

EFFORTS TO IMPROVE STUDENT SCIENCE LEARNING USING THE PROBLEM-BASED LEARNING MODEL

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Abstract: Reviewing the problems encountered by researchers in 4th grade of SDN Madyopuro 6 such as lack of learning in planning, implementation, student activity, and results, then researchers using Problem Based Learning model to solve the problem. This research intends to find out how the planning, implementation, and learning outcomes of students on learning by using the Problem Based Learning model in science learning in 4th grader SDN Madyopuro 6. The subject of this study is the 4th grader in SDN Madyopuro 6 with 22 students. The approach in this research is qualitative, with a descriptive model, and the research type is Class Action Research (CAR). The data in this research were collected using observation techniques, field notes, an evaluation test, and also documentation. The result of this research are: (1) there is the improvement of RPP quality in overall action that is equal to 83,33% until 95,83%; (2) the increase of teacher activity also occurred in overall action, that is 76,92% until 88,46%; (3) the increase of student learning activity also occurred in every action, that is 66% until 82%; (4) improvement in data of students' final learning result which also increase in every action for student's classical learning completeness percentage 36,36% until 81,82%. The conclusion of this research is the application of the Problem Based Learning model can improve the process and result of science learning of the 4th grader of SDN Madyopuro 6.

Keywords: improvement, science learning, problem-based learning model

INTRODUCTION

Learning is a process, way, the act of making people or living things learn. This means that learning is very important in one's learning activities. Someone will learn well if learning can be done well. Learning is done to cause changes in behavior in a learner. Learning is said to be successful if it causes an increase in changes in student behavior.

Considering the importance of learning in the students learning process, the teacher as a good learner can make the atmosphere as effective as possible. Uno & Mohamad (2013) revealed that effective learning is learning implemented by teachers to achieve student learning goals that have been set. This opinion means that the notion of effective learning contains two important things, namely the occurrence of the learning process in students and what is done by the teacher to learn students. Learning is successful if its activities can arouse learning activities. In addition to student activity, learning outcomes can also be used as a benchmark in determining the effectiveness of learning.

Based on this opinion it can be seen that the teacher plays a very important role in the implementation of learning. Sani (2013) said about some characteristics that must be possessed by

teachers in effective learning, two of which are always having preparation to carry out the teaching and learning process (PBM) and the teacher must also be creative in teaching and using various efforts to improve the effectiveness of learning such as by using models, strategies to media variety so that students can participate actively and passionately in learning. Careful preparation will make learning work and can easily monitor the achievement of objectives, and the use of appropriate models, strategies, and media will also arouse student enthusiasm in learning.

Sani (2013) also revealed that one of the effective learning activities aspects is student-centered. Students are the main subject of the education activity, so all activities should be directed to foster student development in all aspects. The success of the learning process lies in the self-realization of students as individuals who are independent, effective learners, and productive workers. Student-centered learning in general is active learning that involves students in physical activity and thinking. The teacher in terms of student-centered learning acts as a facilitator to guide students in observing, solving problems, and developing other knowledge that is built independently by students.

Active learning by students will certainly have a positive impact, not only on the process but also on learning outcomes. Thobroni & Mustofa (2012) revealed based on Bloom's taxonomy that learning outcomes include 3 domains of ability namely cognitive (knowledge), affective (attitude), and psychomotor (skills). Based on that opinion it can be concluded that learning outcomes are changes in overall behavior not just on one aspect of the potential possessed by students only. It means that learning outcomes cannot be seen separately but in the whole frame. Assessment can not only see from the final results without seeing the process experienced by students.

Some of the above points are ideal things that are expected to be applied in schools. However, not all schools can implement such learning. Like the results of preliminary observations made by researchers on 4th grade of SDN Madyopuro 6 which shows the inverse state of learning ideally.

First, in learning activities, the teacher does not prepare enough, because the teacher does not use lesson plans when learning. Second, the lack of teachers in doing variations in the use of models or appropriate strategies in learning. Teachers in teaching only focus on the lecture method, and also assignments and the absence of student activities in the acquisition of information independently. Third, learning deficiencies also appear in student learning activities. Students tend to be passive in learning that can be known to less than 10 children who are actively involved in answering the teacher's questions, asking questions, and reading the results of their work in front of the class voluntarily in the learning, and as many as 4 children including children who cannot participate in learning activities and orderly Two of these children like to annoy other friends, 1 of

them hanging around in class, and 1 of them is saying inappropriate words. Fourth, because of the lack of 3 points above, it affects student learning outcomes as indicated by the end of the semester 1 assessment of 4th grade of SDN Madyopuro 6. After reducing the data from 365 students to 22 students, 19 out of a total of 22 students did not reach the Minimum Master Criterion in the assessment of the knowledge, especially on the content of science, from the results of the attitude assessment there are at least 4 students who can not follow the learning in an orderly and arbitrary manner, 2 of them habitually disturb other friends, 1 of them hanging around the class, and 1 of them said the ones improperly, as well as the aspects of the child's skills can carry out tasks properly and obtain sufficient grades that meet the Minimum Master Criterion for all students but it is even better if it can be improved.

Related to the problems that exist in learning at SDN Madyopuro 6, teachers should innovate with the application of models that can make learning more effective so that students' learning activities and outcomes increase. Seeing from the existing problems, there is one learning model that is expected to be able to overcome the issues raised, namely the Problem Based Learning (PBL) model. As said by Jauhar (2011) that the implementation of the PBL model in learning will spur students to be actively involved in learning activities so that the information/knowledge obtained is really good. The Education and Culture Human Resources Development Agency and the Education Quality Assurance Ministry of Education and Culture in Widiaworo (2017) book also pointed out one of the advantages of PBL models that learning with PBL model applying will lead to meaningful learning for students, thereby affecting the increase in results student learning.

This advantage is also supported by research conducted by Agustin (2013) which revealed that by using the Problem Based learning model of learning can improve learning activities and outcomes, the improvement is described in the following research results. The results of research in the first cycle, the average score reached 68.14, and the percentage of classical learning completion 70.59%. In the second cycle, the average score increased to 84.31 and the percentage of classical study completion was 92.16%. Student involvement in the learning cycle I was 66.28% (high) and increased in cycle II to 76.50% (very high). It can be concluded that the PBL model can improve student learning outcomes and activities in the 4th grade of SD Negeri 01 Wanarejan Pematang.

Based on research conducted by Agustin above can be seen as an increase in learning activities and outcomes. This increase is based on providing actions that are considered successful. Considering the problems and excerpts from the journal, the writer raised a research entitled " Efforts to Improve the Learning of 4th Grader Students at SDN Madyopuro 6 in Natural Science Learning Using Problem Based Learning Models "

METHOD

To follow up on the problem, research to be conducted is using a qualitative approach, with descriptive models and Classroom Action Research (CAR) type. The research will be carried out with the subject 4th-grade students of SDN Madyopuro 6 with the total number of students after data reduction is 22 students. The focus of the research is the content of science, life cycle material of several types of living things in Theme 6. The aspects studied are about the activities and student learning outcomes and to overcome the problems that have been listed in the background of researchers using the Problem Based Learning Model (PBL).

Four data will be taken in the study, namely (1) planning data will take the data of the Learning Implementation Plan used during the study; (2) learning implementation data will take data on teacher activities in applying the PBL model; (3) learning activity data will take student activity data in the teaching and learning process; (4) the results data will take data on student learning outcomes consisting of 3 aspects, namely attitudes, skills, and knowledge. The data obtained came from 2 (two) sources, namely from teachers and students. The instruments used to obtain data are (1) RPP observation sheets to obtain RPP data; (2) teacher activity observation sheets to obtain teacher activity data in teaching using the PBL model; (3) student activity observation sheets to obtain student activity data; (4) evaluation test and observation sheet of students' attitudes and skills to obtain learning outcomes data.

Data collection techniques used are (1) to collect planning data using observation techniques; (2) collecting operational data using observation techniques, field notes and documentation; (3) learning activity data collection using observation techniques, field notes and documentation; (4) data collection on learning outcomes using test techniques, observations, field notes and also documentation. Analysis of the data in this study used descriptive qualitative research data analysis steps. Although it is possible to use descriptive quantitative data analysis as well, it is less dominant. This analysis step consists of three main channels, namely reduction, description, and inference data. There are four data analyzed, as follows.

1. Observation Data of Learning Plan

Analysis of data sourced from the Learning Plan Observation Sheet is calculated by the sum of all observations scores, then divided by the maximum score that has been determined, then the results of the division are multiplied by 100%. From these calculations, the feasibility of the RPP will be known. For these calculations, more details are described in the Suparti (2016) formula. If the percentage shows more than or equal to 80%, then the lesson plan is good and feasible to use.

2. Observation Data for Teacher Activity

Analysis of data sourced from the teacher as a whole data obtained from several observations of teacher activity techniques is then analyzed with a description model. Data from the Teacher

Activity Observation Sheet in particular is calculated as a percentage to measure the teacher's ability to carry out learning. The percentage calculation is explained in the Suparti (2016) formula. If the percentage acquisition is more than or equal to 80% then the teacher can carry out learning well. If less than 80%, the teacher evaluates and repairs.

3. Observation Data of Students Activity

Analysis of student activity observation data was done descriptively. Calculation of the percentage of scores of student learning activities is done by adding up all scores in each aspect, then divided by the maximum score that has been determined, then the quotient is multiplied by 100%. For more details can be described in the Suparti (2016) formula. If the percentage results show more than or equal to 80%, then student learning activities as a result of the actions given by the teacher by using the Problem Based Learning model is good.

4. Student Learning Outcomes Data

Data analysis sourced from student learning outcomes is done in a descriptive way but also through calculations to determine the final results of the assessment. The final results of this assessment were obtained from 3 aspects namely knowledge from the evaluation test, attitude from observation, and skills also from the results of observation. Final scoring for each student, the average scoring is used in 3 aspects namely knowledge, attitudes, and skills as explained with the following formula details.

The researcher determines the minimum score limit by the Minimum Learning Completion in the school which is 75 for the average overall content and 75 for the natural science content only. If the student has not reached the minimum score specified then the student is declared incomplete, but if the student has reached the minimum score limit then the student has been declared complete.

After completeness of individual learning outcomes can be obtained then it can be determined calculation of the percentage of mastery learning classically as conveyed by Purwoko in Purnomo, et al., (2017). Percentage analysis of activity data and learning outcomes that have been obtained are then included in the range of successful actions with a very good, good, sufficient, and deficient predicate type. For the full explanation, the Table 1 will be presented.

Table 1. Classification of Learning Outcomes

Number	Total Score	Predicate
1	The total score of $\geq 90\%$	Very good
2	$80\% \leq$ total score $< 90\%$	Good
3	$60\% \leq$ total score $< 80\%$	Sufficient
4	total score $< 60\%$	Deficient

Source: Suparti (2016)

This study was designed following the type of research used namely CAR. Researchers use the CAR model of Kemmis & McTaggart in Sukardi (2013) which uses four stages of action research, which start from planning, acting, observing, and reflecting in a cycle system that is interrelated between a step and the next step.

RESULTS AND DISCUSSION

The results of this study are as follows. First, based on the data presented in Table 2 it can be seen that there is an increase in each action for the percentage of the Learning Implementation Plan. This increase occurs as follows. Cycle 1 of action 1 to cycle 1 of action 2 increased by 6.25% for the percentage and 3 points for the total score. Cycle 1 action 2 to cycle 2 action 1 increased by 4.17% for percentage and 2 points for score. Cycle 2 action 1 to cycle 2 action 2 increased by 2.08% for percentage and 1 point for the score. In general, this increase occurred because of improvements made by teachers in learning planning. as said Kunandar (2007) that the Learning Implementation Plan is a preparation of learning done by the teacher before teaching so that learning is more directed and runs effectively and efficiently.

Table 2. Percentage of Learning Plan Observations

Cycle	1		2	
Action	1	2	1	2
Total Score	40	43	45	46
Percentage	83,33%	89,58%	93,75%	95,83%
Criteria	Good	Good	Very good	Very good

Writing the Learning Implementation Plan needs to pay attention to several elements including referring to the basic competencies and abilities that students must master in preparing indicators, objectives, and learning material. besides that, the PBL model of learning planning needs to pay attention to the syntax/steps of the model as conveyed by Sugiyanto (2009) suggesting the syntax of the PBL model referred to as follows. Stage 1: giving orientation to the problem to students, stage 2: organizing students to research, stage 3: assisting independent and group investigations, stage 4: developing and presenting results, stage 5: analyzing and evaluating the problem-solving process.

Table 3. Percentage of Teacher Activity Observations

Cycle	1		2	
Action	1	2	1	2
Total Score	80	82	89	92
Percentage	76,92%	78,85%	85,57%	88,46%
Criteria	Sufficient	Sufficient	Good	Good

Second, based on the data presented in Table 3, it can be seen that there is an increase in teacher activity from each of the actions described as follows. The increase from cycle 1 of action 1 to cycle 1 of action 2 occurred by 1.96% for the percentage and increased by 2 points for the total score. The increase occurred because of an improvement in the preliminary learning activities as said by Mulyasa (2011) that opening learning by giving apperception is an activity carried out by the teacher to create readiness in students both in the mental aspects and concentration of students so that learning can run optimally, therefore giving apperception in opening learning activities is very important to do.

The increase from cycle 1 action 2 to cycle 2 action 1 occurred by 6.69% for the percentage and increased by 7 points on the total score. This increase occurred in giving rewards to students, Alma (2010) said about giving rewards (reinforcement) to positive student behavior that reinforcement is a positive response conveyed by teachers to certain (positive) student behaviors that enable the behavior to repeat itself. Doing these two points affects the increase in teacher activity in learning.

The increase from cycle 2 action 1 to cycle 2 action 2 occurred by 2.89% for the percentage and 3 points for the total score. This increase occurred in the case of a student organization in study groups, Mulyasa (2011) suggested that group organizing by teachers needed to pay attention to several things so that discussions could run effectively, one of which was the formation of groups correctly.

Table 4. Percentage of Student Activities

Cycle	1		2	
	1	2	1	2
Total Score	66	70	78	82
Percentage	66%	70%	78%	82%
Criteria	Sufficient	Sufficient	Sufficient	Good

Third, based on Table 4 it can be seen that there has been an increase in every action, as explained as follows. The increase occurred from cycle 1 action 1 to cycle 1 action 2 which is equal to 4.00% for percentage and 4 points for the total score. This increase occurred in group organizing and class management by the teacher, Mulyasa (2011) said that for small group guiding to run well it was necessary to pay attention to several things, one of which was by spreading the opportunity to participate in students. Furthermore, Mulyasa (2011) also expressed his opinion on classroom management to improve student order by creating and maintaining an optimal learning climate, including by showing responsive attitudes and reacting to class disruptions and providing wise reprimands.

The increase from cycle 1 of action 2 to cycle 2 of action 1 was 8.00% for the percentage and as much as 8 points for the total score. This increase occurred in terms of focusing on students'

attention and also guiding group discussions. as said by Mulyasa (2011) that the implementation of variations in learning, that by doing variations can increase the attention of students on the teacher and the material delivered. Mulyasa (2011) also said that the increased involvement of students in groups when observing was also influenced by the skills of teachers in guiding group discussions by spreading opportunities to participate.

The increase from cycle 2 action 1 to cycle 2 action 2 is 4% for percentage and 4 points for score. This increase occurred because of an increase in group organizing, as Mulyasa (2011) said that spreading the opportunity to participate could provide opportunities for participants who did not participate in the group.

The increase that occurs in student activities other than those stated above is also due to the good application of the PBL model as said by Wulandari (2012), that applying the PBL model in learning can improve students' science learning processes and outcomes. Marhadi (2015), also suggested that student activities at each meeting with the implementation of problem-based learning models had increased.

Table 5. Student Final Learning Outcomes

Cycle	Action	Score			Final Score	Complete	Not complete	
		Attitude Score	Skill Score	Knowledge Score				
1	1	Total	1600.00	1575.00	1487.00	1554.00	8	14
		Average	72.73	71.59	67.59	70.64		
		Percentage Criteria					36.36%	63.64%
1	2	Total	1612.50	1612.50	1444.00	1563.28	9	13
		Average	73.30	73.30	65.64	71.06		
		Percentage Criteria					40.91%	59.09%
2	1	Total	1637.50	1741.67	1742.00	1707.06	14	8
		Average	74.43	79.17	79.18	77.59		
		Percentage Criteria					63.64%	36.36%
2	2	Total	1650.00	1841.67	1818.00	1769.89	18	4
		Average	75.00	83.71	82.64	80.45		
		Percentage Criteria					81.82%	18.18%
						Good		

Fourth, based on Table 5 shows that an increase in student learning outcomes from a combination of 3 aspects, namely attitudes, skills, and knowledge. The increase that occurred in the pre-action phase to cycle 1 action 1 was 32.32%. The increase that occurred in cycle 1 action 1 to cycle 1 of action 2 was 4.55%. The increase from cycle 1 action 2 to cycle 2 action 1 was 22.73%. The increase from cycle 2 action 1 to cycle 2 action 2 was 18.18%. The increase occurred due to an increase in the quality of learning that impacts the results. This increase occurred due to the implementation of the PBL learning model, and there was an improvement in learning with the PBL

model in each of its actions. Rahmasari (2016) argues following the results of her research that "the use of PBL (Problem Based Learning) learning models can improve student learning outcomes in general." This opinion was also supported by Widiaworo (2017) who also expressed his opinion about the strengths of the PBL model in terms of learning outcomes, he argued that with the application of the PBL model in learning there would be meaningful learning for students. This means that the application of this model will enable students to absorb information/knowledge better which will certainly have an impact on student learning outcomes.

CONCLUSION

Based on the research findings and discussion, the results of the study can be concluded as follows. Based on data compilation done on lesson plans, teacher activities, student activities and student learning outcomes can be seen that there is always an increase in each action. Overall, it can be concluded that the application of the Problem Based Learning model can improve the learning of science content in the 4th grade of SDN Madyopuro 6. This can be seen from the results and discussion.

Based on the research results obtained and the findings found by researchers during the study can be given some suggestions so that it can be an improvement and improvement in the things mentioned as follows. For teachers, it is better to be able to design learning well by preparing lesson plans so that learning can be directed, then in implementation, teachers should use several types of learning models that can demand student activities. For example, by applying the PBL model that can guide students to learn actively in problem solving and direct experiences such as observation and discovery of information experienced by students will make student learning more meaningful.

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