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Application of Problem Based Learning Models Assisted by Concrete Media to Increase Interest and Achievement in Learning Science for Elementary School Students

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1. Abstract

The interest of students is very important to be grown in learning so that they are able to follow the learning process with a pleasant and well-received taste. Good interest in learning is expected to increase student learning achievement. This research was conducted with the aim of increasing interest and achievement in learning science in class V students for the 2022/2023 school year by applying the Problem Based Learning learning model assisted by concrete media. The Problem Based Learning model is a model that presents real problems that exist in the surrounding environment. The application of the Problem Based Learning model assisted by concrete media makes it easier for students to know, understand, and apply the field being studied. The method used is collaborative classroom action research. Data collection is done by observation, interviews and documentation. Data analysis techniques used are qualitative and quantitative. The results of this study are that the application of the Problem Based Learning model assisted by

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concrete media can increase interest and achievement in learning science for fifth grade elementary school students. This can be seen from the increase in each cycle. The percentage of students' learning interest in cycle I was 77% and cycle II was 83%. Meanwhile, the percentage of student achievement in cycle I was 56% and cycle II was 78%.

Keywords: *interest in learning, learning achievement, problem based learning, concrete media*

2. Introduction

Education plays an important role in the progress of a country. Education can improve the quality of human resources to be more developed and advanced. The progress of a country's education is a shared responsibility of the government, society and family. The educational process takes place at the school level, both formal and informal. Education in elementary schools is the main foundation that provides the basics of knowledge, skills, and character building. The educational process is inseparable from the learning process. Classroom learning is expected to be able to provide meaningful experiences for each student.

The implementation of science learning is one of the lessons that needs to get more attention in improving each lesson. Natural Science is a subject that studies events that occur scientifically and contains material related to natural knowledge that is close to the student's environment (Sobron and Bayu, 2019: 32). Many students feel unable to learn and understand science subjects because there is no media that supports both concrete media and digital media in helping students penetrate their understanding to discussing material that cannot be presented directly . This results in students quickly getting bored in learning so that it reduces interest in learning and student learning achievement is not optimal.

ISSN: 3025-020X

Based on the results of the Middle Semester Assessment (PTS) for class V in science subjects in the even semester of the 2022/2023 school year, the average value of Science in class V was 67, with the highest score being 100 and the lowest score being 40. Minimum Completeness Criteria (KKM) science subjects in class V, namely 70. The number of students in class V for the 2022/2023 academic year is 27 students, students who have achieved KKM are 11 students or 40.7%, while students who have not reached KKM are 16 students or by 59%. According to Salsabila and Puspitasari (2020: 284-286) there are two factors that influence learning achievement, namely factors that come from within (internal) and factors from outside (external).

In addition to the conditions above, based on the results of observations and interviews with the class V teacher on Tuesday, May 9 2023, the following conditions were found during learning: (1) in delivering material the teacher still tends to use media that is abstract in nature, for example pictures, both printed and on blackboards, (2) students are less involved in the use of learning media, (3) learning takes place still using conventional learning models, (4) the learning process that takes place has not given students the maximum opportunity to solve problems related to real life (5) students feel science learning is boring because of the lack of experimentation.

Interest is a feeling of being interested in a field and feeling happy when working in that field. Interest in learning is a person's tendency to have fun without coercion so that it can cause changes such as knowledge, skills and behavior (Achru, 2019). According to Septiani, Lesmono, and Harimukti (2020: 65) interest in learning is a movement from oneself to learn. Interest in learning is the thoughts, desires, and attention of students when understanding a science they are studying (Hamidah and Setiawan, 2019: 458). Interest is important to encourage individuals to achieve the desired goals or expectations. Students need to develop an interest in the learning process so that they are able to

ISSN: 3025-020X

participate in the learning process with a pleasant and well-received taste. The lack of interest of students in the science learning process will make the implementation of learning in class not run optimally so that student learning achievement is low.

Based on the description of the conditions that have been described, it is known that the interest and learning achievement of students in science subjects is still not optimal so that there is a need for improvement with learning that is able to encourage students to be interested and actively involved in every learning process. The application of attractive models and supportive media can provide a comfortable and enjoyable learning atmosphere. One model that can be applied is the Problem Based Learning (PBL) model. The Problem Based Learning learning model is a model that directs students to be active in learning by conveying it through presenting problems or asking questions that help students be able to construct their own knowledge (Handayani and Muhammadi, 2023: 79). PBL will be a learning approach that seeks to apply problems that occur in the real world, as a context for students to practice how to think critically and gain skills to solve problems (Syamsidah & Suryani: 2018: 9).

The application of media that is appropriate to the material will help students learn during the learning process. Therefore, it is also necessary to apply concrete media to help students build the concepts they have. According to Thoifuri, concrete media is a tool to help students learn in the form of objects or images with the aim of making it easier for students to know, understand, and apply the field being studied (Hardini and Akmal, 2017: 237). Providing single substance and mixed substance material teachers can use concrete media in the form of aluminum foil, sugar, salt, spoons, pencils, balloons, coins, sand, wheat flour, coffee, oil, silicone cooking utensils, candles, syrup, hot water, water cooler, flashlights, plastic cups, tissue paper, colored markers, and cloth. Based on the description of the problem and relevant research above, to increase interest and achievement in

ISSN: 3025-020X

learning science on the Theme of Things Around Us in fifth grade students, researchers conducted collaborative classroom action research with class VC teachers entitled "Implementation of Media Assisted Problem Based Learning Models Concrete To Increase Interest and Achievement in Science Learning Elementary School Students ".

3. Methods

a. Participants and context

Research subjects are sources that will provide data and information in PTK (Mulyasa, 2016: 68). The subjects in this study were fifth grade elementary school students for the 2022/2023 academic year, with a total of 27 students, consisting of 12 male students and 15 female students. All students are in normal circumstances, do not have special needs.

b. Material

Data collection techniques used in this classroom action research include non-test and test techniques. Non-test techniques include observation, interest in learning questionnaires, and documentation. Observations were made when teachers and students carried out the learning process to collect data about teacher activities, responses and student participation through the application of the Problem Based Learning model assisted by concrete media. The questionnaire is used to find out data about students' interest in learning as many as 20 statement items. Documentation techniques are also used in this research. Documentation is carried out to obtain data in the form of previous students' test scores, lists of students, as well as teaching modules that support and strengthen observation data. Documentation also includes taking photos of learning activities as archives that can add confidence to research results. The test technique is in the form of science learning achievement. The learning achievement test is in the form of a set of questions that are tested on students to evaluate their understanding of the learning

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material after it is implemented. These questions have been validated with the help of the class V teacher.

c. Data Collection and analysis

This study uses the data analysis model of Miles and Huberman (Sugiyono, 2015: 338-345), which is a data analysis technique model that has four stages including the stages of data collection, data reduction, data presentation, and drawing conclusions. The analysis carried out includes:

1) Data Analysis of Student Learning Interests

This analysis is used to measure students' interest in learning through the distribution of interest in science questionnaires. The formula used to calculate the percentage of students' interest in learning according to Anas (2010), namely:

$$P = \frac{F}{N} x100$$

Information:

P = percentage number

F = number of respondents' answers

N = total number of students

Determining the Interpretation of Learning Interest Scale

a. Determine the total score as a whole = score answers x the number of respondents who answered.
b. Determining the number of low scores = 1 x the number of respondents
c. Determine the presentation of the respondent group = total score overall / total ideal score x 100%.

Note: Score Interpretation Criteria

0%-20% = Very Weak

ISSN: 3025-020X

21%-40% = Weak

41%-60% = Enough

61%-80% = Strong

81%-100%= Very strong

2) Analysis of Student Learning Achievement Data

This analysis is carried out through a test of learning outcomes obtained at the end of each cycle. The learning achievement scores given by students are based on obtaining the correct answers with a score scale between 0 to 100. The formula used to calculate the results of the activity sheet according to Suharsimi Arikunto (2002: 183) is as follows:

$$\text{Nilai} = \frac{\sum \text{skor yang diperoleh}}{\sum \text{skor maksimal}} \text{ x } 100$$

To find out the development of student learning achievement, a comparison of the class averages for each cycle is carried out. Descriptively, the formula for the average (mean) used in this study is the sum of all the numbers divided by the number of numbers. To find the classical average calculation from a set of values that have been obtained by these students, you can use the average formula (Suharsimi Arikunto, 2006):

$$\bar{X} = \frac{\Sigma X}{N}$$

Information :

$\bar{X}$ = class average (mean)

ΣX = Total student scores

N = Number of students

To calculate the classical mastery of student learning can use the following formula (Aqib, 2014: 41):

ISSN: 3025-020X

$$P = \frac{\Sigma \text{ siswa tuntas}}{\Sigma \text{ siswa}} x100$$

This data analysis was carried out to reflect each cycle in this study. The reflection results are used to determine further planning in the next cycle. The results of this reflection are used to improve the next learning design. The following are the criteria for the success rate of students in %.

Table 1 Success Rate

Level of success (%)	Meaning
>80%	very high
60-79%	tall
40-59%	currently
20-39%	low
<20%	very low

4. Result and Discussion

1) Results of Cycle I Actions

Data on students' interest in learning were obtained by using a questionnaire with a total of 13 statements. Based on the activities of the students filling out the interest in learning questionnaire, the score for students' interest in learning in science subjects in cycle one is as follows:

Table 2 Data on Student Interest Score Results in Cycle I

Achievement	Cycle I Interest Data
Highest Learning Interest Score	51

ISSN: 3025-020X

Lowest Learning Interest Score	32
Average	40
Percentage	77%
Category	Strong

Based on table 2, it shows that the average result of students' interest in learning in cycle one is 40. In table 2, it shows that the average percentage of students' interest in learning science is 77% in the strong category. This shows that the application of the Project Based Learning learning model assisted by concrete media can increase students' interest in learning science.

Then data on student achievement was obtained using a written test technique with the help of a 10-item multiple-choice instrument. This evaluation activity is carried out at the end of each cycle. The following is a table of student achievement in cycle I:

Table 3 Student Learning Achievement Cycle I

No.	Achievement	Data
1	Average	68
2	Lowest Value	20
3	The highest score	100
4	Many students complete	15
5	Many students do not complete	12
6	Complete Presentation	56%
7	Incomplete Presentation	44%
	Level of success	currently

ISSN: 3025-020X

Of the 27 students, the average score for science learning content in cycle I was 68 with the lowest score being 20 and the highest score being 100. With a KKM score of 70, 15 students scored above the KKM and 12 students had not yet reached the KKM. The percentage of completeness is 56% and the percentage of incomplete scores is 44%. The success rate of students in cycle I is still in the medium category. Then the research was carried out again in cycle II because it had not yet reached a level of success. Cycle II was held on Wednesday, May 17, 2023, with the help of a multiple-choice instrument consisting of 10 items.

b. Results of Cycle II Actions

Data on students' interest in learning were obtained by using a questionnaire with a total of 13 statements. Based on the activities of the students filling out the interest in learning questionnaire, the scores obtained for students' interest in learning science in cycle two were as follows:

Table 4 Data on Student Interest Score Results in Cycle II

Achievement	Cycle II Interest Data
Highest Learning Interest Score	51
Lowest Learning Interest Score	36
Average	43
Percentage	83%
Category	Very strong

Based on table 4, it shows that the average result of students' learning interest score in cycle two is 43. Table 4 shows the results of the average percentage of students' interest in learning science by 83% in the very strong category. This shows that the

ISSN: 3025-020X

application of the Project Based Learning learning model assisted by concrete media can increase students' interest in learning science.

Then data on student achievement was obtained using a written test technique with the help of a 10-item multiple-choice instrument. This evaluation activity is carried out at the end of each cycle. The following is a table of student achievement in cycle II:

Table 5 Student Learning Achievement Cycle I

No.	Achievement	Data
1	Average	82
2	Lowest Value	50
3	The highest score	100
4	Many students complete	21
5	Many students do not complete	6
6	Complete Presentation	78%
7	Incomplete Presentation	22%
	Level of success	Tall

Of the 27 students, the average score for science learning content in cycle II was 82 with the lowest score being 50 and the highest score being 100. From the KKM score of 70, it was found that 21 students scored above the KKM and 6 students had not yet reached the KKM. The percentage of completeness is 78% and incomplete is 22%. The success rate of students in cycle II was in the high category and was declared successful.

c. Comparison of Results Between Cycles

1) Comparison Between Cycles of Increasing Interest in Learning Science with the Theme of Objects Around Us

Interest in learning science about the theme of Things Around Us has experienced various improvements in the learning process to achieve maximum

ISSN: 3025-020X

student interest in learning. Comparison between cycles of interest in learning science

Table 6 Comparison of Intercycle Interest in Learning Science

Achievement	Cycle I Interest Data	Cycle II Interest Data
Highest Learning Interest Score	51	51
Lowest Learning Interest Score	32	36
Average	40	43
Percentage	77%	83%
Category	Strong	Very strong

Based on table 6, it can be concluded that the interest in learning science has reached the research performance indicators, and this research was declared successful. The percentage of students' interest in learning also increased from cycle I of 77% to cycle II of 83%.

2) Comparison Between Cycles of Increasing Science Learning Achievement with the Theme of Things Around Us

Science Learning Achievement on the Theme of Things Around Us underwent various improvements in the learning process to achieve maximum results. Comparison between post-cycle science learning achievement tests can be seen in table 7 below:

Table 7 Posttest Comparison of Science Learning Achievement

Achievement	Cycle I Data	Cycle II data
Average	68	82
Lowest Value	20	50

ISSN: 3025-020X

The highest score	100	100
Many students complete	15	21
Many students do not complete	12	6
Complete Presentation	56%	78%
Incomplete Presentation	44%	22%
Level of success	currently	Tall

Based on table 7, it can be concluded that the complete science learning achievement of students has reached the research performance indicators, and this research was declared successful. The average value of student learning achievement also increased starting from the first cycle by 56% and the second cycle reached 78%.

The steps for implementing the PBL model in science learning in cycle I to cycle II are adjusted to the PBL steps according to Suprijono (2015: 92-93), namely (a) giving orientation on problems to students; (b) organizing students to research; (c) assisting independent and group investigations; (d) developing and presenting artifacts or exhibits; and (e) analyze and evaluate the problem solving process. These steps are combined with the steps for implementing concrete media according to Sudjana & Rivai (2013: 197-205), namely: (a) introducing media; (b) describes the process; (c) answer questions; (d) complete the comparison; and (e) end or peak units.

Science learning is the relationship between learning components in the learning process in the form of competencies to be used in achieving goals (Wisudawati & Sulistyowati, 2014: 26). Based on this, it was concluded that improving science learning with the theme of Objects Around Us in fifth grade students is a process or method that is carried out by the teacher towards students in improving or achieving goals so that they get meaningful experiences in the learning process.

ISSN: 3025-020X

Obstacles that often arise in research in each cycle are: (a) there are some students who pay less attention to learning; (b) there are some students who are still passive during discussion and delivery of opinions. These constraints are in accordance with the weaknesses of the PBL model expressed by Shoimin (2014: 132), namely that there will be difficulties in the division of tasks if a class has a high level of student diversity. The solutions made to overcome these obstacles are: (a) being assertive and paying more attention to students; (b) motivating students to be more active and confident while participating in learning; and (c) conditioning the class so that it is more conducive and comprehensive.

5. Conclusion

Based on the results of the study it can be concluded that the use of the Problem Based Learning model assisted by concrete media can increase students' interest and achievement in learning science. The research results can be seen from the increase in each cycle. The percentage of students' learning interest in cycle I was 77% and cycle II was 83%. Meanwhile, the percentage of student achievement in cycle I was 56% and cycle II was 78%.

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ISSN: 3025-020X

7. References

Achru, A. (2019). Development of interest in learning in learning. *Journal of Idara* , III(36), 205–215.

Anas Sudijono. (2010). *Introduction to Educational Statistics* . Jakarta: RajaGrafindo Persada.

Hamidah, N. & Setiawan, W. (2019). Analysis of Learning Interests of Class XI High School Students on Matrix Material. *Journal On Education Volume* 01, No. 02, February, p. 457-463.

Handayani, RH, & Muhammadi, M. (2023). The effect of the problem-based learning model on student learning outcomes in Integrated Thematic learning in Class V SD. *e-Journal of Innovation in Elementary School Learning,* 9(2), 79-88.

Mulyasa, E. (2016). *Class Action Research Practice* . Bandung: PT Juvenile Rosdakarya.

Salsabila, A., & Puspitasari, P. (2020). Factors that influence the learning achievement of elementary school students. *Pandavas* , 2(2), 278-288.

Septiani, I., Lesmono, AJ, & Harimukti, A. (2020). Analysis of Student Learning Interests Using the Problem Based Learning Model with the STEM Approach in Vector Material in Class X MIPA 3 SMAN 2 Jember. *Journal of Learning Physics* , Vol. 9 No. 2.

Shoimin, A. (2014). *68 Innovative Learning Models in the 2013 Curriculum* . Yogyakarta: Ar-Ruzz Media.

Sobron, AN, & Bayu, R. (2019). Students' perceptions in the study of the effect of online learning on interest in learning science. SCAFFOLDING: *Journal of Islamic Education and Multiculturalism,* 1(2), 30-38.

Sudjana, N & Rivai, A. (2013). *Teaching Media* . Bandung: Algensindo's New Light.

Sugiyono. (2015). *Quantitative Qualitative Research Methods and R&D.* Bandung: Alphabet.

ISSN: 3025-020X

Suharsimi, Arikunto. (2002). *Class Action Research* . Jakarta: Earth Script.

Suharsimi, Arikunto. (2016). *Class Action Research* . Jakarta: Earth Script.

Suprijono, A. (2015). *Cooperative Learning Theory and Application of Paikem* . Yogyakarta: Student Libraries.

Syamsidah & Hamidah Suryani. (2018). *Problem Based Learning (PBL) Model Book; Food Ingredients Knowledge Course* . Yogyakarta: DEEPUBLISH.

Wisudawati, AW & Sulistyowati, E. (2014). *Science Learning Methodology* . Jakarta: Earth Script.