

The Effect of Implementing Project Based Learning Assisted by Manipulative Learning Media on Elementary School Students Understanding

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ABSTRACT

This research aims to determine if the Problem Based Learning (PBL) learning model assisted by real media affects student learning outcomes at MI Islamiyah Kedungmegarih. The lack of teacher creativity in using innovative learning models and the suitability of the media with the material being delivered so that learning outcomes are not optimal. To overcome these problems, there are recommendations for alternative actions that are effective and innovative so that students obtain maximum learning outcomes. This study uses a quantitative approach. The design used is quasi-experimental. The research design used a pretest and posttest with a non-equivalent control group design. To answer the research hypothesis, the independent sample T-test formula is used. Based on the results of this study, this statement was proven by the average post-test results in both classes, namely, in the experimental category, it was 82.80 and in the control class, it was 70.80. In addition, based on the results of T_{hitung} which is more significant than 5.42 compared to T_{tabel} of 1.72, it means that H_0 is rejected and H_1 is accepted, meaning that there is a significant influence on student learning outcomes than without using the Problem Based Learning (PBL) learning model assisted by concrete media in improving results student learning on material changes in the form of objects in class VA MI Islamiyah Kedungmegarih.

Introduction

The success of education cannot be separated from the teaching and learning process, which contains several interrelated components, including teachers (education), students (learners), materials (materials), media (tools/means), learning models and methods or pattern of delivery of teaching materials (Yurindah, n.d.). The suitability between the learning model and learning media with the material the teacher delivers to students greatly influences the teaching and learning process to obtain optimal learning results. Learning is a process characterized by changes in a person (Shoimah & Mukhlisotin, 2019). Change as a result of learning can be shown in various forms, such as changes in knowledge, understanding, attitudes and behavior, skills, abilities and abilities, reaction power, acceptance power, and various aspects that exist in the individual. Someone is said to be learning if that person experiences changes in several specified factors (Siregar, 2018).

It is hoped that changes in the learning process can provide modifications for the better and increase goodness and experience for people who learn. Minister of National Education Regulation of the Republic of Indonesia number 22 of 2006 concerning basic unit content standards states that the Elementary School curriculum contains 8 subjects, local content and development. Minister of Education and Culture Regulations (2014) one of the subjects taught in elementary schools is Natural Science (IPA) subjects (Nasional, 2013). Natural Science (IPA) is a science that explicitly studies nature and its surroundings, which includes natural and artificial objects as well as the concepts of Natural Science (IPA) contained therein (Samatowa, 2011). Learning Natural Sciences (IPA) at the elementary school level is expected to be a vehicle for students to learn about themselves and their natural surroundings and prospects for further development in applying it in everyday life (Siregar, 2018).

This is by the definition of Natural Science (IPA), which is related to systematically finding out about nature. So Natural Sciences (IPA) is the mastery of a collection of knowledge in the form of facts, concepts, or principles and a discovery process (Sujana, 2014). In learning Natural Sciences (Science), teachers must be able to utilize various models and teaching media and objects in the environment so that students gain direct experience and can apply the concepts they have learned.

The reality in the field shows that there are still many problems found in the learning process in elementary schools. There are still many students who experience difficulties in understanding and following Natural Sciences (IPA) learning. Few of them think that Natural Sciences (Science) subjects are boring because there is too much material that they have to study and understand. The student's lack of enthusiasm in participating in science learning is due to the learning process still using conventional learning models, and also the lack of use of learning media and still being teacher-centered, which results in students being passive and less likely to participate in learning activities.

Problems in learning Natural Sciences (IPA) were also found in class V of MI Islamiyah Kedungmegarih Lamongan—lack of teacher creativity in using innovative learning models to attract student's attention to the learning process. Teachers still use conventional learning models in delivering material. In contrast, the Natural Sciences (Science) learning process is not just about understanding theory. Still, it requires observation and experimentation to understand the material perfectly to answer and get the truth of the concept. To overcome the problems mentioned above, we need a learning model and media that is by the idea of Natural Sciences (IPA) learning, which can improve the learning process in a better direction and can improve students' understanding and learning outcomes, especially in the material on changes in the form of objects. Therefore, one learning model that can make students active and think creatively is the Problem Based Learning (PBL) learning model (Yurindah, n.d.).

The term Problem Based Learning (PBL) has several meanings. According to Wood, Problem Based Learning (PBL) uses a case or problem scenario to determine learning goals for students. Another understanding was put forward by Gijsselaers, who stated that Problem Based Learning (PBL) involves students working on problems in groups with guidance from the teacher (Prayogi & Asy'ari, 2013). Meanwhile, Arends explained that Problem Based Learning (PBL) is a learning model that presents various problematic situations that are authentic and meaningful to students and functions as a springboard for investigation and research (Kelana & Wardani, 2021).

From these several definitions, it can be concluded that what is meant by Problem Based Learning (PBL) is a learning model that provides students with problems to investigate both individually and in groups as learning through teacher guidance (Wulandari, 2012). So that students can better understand the material on changes in the form of objects in depth so that they can improve learning outcomes, real or concrete learning media is needed (Aryani, 2020). Syaodih stated that concrete or tangible objects will provide significant stimulation for students in learning various things, especially those involving the development of skills or attitudes (Kelana & Wardani, 2021). Through concrete media, students can be actively engaged in the learning process (Arsyad, 2013). With factual media, students can see actual objects and be observed directly by the five senses.

It was concluded that the application of the Problem Based Learning (PBL) learning model assisted by audiovisual media was adequate compared to the Think Pair Share model assisted by image media on the learning outcomes of multiple science students in class IV at SD Gugus Wahidin Grabag Magelang (Haqiqi & Syarif, 2021). Henny Ernawati conducted the second research titled "The Influence of the Problem Based Learning (PBL) Model on Student Learning Outcomes on the Concept of Plant Tissue". The study results explain that the Problem Based Learning (PBL) model influences student learning outcomes on plant tissue. This is based on the results of the posttest hypothesis through a t-test with a value of $t_{count} = 3.14$ and $t_{tabel} = 1.99$ so that H_0 can be accepted because the value of $t_{count} > t_{tabel}$. This shows that student learning outcomes

with the Problem Based Learning (PBL) learning model are higher compared to conventional learning models (discussion and question and answer) (Haqiqi & Syarifa, 2021).

The formulation of the problem in this research is how to use the Problem Based Learning (PBL) learning model with the help of concrete media to improve student learning outcomes on material changing the shape of objects in class V MI Islamiyah Kedungmegaroh Lamongan. What is the effect of increasing student learning outcomes on material changing the condition of objects after implementing the Problem Based Learning (PBL) learning model assisted by concrete media in class V MI Islamiyah Kedungmegaroh Lamongan?. This research aims to determine the use of the Problem Based Learning (PBL) learning model assisted by factual media to improve student learning outcomes on material changing the shape of objects in class V MI Islamiyah Kedungmegaroh Lamongan. To determine the effect of increasing student learning outcomes on material changing the condition of objects after implementing the Problem Based Learning (PBL) learning model assisted by concrete media in class V MI Islamiyah Kedungmegaroh Lamongan.

Method

This research uses a quantitative approach. The design used in this research is quasi-experimental, a form of structure that involves at least two groups, namely group one as the experimental group and group two as the control group (Rukminingsih & Latief, 2020). This research design uses a pretest and posttest with a non-equivalent control group design. This design has two sample classes: experimental and control (Sugiono, 2017). The experimental class is a class that receives Problem Based Learning (PBL) learning model treatment using concrete media. In contrast, the control class uses a conventional lecture and question and answer model. The two types were given a test before the learning activities (pre-test) and given a test after the learning activities (post-test).

The data collection technique in this research is the observation of learning implementation, Pretest and Posttest questions regarding changes in the shape of objects. The target population in this research is all class V students at MI Islamiyah Kedungmegaroh Lamongan, which consists of two classes, namely class V A as an experimental class with 20 students and class V B as a control class with 20 students. The sampling in this research used the Total Sampling technique. The Total Sampling technique is used if the entire population is used as a sample. The sample used in this research was class V, which consisted of two classes, namely class V A as an experimental class with 20 students and class V B as a control class with 20 students.

Quantitative data was obtained from test results in the form of pretest and posttest of students taken from the experimental class and control class:

1. Normality Test, with the test criteria, if $L_{count} < L_{table}$ accept H_0 , and if $L_{count} > L_{table}$ reject H_0 at the significance level 5% (0,05).
2. Homogeneity Test, with the test criteria, if $F_{count} > F_{table}$ H_0 rejected and H_a Accepted so that the two groups of data are said to be not homogeneous. If

$F_{count} < F_{table}$, H_0 accept and H_a rejected so that the two data are declared homogeneous. At the level of significance 5 % (0,05).

3. Hypothesis Testing, the hypothesis that will be used in this research is:

H_0 : There is no influence of the Problem Based Learning (PBL) learning model assisted by concrete media.

H_a : There is the influence of the Problem Based Learning (PBL) learning model assisted by concrete media.

With if criteria $T_{count} \geq T_{table}$ so H_0 rejected and H_a accept. If $T_{count} \leq T_{table}$ so H_0 accept dan H_a rejected.

Result and Discussion

Generally, the research results described in this section are test scores in the control class and the experimental category before and after being treated with Problem Based Learning (PBL).

Table 1. Descriptive Pretest and Posttest Data Values

Description	Experiment Class		Control Class	
	Pretest	Posttest	Pretest	Posttet
Minimum value	56	76	56	60
Maximum value	84	96	60	84
Average	74,60	82,8	67	70,8
Std. Deviation	7,022	6,63	8,398	7,353
Range	49,305	43,958	70,526	54,063

Based on the results of descriptive analysis of student learning outcomes before learning (pretest) in the experimental class and control class as well as student learning outcomes after being treated with the Problem Based Learning (PBL) learning model assisted by concrete media in the experimental class and student learning outcomes without treatment in the control class. The average pretest score in the practical course was 74.60, and the average posttest score was 82.80. In the control class, the average pretest score was 67, and the average posttest score was 70.80. This means that the pretest score and posttest score are different. The posttest score after being given treatment is better than the posttest score without treatment.

Table 2. Normality Test Results

Deskripsion	One-Sample Kolmogorof-Smirnov Test	
	Experiment Class	Control Class
Statistics	0,183	0,129
Sig. 2 Tailed	0,076	0,2
Std. Deviation	5,76	3,67

Based on the table above, which describes the results of the pretest and posttest normality tests using the One Sample Kolmogorov-Smirnov Test technique in the experimental class, it is known that the significance value is 0.076

more than 0.05 ($0.075 > 0.05$), so it can be concluded that the data is usually distributed. In the control class, the results of the pretest and posttest normality tests using the One Sample Kolmogorov-Smirnov Test technique show that the significance value is 0.200, more than 0.05 ($0.200 > 0.05$), so it can be concluded that the data is usually distributed.

Table 3. Homogeneity Test Result

Description	F-Test Two-Sample For Varances	
	Exsperimen Class	Control Class
F Table	1,12	1,30
F Count	2,16	

The table above shows that the pretest and posttest results with the calculated F_{value} are 1.12, while the F_{table} value at the 5% significance level is 2.16. These results show that the F_{count} value is smaller than the F_{table} value, so the data is said to be homogeneous. The control class indicates that the pretest and posttest results with the calculated F_{value} are 1.30, while the F_{table} value at the 5% significance level is 2.16. These results show that the F_{count} value is smaller than the F_{table} value, so the data is said to be homogeneous.

Table 4. Hypothesis Test Result

Levene's Test For Equality Of Variances				T-Test For Equality Of Means				
F	Sig.	T	Df	Sig. (2-Tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
							Lower	Upper
.000	1.000	5.420	38	.000	12.000	2.214	7.518	16.482

Based on the table above, the value obtained shows that the sig (2-tailed) value is $0.00 < 0.05$, so it can be concluded that there is a difference in the average learning outcomes (Posttest) in the experimental class and the control class by the basis for decision making, namely Sig $0.00 < 0.05$ so it can be stated that H_0 is rejected and H_a is accepted. Then the results obtained on T_{count} were 5.42 and the significance value was 0.00 with a significance level of $\alpha = 0.05$. With T_{table} of 1.72. Because the value of T_{count} ($5.42 > T_{\text{table}}$ (1.72)), H_0 is rejected and H_a is accepted, meaning that there is a difference in the influence of the Problem Based Learning (PBL) learning model assisted by concrete media.

From the results of the research that has been carried out, it is known that learning using the Problem Based Learning (PBL) model has been implemented quite well. From the first step of introducing the problem to students to the final stage of analyzing and evaluating the problem solving process. Then, in the learning process the researcher presents an issue related to changing an object's shape. Each group will solve the problem of changing an object's form in an experimental activity through concrete media according to the steps contained in

the LKPD. This is by what Arends stated that the Problem Based Learning (PBL) learning model is a learning model that presents authentic and meaningful problematic situations to students, which can function as a springboard for investigation and research (Yurindah, n.d.).

Media is a tool or means used to convey or channel messages from teachers to students to stimulate students' thoughts and interest in learning so that learning objectives can be achieved optimally (Munadi, 2013). Using the Problem Based Learning (PBL) learning model assisted by concrete media can make students more active in learning activities. Apart from making students more engaged, learning media also makes students more enthusiastic and less likely to get bored when the teacher explains the material to obtain maximum learning results. Because with concrete media, students can see actual objects and be observed directly by the five senses, it is easier for students to understand the material. This aligns with what Lovita stated, that concrete media is real media used in the teaching and learning process to provide authentic experiences that attract students' interest and enthusiasm (Wijaya et al., 2021). Compared to the learning process carried out previously using the conventional model, in this model, students only listened to the explanation given by the teacher so that the learning process was less exciting and boring.

Based on the pretest and posttest data of students in the control and experimental classes, it shows that the data is usually distributed and homogeneous. The results of the Pretest and Posttest show that T_{count} is $5.42 > T_{table}$. At the 5% significance level, it is 1.72, so H_0 is rejected and H_a is accepted. As is the rule for accepting or rejecting H_a . The results of the posttest difference test between the experimental group and the control group showed that T_{count} was 5.42, which was more significant than the T_{table} value at the 5% significance level of 1.72 so that H_0 was rejected, and H_a was accepted. This means that there are substantial differences in these two groups so it can be concluded that in this research, there is an influence of the Problem Based Learning (PBL) learning model assisted by concrete media on improving student learning outcomes in the material of changing the shape of objects for class V students at MI Islamiyah Kedungmearih Lamongan.

Based on the results of calculating the average pretest and posttest scores, it is known that there was a very significant increase between the experimental class and the control class. In the practical class the average pretest score was 74.60 and the posttest score was 82.80, while in the control class, the average pretest score was 67 and the posttest score was 70.80. These values show a higher increase in student learning outcomes in the material on changing the shape of experimental objects compared to the practical class. This increase in student learning outcomes is caused by how teachers use learning models during the learning process, which differs from how teachers usually apply them. In the control class, the teacher only uses the conventional model, namely boring lectures and questions and answers, so students do not understand the material. Meanwhile, in the experimental class, the teacher uses the Problem Based Learning (PBL) learning model assisted by concrete media, where the teacher, during the learning process, creates a pleasant

atmosphere, and the material is easier to understand because using real media, students can directly observe the objects in the learning process.

There are significant learning outcomes using the Problem Based Learning (PBL) learning model assisted by concrete media. This is shown from the average calculation between the pretest and posttest between the control and experimental classes. The average posttest score in the practical class has higher results than the average posttest score in the control class.

Based on the results of the calculations that have been carried out, the value results are obtained. $T_{count} > T_{table}$ This means learning using the Problem Based Learning (PBL) learning model assisted by concrete media significantly influences student learning outcomes. The average pretest score in the experimental class was 74.60, the posttest score was 80.82, the average pretest score in the control class was 67, and the posttest score was 70.80. From the increase in the average value, it can be concluded that there is an influence of the use of the Problem Based Learning (PBL) learning model assisted by concrete media on student learning outcomes in the material on changes in the shape of objects at MI Islamiyah Kedungmegaroh Lamongan.

Conclusion

Concrete media assist the Problem Based Learning (PBL) learning model in changing objects' shapes. Students can solve problems individually and in groups to make the learning process active. Students can also be actively involved in the learning process through concrete media. With factual media, students can see actual objects and be observed directly by their five senses, making it easier to understand the material. Compared to the learning process carried out previously using the conventional model, in this model, students only listened to the explanation given by the teacher so that the learning process was less exciting and boring. Learning using the Problem Based Learning (PBL) model assisted by concrete media is an innovation believed to be very effective and creative in learning and fun for students.

The Problem Based Learning (PBL) learning model assisted by concrete media significantly influences student learning outcomes in changing objects. This statement is shown by the average posttest score in the experimental class of 82.80, while the average posttest score in the control class is 70.80. Hypothesis test results obtained T_{count} sebesar 5,42 dengan T_{table} sebesar 1,72. Dengan demikian $T_{count} > T_{table}$ ($5,42 > 1,72$), so H_0 rejected and H_a Accept This means that the Problem Based Learning (PBL) learning model assisted by concrete media has a significant influence on student learning outcomes compared to without using the Problem Based Learning (PBL) learning model assisted by factual media in improving student learning outcomes on the subject of changing the shape of objects in the VA MI class. Islamiyah Kedungmegaroh Lamongan.

References

Arsyad, A. (2013). *Media Pembelajaran*. Raja Grafindo Persada.

- Aryani, L. (2020). *Pengaruh media konkret terhadap hasil belajar siswa pada mata pelajaran IPA Kelas IV SDN 105323 Bakaran Batu Kecamatan Batang Kuis Kabupaten Deli Serdang*. Universitas Islam Negeri Sumatera Utara.
- Haqiqi, A. K., & Syarifa, S. N. (2021). Keefektifan Model Problem Based Learning Berbantuan Video dalam Liveworksheets Terhadap Kemampuan Pemecahan Masalah Matematis Siswa. *Jurnal Pendidikan Matematika (Kudus)*, 4(2), 193–210.
- Kelana, J. B., & Wardani, D. S. (2021). *model pembelajaran IPA SD*. Cirebon: Edutrimedia Indonesia.
- Munadi, Y. (2013). *Media Pembelajaran Sebuah Pendekatan Baru*. GP Press Group.
- Nasional, M. P. (2013). Keputusan Menteri Pendidikan Nasional Republik Indonesia. *Jakarta: Depdiknas*.
- Prayogi, S., & Asy'ari, M. (2013). Implementasi model PBL (Problem Based Learning) untuk meningkatkan hasil belajar dan kemampuan berpikir kritis siswa. *Prisma Sains: Jurnal Pengkajian Ilmu Dan Pembelajaran Matematika Dan IPA IKIP Mataram*, 1(1), 80–88.
- Rukminingsih, G. A., & Latief, M. A. (2020). Metode Penelitian Pendidikan. *Penelitian Kuantitatif, Penelitian Kualitatif, Penelitian Tindakan Kelas*, 53(9).
- Samatowa, U. (2011). *Pembelajaran IPA di Sekolah Dasar*. Indeks.
- Shoimah, R. N., & Mukhlisotin, M. (2019). PENERAPAN MODEL PEMBELAJARAN COURSE REVIEW HORAY UNTUK MENINGKATKAN HASIL BELAJAR SISWA KELAS IV MAPEL AKIDAH AKHLAK MATERI ASMAUL HUSNA. *MIDA: Jurnal Pendidikan Dasar Islam*, 2(2), 95–111.
- Siregar, P. S. (2018). *Pembelajaran IPA Sekolah Dasar*. Deepublish.
- Sugiono. (2015). *Metode Penelitian*. Alfabeta.
- Sugiono. (2017). *Metode Penelitian Kuantitatif, Kualitatif dan R&D*. Alfabeta.
- Sujana, A. (2014). *Dasar-dasar IPA: Konsep dan aplikasinya*. UPI Press.
- Wijaya, R., Vioreza, N., & Marpaung, J. B. (2021). Penggunaan Media Konkret dalam Meningkatkan Minat Belajar Matematika. *Prosiding Seminar Nasional Pendidikan STKIP Kusuma Negara III*, 579–587.
- Wulandari, E. (2012). Penerapan Model PBL (Problem Based Learning) Pada Pembelajaran IPA Siswa Kelas V SD. *Kalam Cendekia PGSD Kebumen*, 1(1).
- Yurindah, Y. (n.d.). B, A., & Hamid, R.(2020). PENERAPAN MODEL PROBLEM BASED LEARNING (PBL) UNTUK MENINGKATKAN PEMAHAMAN KONSEP PERUBAHAN SUHU DAN WUJUD BENDA PADA SISWA KELAS VC SDN 36 KENDARI. *Jurnal Ilmiah Pembelajaran Sekolah Dasar*, 2(1).