023
Revised: 23 May 2023
Accepted: 1 June 2023

Keywords:

Problem-Based-Learning, Mathematics, Two Variables

Abstract

The purpose of this study was to determine the extent to which the growth of students' mathematics learning outcomes by using the Problem Based Instruction (PBI) learning model in Class VII material at the Salapiah Gunung Silayang-Layang Islamic Boarding School. school for the 2020-2021 academic year. This type of research is Classroom Action Research (AUTO), which consists of two parts. The subjects of this study were class VII students of Pondok Pesantren Salapiah Gunung Silayang Layang Padangsidimpuan for linear equations with two variables. The results showed that student learning outcomes in learning mathematics using the PBI Learning Model for students of the Salapiah Gunung Silayang-Layang Islamic Boarding School Class VII-2 in the material variable Linear Equation One academic year 2021 increased to 71.85, increasing to 71.85. category "sufficient" in Cycle I, then raised to 88.55 to a "good" value in Cycle II. The results achieved in Fall II indicated that the expected categories were fulfilled. The average score is 75 and Classical Perfection 75% of students achieve a passing grade of Good.

Abstrak

Tujuan penelitian ini adalah untuk mengetahui sejauh mana pertumbuhan hasil belajar matematika siswa dengan menggunakan model pembelajaran Problem Based Instruction (PBI) pada materi Kelas VII di Pesantren Salapiah Gunung Silayang-Layang. sekolah tahun pelajaran 2020-2021. Jenis penelitian ini adalah Penelitian Tindakan Kelas (Classroom Action Research/AUTO) yang terdiri dari dua bagian. Subyek penelitian ini adalah siswa kelas VII Pondok Pesantren Salapiah Gunung Silayang Layang Padangsidimpuan untuk persamaan linier dengan dua variabel. Hasil penelitian menunjukkan bahwa hasil belajar siswa dalam pembelajaran matematika dengan menggunakan Model Pembelajaran PBI siswa Pondok Pesantren Salapiah Gunung Silayang-Layang Kelas VII-2 pada materi variabel Persamaan Linier Satu tahun ajaran 2021 meningkat menjadi 71,85

[a] Dosen Program Studi Pendidikan Matemetika, FKIP, Universitas Graha Nusantara Padangsidimpuan, Indonesia

meningkat menjadi 71,85. kategori "cukup" pada Siklus I, kemudian dinaikkan menjadi 88,55 menjadi nilai "baik" pada Siklus II. Hasil yang dicapai pada Fall II menunjukkan bahwa kategori yang diharapkan terpenuhi. Nilai rata-rata 75 dan Kesempurnaan Klasik 75% siswa mencapai nilai kelulusan Baik.

Correspondingauthor:
Andi Saputa Mandopa
Dosen Pendidikan Matemetika, FKIP, Universitas Graha Nusantara Padangsidimpuan, Indonesia
Email address: andimandopa100@gmail.com

1. Introduction

Advanced schools have been supported by educational facilities with electronic multimedia facilities such as computers, laptops, television screens (TV), Liquid Crystal Display (LCD), projectors, Video Compaq Discs (VCD), and others. Problem solving is a very important part of the mathematics curriculum because in the process of learning and solving it, it is possible for each student to gain experience using the knowledge and skills they already have to apply to problem solving. Indicators in solving mathematical problems include the following: 1) Shows understanding of the problem. Students are said to have a good understanding of the problem if students can identify what is known, what is asked of the problem, symbolizing to solving the problem. 2) Organizing data and selecting relevant information in solving problems. Students are said to have the ability to organize data and choose relevant information in good problem solving if students can group data and choose solutions according to reality. 3) Presenting mathematical problems in various forms. Students are said to have the ability to present mathematical problems in various forms which are good if students can present mathematical problems in various forms of mathematical models. 4) Choose approaches and problem solving methods. Students are said to have the ability to choose good approaches and problem-solving methods if students can choose logical thinking approaches to the data they have. 5) Develop a problem solving strategy. Students are said to have the ability to develop good problem solving strategies if students think in the way students use concrete objects. One aspect that plays a very extraordinary role in the success of the learning process is the teaching method (learning methods – models of instructions). These aspects support the success of the process of delivering learning materials (learning contents) in the classroom according to learning objectives (learning objectives). To be able to improve the quality of education in a school can be seen from the increase in the quality of learning, especially in Mathematics. Improving the quality of education is largely determined by the teacher as an educator in achieving the expected educational goals.

In other words, the teacher occupies the central point of education. In order for the teacher to be able to carry out his duties properly, he must first understand matters related to the teaching and learning process as well as the educational process in general. Thus the very important role of the teacher is to activate and streamline the learning process in schools including applying appropriate learning models. In the process of learning mathematics, students are more required to be active in participating in the learning, as well as to think critically in solving problems mathematically. The learning process places more emphasis on providing direct experience to develop competence.

There are still many problems encountered in the process of learning mathematics which have an impact on low student learning outcomes. Based on the information the researchers obtained from one of the mathematics teachers, that the average grade VII mathematics daily test score had not yet reached the learning completeness limit, which still reached 34.80%. Meanwhile, the average score for the first daily math test is also still low, namely 60.90. The Problem Based Instruction (PBI) learning model is a learning model that uses a problem in everyday life to be identified and solved, not just focusing on mastery of the material. The Problem Based Instruction (PBI) learning

model encourages students to analyze problems, seek information, develop hypotheses, and solve a problem. The advantages of the PBI learning model are being able to increase student motivation in learning to encourage cooperation in solving problems, encourage students to make observations and dialogue with others, involve students in investigations of their own choices. This allows students to explain and build their own understanding of the phenomenon. Problem Based Instruction is learning with a constructivist approach, which says that knowledge is not static, but evolves and changes constantly as long as students construct new experiences that force them to base themselves and modify them.

Based on the results of observations and interviews with one of the Salapiah Gunung Silayang Layang Islamic Boarding School teachers, the authors obtained some information, namely: There are still students who do not participate in the learning process, Teachers are still carrying out conventional learning, There are still many students who have not been able to work on practice questions given by the teacher, and there are still many students who do not pass the KKM during the math test. The teacher stated that the average daily test score for mathematics had not yet reached the learning completeness limit, which still reached 35.28%. Meanwhile, the average daily test score is still low, namely 62.90. Of course, this condition should not be allowed to drag on. According to Sanjaya, teachers must have a number of competencies, one of which is professional competence (Wina Sanjaya, 2006: 145–146). Professional competence is the ability to complete teacher tasks. This means that teachers are also required to be professionals who must be able to develop themselves and keep up with the times. The PBI learning model or commonly called problem-based learning, in this learning model, students are required to produce a real work and demonstration that explains or represents the problems they find and convey them verbally. With the PBI learning model, teachers can increase student motivation to be directly involved in the learning process. In addition, students can also easily understand what is conveyed by the teacher because students determine and find their own answers to the problems given. in the PBI learning model designed in such a way as to attract students' attention. Learning that involves children tends to be more effective because students feel more relaxed.

2. Method

This research uses classroom action research (CAR). Classroom Action Research is a form of research that occurs in the classroom in the form of certain actions taken to improve the teaching and learning process in order to improve learning outcomes better than before. Classroom Action Research can be used as an implementation of various existing programs in schools, by examining various indicators of successful processes and learning outcomes that occur in students or the success of the processes and results of implementing various school programs. Classroom Action Research requires a lot of time because it must be able to implement the actions along with the variables that have been designed to achieve the desired results. This research cannot be completed in just 1-2 days. The research location that the researchers conducted was at the Salapiah Gunung Silayang Layang Islamic Boarding School. When the research that the writer did was carried out in the odd semester, the 2020-2021 school year. The subjects in this study were Grade VII students at the Salapiah Gunung Silayang Layang Islamic Boarding School, Padangsidimpuan, in the matter of one-variable linear equations. on the material linear equation one variable. Tools for researchers in using data collection methods are called instruments. Thus there is a link between the method and the data collection instruments. Selection of one type of data collection method can sometimes require more than one type of instrument. Conversely, one type of instrument can be used for various methods (Arikunto, 2009). "Research instruments" which are defined as "tools" are suggestions that can be realized in objects, for example a questionnaire (questionnaire), a checklist of test questions and so on (Arikunto, 2009). In connection with the explanation above, in this study the researcher used several instruments as a tool in collecting data, namely tests.

The following indicators of success are:

1. Improving student learning outcomes in the teaching and learning process as seen from the observation sheet with a minimum achievement percentage of 80%, namely the "Good" category from all aspects observed.
2. Class success can be seen if the average student learning outcomes increase from the test results after students are given the action to achieve the Minimum Completeness Criteria "75" set by the school and the classical

completeness of 70% of students must obtain a minimum score of "Good" from students who take part test on the application of the Problem Based Instruction (PBI) Learning Model in the material of One Variable Linear Equation in class VII of the Salapiah Gunung Silayang Layang Islamic Boarding School for the 2020-2021 academic year.

3. Results And Discussion

The results of class action research in cycle I are described into several stages. The stages carried out in the Classroom Action Research Process (PTK) in class VII of the Salapiah Gunung Silayang-Layang Islamic Boarding School are action planning, action implementation, observation, and reflection. The results of the first cycle research are described as follows: Cycle I is learning with the subject of Number Patterns. The Problem Based Instruction (PBI) Learning Model was introduced to students in learning activities to see the results of increasing the learning outcomes of class VII students at the Salapiah Gunung Silayang-Layang Islamic Boarding School. At the end of Cycle I learning, then the research carried out tests of student learning outcomes in mathematics learning, the results obtained from these tests can be seen in the following table:

Table 1. Classification of Cycle I Test Result Values

No	Ability Level	The number of students	Percentage	Value Classification
1	90-100	0	0%	Very good
2	80-89	7	35%	Good
3	65-79	6	30%	Enough
4	55-64	4	20%	Not enough
5	0-54	3	15%	Very less
Amount		20	100%	

Based on table 1 above, of the 20 students who took the test, 7 people with a percentage of 35% were in the "Good" category, 6 people with a percentage of 30% were in the "Enough" category, 4 people with a percentage of 20% were in the "Less" category , 3 people with a percentage of 15% are in the "Very Less" category. However, this increase has not yet reached the expected completeness criteria, because the number of students who obtained the minimum sufficient category limit was only 68% of the 20 students who had taken the test, so that research in cycle I was declared incomplete with a minimum target of 80% with a total of 16 students of the 20 students who took the test, so that the research in cycle I was declared not in accordance with the target set at 80%, so reflection was held in the next cycle, namely cycle II.

An explanation of the description of the level of student learning test results in mathematics from the test results in cycle I can be seen in the following graph.

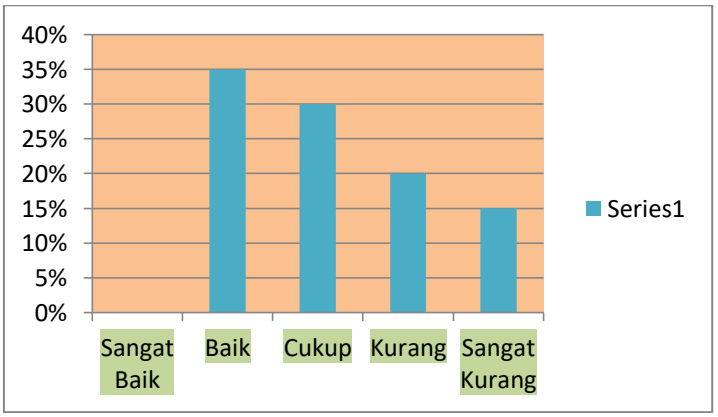

Figure 1. Diagram of Student Learning Outcomes in Cycle I

Based on diagram 1 it can be seen that students' mathematics learning outcomes are in the "Enough" category. So it is necessary to make improvements and improvements to the learning process in the next cycle or in Cycle II. It is expected that in Cycle II student learning outcomes in mathematics will increase from being in the "Very Good" category, and the "Very Poor" category will decrease.

4. Discussion

Judging from the level of student mathematics learning outcomes, at the beginning of the study and research notes during the research. At the beginning of the research, the action was given in cycle I for 2 meetings, then students were given a test, obtained as many as 13 people or around 65% were in the "Enough" category. While 7 students have not reached the expected level. Furthermore, students' mathematics learning outcomes in cycle II increased to 100%. Based on the results of observations in cycle I, students and teachers have carried out learning using the Problem Based Instruction model. Things that need to be improved and paid more attention to in cycle II are the teacher and student participation in group learning. The teacher must be able to create a conducive learning atmosphere and manage time as efficiently as possible so that the stages in the learning scenario can be carried out. In Cycle II action, the learning model is still implemented. Based on the results of observations on the actions of the second cycle, the teacher's activities in carrying out the learning process have increased, where the deficiencies in the first cycle have been corrected. After completing the implementation of cycle II, the test scores of student learning outcomes increased from cycle I, which was 73.31 in the "Enough" category to 86.73 in the "Good" category. This means that cycle II has reached the specified success benchmarks, and shows that the action hypothesis has been achieved, namely increasing student learning outcomes through the Problem Based Instruction model.

5. Conclusion

Based on the research that has been carried out with the Problem Based Instruction learning model in class VII-2 of the Salapiah Gunung Silayang-Layang Islamic Boarding School, the following conclusions are drawn: The ability of student learning outcomes in learning mathematics through the Problem Based Instruction Learning model for class VII students -2 Salapiah Gunung Silayang-Layang Islamic Boarding School in the material Linear Equation One Variable for the 2020/2021 school year increased by 71.85 in the "Enough" category in cycle I, then increased to 88.55 in the "Good" category in cycle II. The results obtained in cycle II showed that the expected categories had been fulfilled, with an average score of 75 and classical completeness of 75% of students obtaining a minimum score of Good.

References

[1] Made Wena. 2009. Strategi Pembelajaran Inovatif Kontemporer. Jakarta: Bumi Aksara

[2] Nufus, H., Herizal, H., & Sahputri, L. D. (2021). Pengaruh Model Pembelajaran Problem Based Learning (PBL) Terhadap Kemampuan Berpikir Kritis Matematis Siswa pada Materi Sistem Persamaan Linear Dua Variabel. Jurnal Pembelajaran Dan Matematika Sigma (JPMS), 7(1), 12-19.

[3] Cahyaningsih, U., & Ghufron, A. (2016). Pengaruh penggunaan model problem-based learning terhadap karakter kreatif dan berpikir kritis dalam pembelajaran matematika. Jurnal Pendidikan Karakter, 7(1).

[4] Alhadad, I., Hamid, H., Tonra, W. S., & Siddik, R. (2020). Penerapan Problem Based Learning (PBL) untuk Meningkatkan Kemampuan Pemecahan Masalah Matematis Siswa pada Sistem Persamaan Linear Dua Variabel (SPLDV). Delta-Pi: Jurnal Matematika dan Pendidikan Matematika, 9(2).

[5] Mulyanto, H., Gunarhadi, G., & Indriayu, M. (2018). The effect of problem based learning model on student mathematics learning outcomes viewed from critical thinking skills. International Journal of Educational Research Review, 3(2), 37-45.

[6] Ramadhani, R., Rofiqul, U. M. A. M., Abdurrahman, A., & Syazali, M. (2019). The effect of flipped-problem based learning model integrated with LMS-google classroom for senior high school students. Journal for the Education of Gifted Young Scientists, 7(2), 137-158.

[7] Rahman, O., & Johar, R. (2021, May). Improving high school students' critical thinking ability in linear programming through problem based learning assisted by GeoGebra. In Journal of Physics: Conference Series (Vol. 1882, No. 1, p. 012070). IOP Publishing.

[8] Alwendi, A. (2020). The Promotional Decision Support System uses the Profile Matching Method (Case Study of PT. Beyf Bersaudara). Smart Comp: The Journal of Computer Smart People, 9(2), 99-104.

[9] Alwendi, A. (2023). Socialization of Digital Marketing in Increasing MSME Income in Basilam Baru Village, Muara Tais-II District, South Tapanuli Regency. Welfare Community Service Journal, 1(1).

[10] Alwendi, A., & Samosir, K. (2023). DEVELOPMENT AND IMPLEMENTATION OF THE MAMDANI FUZZY METHOD FOR ASSESSING LECTURER RESEARCH PERFORMANCE. EKSAKTA: Journal of Research and Learning MIPA, 8(1), 24-30.

[11] Samosir, K. (2022). DEVELOPMENT AND IMPLEMENTATION OF THE MAMDANI FUZZY METHOD FOR ASSESSING LECTURER RESEARCH PERFORMANCE. Journal of Tekinkom (Information and Computer Engineering), 5(2), 333-340.

[12] Mandopa, A. S. (2022). Implementation of the Profile Matching Method to Determine Scholarship Recipients: Implementation of the Profile Matching Method to Determine Scholarship Recipients. Technical and Vocational Education International Journal (TAVEIJ), 2(2), 14-21.

[13] Fadillah, Y., & Mandopa, A. S. (2022). TRAINING ON THE USE OF DECISION SUPPORT SYSTEM APPLICATIONS TO DETERMINE PROSPECTIVE SCHOLARSHIP RECIPIENTS. Independent Community Service Journal (JPMM), 1(01), 5-11.