Improving science learning outcomes in material changes in natural appearance

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Abstract. The purpose of this study is to improve the learning outcomes of students' natural science on material changes in natural appearance. This research is a participatory type of collaborative classroom action research conducted in two cycles. Each cycle is held three times, consisting of planning, implementation, observation, and reflection. The subjects in this study were fourth-grade students at YPPK elementary school Sta. Theresia Buti totaling 34 students consisting of 19 male students and 15 female students. Data collection is obtained through interviews, observation, and evaluation of learning outcomes. The form of data analysis uses qualitative descriptive. The results of the analysis of student learning outcomes data in the first cycle showed that the percentage of student learning outcomes only reached 53.6% with an average grade value of 58.3 below the value of a predetermined indicator. In the second cycle, the percentage of student learning completeness increased to 82.4% with a class average value of 79.2. Based on the results of this study, it can be concluded that the learning of natural science in the material changes in the appearance of the earth increases in each cycle by involving students directly and conducting experiments.

1. Introduction

The use of strategies and learning methods is often less than optimal by the teacher [1,2]. Especially in the learning of Natural Sciences (IPA) in elementary schools, where learning is often given only to the extent of theory without giving concepts and student involvement directly in everyday life [3]. This results in science learning need to prioritize the role of students in teaching and learning activities so that learning takes place is learning that is centered on students and teachers as facilitators in the learning. Based on the results of the Program for International Student Assessment (PISA) under the Organization of Economic Cooperation and Development (OECD), it shows that Indonesia is a country with a relatively low level of capability. Focusing on science literacy confirmed students in Indonesia ranked 62nd out of 70 participating countries with an average score of 403 [4]. The science aspect measured by PISA aims to determine students' ability to identify global perspectives in their daily environment to be able to compete at the international level.

Meaningful science learning is expected to be able to improve the quality of Indonesian education. [1], argues that in fact, the process of science learning in elementary schools on average has not touched a meaningful learning process, even though meaningful learning and mastery learning in
science learning will be able to improve student learning outcomes. [5,6] says thinking ability means that thinking can be taught and requires exercises to be able to have it, just as with other abilities. The results of interviews with fourth-grade teachers said that the learning carried out so far had rarely used learning models and learning media, only using books that were in school. More likely to use lecture and question and answer methods without involving students in the learning process. When asked about the science subject matter that had been taught, the teacher answered that all this time the teacher had only used textbooks available in schools as an alternative in the process of learning science without using media and direct student involvement [7–9].

Observation of the implementation of the science learning process at the YPPK Santa Theresa Buti Elementary School in the Merauke Regency was the initial stage of the researcher getting the problem in the school. Based on observations in class IV of YPPK Primary School Sta Theresa Buti conducted on 02 to 08 February 2019 shows that the learning process tends to still use the teacher-centered approach, meaning that the teacher becomes the center of learning and becomes the only source of information inside the learning. Based on the classroom teacher assessment document, the science learning outcomes of fourth-grade students at YPPK elementary school Sta. Theresa Buti Merauke 2018/2019 academic year amounted to 68.18% of students who did not complete because they did not reach the minimum completeness criteria of 75 out of 34 students. There were still a lot of daily test scores and midterms for students. This means that the achievement of learning outcomes of fourth-grade students for natural science subjects is still low category so it is necessary to find a solution to deal with the problem.

This fact shows that natural science subject matter in class IV of YPPK elementary school Sta. Theresa Buti Merauke through the results of observation and interviews with classroom teachers there are problems, namely, 1) learning methods that do not involve students in learning; 2) lack of learning motivation obtained by students so that in learning students do not dare to ask and answer questions given by the teacher; 3) there are still many students who play and are indifferent to the learning given by the teacher at that time; 4) student learning outcomes are still very low and teachers have never used learning media when teaching science materials. In connection with these problems, the researcher took an action step that was needed in an effort to improve the quality of the science learning process by using a learning process that was centered on student centered students and could improve student learning outcomes [10][11]. Other problems in science learning at YPPK elementary school Sta. Theresa Buti Merauke is the lack of ability of students to express their opinions or ideas in the learning process and the lack of direct involvement of students in the learning process so that the material taught is easily forgotten or meaningless.

2. Methods
This study is a class of participatory CAR collaborative classroom action research in which researchers collaborate with class teachers, which consists of 2 cycles, each of which is held three times. This research was conducted in February - March of the 2018/2019 school year in semester Two. The subjects in this study were fourth-grade students at YPPK elementary school Sta. heresia Buti Merauke, consisting of 34 students. Data collection techniques in this study are interviews, observation and evaluation of student learning outcomes. The data in this study are in the form of student learning outcomes, in the form of questions learned every cycle. Analysis of student learning outcomes data is used to determine the level of understanding of students after being given treatment at each meeting determined by the researcher. Furthermore, to calculate the completeness of student learning outcomes classically if $\geq 75\%$ of all students achieve a minimum completeness criteria of 75. The completeness of student learning outcomes can be calculated using the following formula.

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\text{Value of Student learning Completeness} = \frac{\text{Number of Scores Obtained}}{\text{Maximum Score}} \times 100\%
\]
Maximum score Analysis to calculate the indicators of success of student learning outcomes if it shows $\geq 70\%$ with very good criteria, this study may be said to have been completed and if the results of the implementation criteria show $<70\%$ with less criteria then this study will be continued in the next cycle.

3. Result and discussion

3.1 Results

This research was carried out at YPPK elementary school Sta. Theresia Buti Merauke for class IV second semester 2018/2019 academic year. The action of the first cycle consisted of four main parts adapted by Kemmis and Mc Taggart, namely the stages of action planning, action, observation, and reflection. The implementation of the first cycle of action was carried out on the 18th, 20th and 23rd of February 2018. Broadly speaking, the implementation of learning consisted of an introduction, core activities, and closing. Learning activities begin with material changes in the appearance of the earth about celestial objects. The teacher began learning by giving apperception in the form of questions to students relating to the material discussed on that day and giving questions to students following the learning students have begun to appear in learning students answer questions given by the teacher, and at the next stage the teacher distributes student worksheets to work together with the group then the teacher instructs students to present them in front of the class about the work that has been completed together with group friends. Activities carried out by students in the first meeting can be seen in figure 1 below.

![Figure 1. The teacher explains using picture media](image)

Based on the observation sheet of teacher activities and activities of students learning natural science learning can be said that the first meeting is not all stages in accordance with the plan of implementing learning can be achieved by students. Students seem confused with the material conveyed by the teacher and the teacher also has not been able to manage the time well so that the time allocation needed exceeds the time set in the learning implementation plan.

The implementation of the second meeting included apperception activities carried out by reviewing the first meeting material about celestial bodies. In the preliminary activities, students follow learning in accordance with the direction of the teacher, at the core activities students see the experiments conducted by the teacher at the beginning, students individually observe and analyze the experiments conducted by the teacher. Then in the core activity, the teacher divides students into groups to work on student worksheets and observe experiments conducted by other groups about celestial objects. The discussion process carried out smoothly, although in the implementation the students were still less active in discussing. In the final activity, the teacher gives confirmation of changes in the appearance of the earth caused by the moon. Based on the learning implementation observation sheet, it can be said that at the second meeting all stages in learning are in accordance with the implementation plan of learning.

The implementation of the third meeting included apperception activities carried out by the teacher by giving a review of the previous meeting material about changes in the appearance of the earth
caused by wind. In the core activity, students observe images of changes in the appearance of the earth caused by abrasion on the coast. Students are given the opportunity to express their opinions related to the images observed according to the teacher's explanation. At the core activity, the teacher asks students to pair up asking one of the couples to experiment with changes in the appearance of the earth caused by abrasion winds on the coast with tools prepared by the teacher and assisted by observers, in this case, the observer. Students look active in learning as well as in groups, although there are still some students who are still less active. After observing the experiments conducted by his group friends the students were instructed to present the results of the experiments that had been carried out with their partners about changes in the appearance of the earth caused by wind. The activities carried out by students on that day can be seen in figure 2.

Figure 2. Student activities on group discussions

In the final activity, the teacher gives confirmation of changes in the appearance of the earth caused by the wind. Students work on the evaluation cycle I in the form of essay questions consisting of 10 items. Students work on the questions as well as possible and walk in an orderly manner. Based on the data analysis of the first cycle obtained student learning outcomes in Table 1 below:

| Value | Category      | The number of Students | Percentase |
|-------|---------------|-------------------------|------------|
| >75   | Complete      | 16                      | 53.6%      |
| <75   | Not Complete  | 18                      | 46.4%      |
| Total |               | 34                      | 100%       |

Based on Table 2 above, it can be seen the student learning outcomes in the material changes in the appearance of the earth caused by wind in the first cycle, namely from 34 students who attended the study as many as 18 students or 53.6% students fulfilled the completeness of learning outcomes with an average value of 58.3. While 16 students or 46.4% of students have not fulfilled the completeness of the specified learning outcomes.

Based on the results of the analysis it can be concluded that the implementation of the first cycle has not yet reached the predetermined indicator, namely ≥ 75 students in the classical class get a score above the minimum criteria of perseverance. Reflections on the first cycle there are some shortcomings that occur and will be corrected in the second cycle. The weaknesses of the implementation of learning cycle I are: First, there are still many students who expect answers from smart friends to work, without being actively involved in the group, both students are still shy about conveying the results of their work and afraid of being wrong. specified time; Fourth, some students who still have difficulty reading so that when working on the question requires teacher guidance and requires a long time.

The implementation of the second cycle of activities carried out on the 13th, 14th and 18th of the activities carried out at the planning stage included the preparation of the RPP, explaining the causes
of changes in the appearance of the earth to the land. In the initial activity, the teacher performs an apperception by showing pictures and then asks the students to give their opinion about the appearance of the earth as an influence on the land. Then the teacher distributes the student's worksheets to work according to the activity stage that day. Then in the core activities the students discussed in class presenting the results of their partner's discussion about the appearance of the earth's influence on the land, when the presentation activities students had begun to feel confident and enthusiastic in presenting the results of the discussion with their partners. Students seem to focus on paying attention to the group that is presenting, other groups provide input and questions related to the results of the discussion presented. Students are no longer ashamed in discussions, give advice to each other and listen to other groups talking and how to ask students have begun to change and explore the subject matter more.

The second meeting began with the teacher reviewing the material at the first meeting about changes in the appearance of the earth caused by rain. Then convey the things that will be learned today about changes in the appearance of the earth caused by sea waves. The teacher plays the video and asks the students to observe the process of changes in the presence of the earth caused by the seawater waves that occur on the beach. Then the teacher ordered one of the students to do an experiment in front of the class about the occurrence of abrasion on the coast, students were very enthusiastic about the course of learning at that time. The activity of the experimental learning process changes the appearance of nature which is influenced by waves of seawater abrasion can be seen in figure 3 below.

![Figure 3. Students conduct an abrasion test on the coastal zone](image)

The activity above illustrates the enthusiasm of students working on student worksheets that are distributed after students take turns doing experiments in front of the class, students feel happy to be involved in the learning process today because students know how abrasion occurs on the coast and how to prevent it. All students are active in discussions and no more students disturb their friends. In the final activity, the teacher gave an affirmation of changes in the appearance of the earth caused by seawater waves, namely the occurrence of coastal abrasion on the coastal shore, the teacher also conveyed how to preserve the beach from being abraded by planting mangrove trees as was done in the experiment. Then the students work on the evaluation cycle II in the form of essay questions consisting of 8 items. Students work on the questions as well as possible and walk in an orderly manner. Based on the data analysis of the first cycle obtained student learning outcomes in table 1 below:

**Table 2. Completion of student cycle II learning outcomes**

| Value | Category   | The number of Students | Percentage |
|-------|------------|------------------------|------------|
| >75   | Complete   | 28                     | 82.4%      |
| <75   | Not Complete | 6                     | 17.6%      |
| Total |            | 34                     | 100%       |
Based on table 2 above, it can be seen from 34 fourth grade students, as many as 28 students or 82.4% students meet the minimum completeness criteria with an average value of 79.2. While students who have not fulfilled the minimum completeness criteria that have been determined are as many as 6 students or 17.6%.

3.2. Discussion
Based on the analysis of the above research it is known that the implementation of the first cycle of action has not yet reached the predetermined indicators. In the implementation of the first cycle there were obstacles or shortcomings that caused the achievement of students' learning outcomes to not be achieved. Some of these obstacles are addressed, namely: First, there are still many students expecting answers from clever friends to work on, without being actively involved in the group. Second, students are still shy about conveying the results of their work and afraid of being wrong. Third, the time allocation used by the teacher is still not in accordance with the specified time; Fourth, some students who still have difficulty reading so that when working on the question ters requires teacher guidance and requires a long time [12]. This is indicated by the acquisition of classical student learning outcomes on a cycle of 58.3 with learning completeness of 53.6%. The results of this study indicate that the implementation of the first cycle of action has not reached the indicator of success and needs to be carried out in the next cycle.

Based on the reflections carried out in the first cycle with the shortcomings experienced and input from peers the results of student learning in the second cycle experienced an increase of 79.2 with student learning completeness of 82.4%. These results indicate that the implementation of the second cycle has reached a predetermined indicator> 75% of students meet the minimum criteria of completeness, so this class action research can be said to be successful. The changes in student learning styles in cycle I to cycle II have an impact on student learning outcomes. [13]teachers have an important role in the learning process, the success of the learning process is largely determined by the quality or ability of the teacher in designing suitable media that will facilitate the learning process. This is in line with the research and opinions of experts who indicate that learning directly or conducting experiments and adapted to the lives of students can increase student activity and influence student learning outcomes [14,15].

4. Conclusion
Based on the results of the research conducted it can be concluded that the increase in the results of natural science learning in fourth-grade students at YPPK elementary school Sta. Theresia Buti Merauke on material changes in the appearance of the earth. This can be seen from the results of the average value of students in the first cycle of 58.3 and in the second cycle increased by 79.2. The percentage of completeness of students in the first cycle was 53.6% with the number of students completing 16 students, while in the second cycle the completeness of learning students increased by 82.4% of students who completed 28 students. Based on the results of this study several suggestions were proposed as follows. First, the teacher is expected to be able to use learning models that can increase student activity in the classroom. Second, the next researcher is expected to use learning media that can foster student interest in the class and not get bored quickly.

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