

The Implementation of Demonstration Method to Increase Learning Outcome in Natural Science Lessons

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Abstract

This research is motivated by the low understanding of students' concepts in science learning in grade 2 State Elementary Schools. Researchers provide solutions by applying the demonstration method, a learning method by demonstrating items, events, rules and sequences of carrying out an activity, either directly or through the use of teaching media that are relevant to the subject or material being presented. This type of research is classroom action research. This research has two cycles. Each cycle consists of two sessions and four phases, namely planning, implementation, observation and reflection. The subjects of this study were 2nd grade elementary school students, totaling 21 people. The results of the study concluded that the use of the demonstration method could improve student learning outcomes in science subjects in Grade 2 of State Elementary Schools.

Keywords: *demonstration methods; learning outcomes; science lessons.*

Abstrak

Penelitian ini dilatarbelakangi oleh rendahnya pemahaman konsep siswa dalam pembelajaran IPA kelas 2 Sekolah Dasar Negeri. Peneliti memberikan solusi dengan penerapan metode demonstrasi, suatu metode pembelajaran dengan cara memperagakan barang, kejadian, aturan dan urutan melakukan suatu kegiatan, baik secara langsung maupun melalui penggunaan media pengajaran yang relevan dengan pokok bahasan atau materi yang sedang disajikan. Jenis penelitian ini adalah penelitian tindakan kelas. Penelitian ini memiliki dua siklus. Setiap siklus terdiri dari dua sesi dan empat fase yaitu perencanaan, pelaksanaan, observasi dan refleksi. Subyek penelitian ini adalah siswa kelas 2 Sekolah Dasar yang berjumlah 21 orang. Hasil penelitian menyimpulkan bahwa penggunaan metode demonstrasi dapat meningkatkan hasil belajar siswa pada mata pelajaran IPA Kelas 2 Sekolah Dasar Negeri.

Kata Kunci: *metode demonstrasi; hasil belajar; pelajaran IPA.*

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INTRODUCTION

Education is one of the success factors in efforts to improve the quality of human resources and shape the human soul itself as a unique person. Education can serve as a guide / help for adult children so that children can grow up, It can develop knowledge, improve the quality of life and human dignity through all the opportunities it has, without having to depend on others. With education, we can build high quality human resources (Nahdi et al., 2018).

Learning activities are processes where teachers and students interact reciprocally that influence and involve teachers as educators (Walter et al., 2016); (Sailer et al., 2021). Therefore, teachers are required to have the skills to understand teaching methods (Ibanez et al., 2014). To achieve these results, teachers as educators must have the competence to become professional teachers (O'Dowd, 2015). The interconnected components of the teaching and learning process include teaching objectives, teachers and students, teaching materials, teaching and learning methods/strategies, tools or media, learning resources and assessments. Therefore, an active teaching and learning process is characterized by the involvement of students as physical, mental and emotional (Ananda & Fadhilaturrahmi, 2018; Radovan & Makovec, 2015). Thus, the occurrence of interaction or communication between teachers and students. Learning is a man-made routine activity to live his life. Learning is a process of change that happens to everyone and lasts a lifetime. The change in behavior is the result of the interaction between the environment in meeting their needs. One of the signs that a person learns is a change in the behavior of people who are not sedentary (Sullivan & Lachman, 2017). Behavior change is about changing knowledge, skills, and attitudes. Learning is a change in behavior where the change can lead to better behavior, but there is also the possibility of leading to worse behavior (Gumay & Bertiana, 2018).

Learning is any relatively permanent change in behavior that occurs as a result of practice or experience, according to Sari, (2012). Learning in idealism means psycho-physical-social activities towards complete personal development (Cohen & Helling, 2014). Learning is a behavior. When people learn, the response becomes better. On the other hand, if he does not learn, his response decreases. According to Skinner (Gasong, 2018). Based on the opinion of the experts above, it can be concluded that learning is a process of efforts made by a person or psycho-physical-social or cognitive activity to produce human growth or development and characteristics with the environment either by getting better or less.

To find out that students receive or go through the learning process provided by the teacher, it can be seen from student learning outcomes through measurement and evaluation. The results consist of two words: "Outcomes and learning" (McGrath et al., 2015). The result is the result of a continuous process of activity. Learning is a series of activities to achieve behavior change as a result of a person's experience in interacting with his environment. Change can be interpreted as improvement and development that is better than before (Siahaan et al., 2021). According to Wijaya & Bukhori, (2017) Learning outcomes are patterns of actions, values, understandings, attitudes, appreciation in skills". Furthermore, according to (Watson et al., 2016) "Learning outcomes are the result of behavioral changes. Behavioral changes include cognitive, affective and psychomotor learning outcomes.

Furthermore, according to Nurlaela et al., (2018) Learning outcomes are the result of an interaction between learning and teaching. Based on the thoughts of the experts above, it can be concluded that the learning outcomes are the results caused by the ongoing teaching and learning process. Learning conclusions can be cognitive, effective, and psychomotor conclusions. The results of the study can also be seen in changing attitudes and actions as far as students can accept the experiences or experiences learned (Purba & Gusar, 2020).

In elementary school science education, it is necessary to provide students with experience in observing natural phenomena either directly (on stage) or indirectly (brought to the laboratory). Offering practical learning activities can promote students' thinking skills, work, and scientific behavior. Because elementary school students are generally still at their

age they still like to play, enjoy activities, have great curiosity (Siahaan et al., 2020). Based on the observations experienced by the researcher, the researcher can see that there are still many students who have difficulty digesting science lessons. The causes are: 1) Teachers are less varied in applying the learning methods/models used so that students tend to get bored in dealing with lessons, especially learning science. 2) There are still many students who are not confident to ask the teacher so that the students' ability to solve the questions is still low. 3) Students have a lack of confidence in their answers to every question given by the teacher. 4) Students still think that science lessons are very difficult. 5) The learning process does not motivate students. So that there is a lack of students' understanding of science subjects (Cahyani et al., 2015).

Before carrying out learning, the learning steps must be designed according to the learning method that will be used. In order for the implementation of this demonstration method to run effectively, several steps that need to be taken by the teacher are described by experts. The steps of the demonstration method according to Ramadhan & Surya, (2017) are: 1) there is a problem to be solved. 2) according to the level of cognitive abilities of students. 3) the concepts or principles found must be written clearly. 4) the necessary tools or materials must be available. 5) the atmosphere of the class must be arranged in such a way. 6) the teacher gives students the opportunity to collect data. 7) must be able to provide answers correctly in accordance with the data needed by students.

Ranya et al., (2013) based on the research obtained, it can be stated that applying the demonstration method could make students more active in participating in learning, because they could dare to speak, trained to conduct experiments, dared to ask and answer questions. Therefore, in teacher learning activities, should use a learning model that can make students active, so that students don't just stay silent and listen in learning which tends to make students bored and passive. This is in accordance with what was stated by Nihayatuzzahra, (2020) that demonstrations have the aim of making students able to seek and find their own answers to the problems they face by conducting their own experiments. Students can also be trained in scientific thinking. With demonstration students find evidence of the truth of the theory of something they are studying.

The relevant research is the research conducted by Gunawan, (2017) with the research title Application of the demonstration method in improving students' abilities in the material of natural events and their impact in class V SDN 57 eastern city "This research focuses on how the activeness of students in science learning in natural events and their impacts by using the demonstration method and whether through the demonstration method can improve student learning outcomes about change environment. The results of the research conducted showed that by applying the demonstration method the student's activity in participating in learning was very active while student learning outcomes increased. Based on the results of the research described above, the relevance of this research lies in the application of the demonstration method in improving student learning outcomes in Natural Sciences.

From the value data obtained by students, it can be seen that student learning completeness in students in the 2019/2020 school year has a value above the KKM in the second semester there are 24 (72.73%) students. In the 2019/2020 semester II academic year there were 20 (74.07%) students who scored above the KKM and 7 (25.93%) students who did not score above the KKM. While in the 2015/2016 academic year in the first semester there were 14 (66.67%) students who scored above the KKM and 7 (33.33%) students who scored below the KKM. From the description above, it can be concluded that grade 2 of the State Elementary School 173606 Pangururan is still relatively low because there are still students who have not completed science subjects and have not reached the level of completeness according to the standard level of 80%.

To overcome this, it is necessary to take actions that must be taken by the teacher so that it is easy for students to understand the material in science subjects. So that the expected learning objectives can be achieved with good results. Therefore, the use of learning

methods/models is very important to help students understand science. There are a number of learning methods applied to elementary school students, including: Lecture Method, Discussion Method, Demonstration Method, Lecture Plus Method, Recitation Method, Experimental Method, Field Trip Method, Exercise Method, Design Method, Debate Method, Mind Mapping Method (Deng & Yu, 2014). Teachers are not enough just to use the lecture method, but must develop learning models that can help students to better understand difficult concepts. For this reason, the demonstration method is sought to help students to be more active in the learning process (Hizbi, 2019).

The Demonstration Method is expected to be used as a form of action to improve student learning outcomes in science subjects (Natural Sciences). Because students are invited to be active in thinking activities on certain problem topics. In this method, students are invited to talk, discuss and exchange opinions with their classmates and group friends, and students will formulate ideas and answers from the results of group discussions into written form (Sadiah, 2016).

The purpose of this study was to collect data and find out how the effect of using demonstration methods in science learning with the material properties of light on improving student learning outcomes in grade 2 Elementary School 173606 Pangururan.

METHODOLOGY

This type of research is classroom action research (Nurhasanah et al., 2020). This research seeks to improve student learning outcomes by using the demonstration method in science in Class 2 State Elementary School 173606 Pangururan. The subjects in this Classroom Action Research are students of Class V Elementary School 173606 Pangururan, totaling 21 students. Meanwhile, the object in this study is the student learning outcomes in science lessons in class 2 Elementary School 173606 Pangururan by using the demonstration method. This research has several stages which are a cycle. Each cycle is carried out in accordance with the changes to be achieved. The flow of the implementation of classroom action research is carried out as Figure 1.

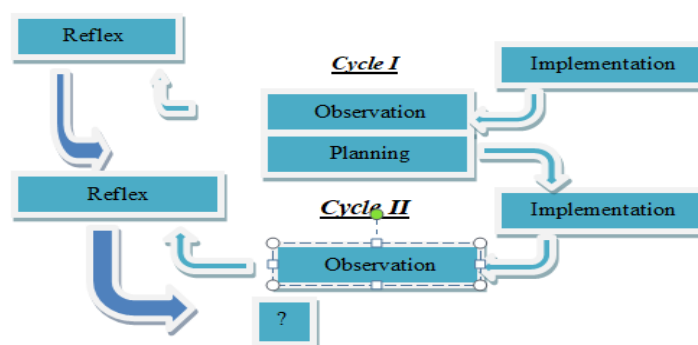


Figure 1: Schematic of Classroom Action Research (CAR) Model Kemmis & MC Taggart (Dadds, 2020)

From Figure 1, it can be explained that the Classroom Action Research procedure is as follows:

Cycle I started from the planning stage, the researcher asked permission from the school, then discussed with the homeroom teacher to see the problems that occurred in learning mathematics. Next, the researcher developed a plan of action to be taken in improving mathematics learning outcomes in integer operations, namely preparing lesson plans, learning media, worksheets, and observation sheets. At the implementation stage, the researcher applied the lesson plans in accordance with the lesson plans that had been prepared, recorded various learning activities and documented the results of the worksheets. The observation stage was carried out to determine the extent of the success of learning after the actions in the

first cycle were carried out. And the last stage is reflection, which is the stage that plays an important role in understanding and giving meaning to the learning outcomes process that has been carried out by: (a) thinking and analyzing the actions taken, (b) redesigning the actions to be taken in the next cycle to achieve predetermined targets. Cycle II is carried out based on the results of the reflection of cycle I, if in cycle I it has not reached the KKM (Minimum Completeness Criteria).

The level of success achieved can be seen from the changes in students' acceptance of the lessons delivered. To analyze the observation data is determined by the formula:

$$P = \frac{\text{Number of observed aspects}}{\text{total number of aspects}} \times 100\% \text{ (Sudjana, 2014)}$$

Description: P = percentage of observation

With the following conditions:

Table 1. Description of the Percentage Value of Observation Results

Number	Change Percentage	Category
1.	90-100%	Very Good
2.	80-89%	Good
3.	70-79%	Enough
4.	< 70%	Less

Based on the data in Table 1, the Percentage Value of Observation Results above, it can be seen that students with a percentage change of 90-100% are very good. Meanwhile, students with a percentage change below <70% are very poor. For the assessment of observations can be given a value based on the score criteria: 4: Very Good (A), 3: Good (B), 2: Fairly Good (C), and 1: Not Good (D).

Furthermore, to find out the data from the questionnaire regarding the improvement of students' social attitudes, the following formula was used:

$$P = \frac{f}{N} \times 100\% \text{ (Carter Andrews et al., 2016)}$$

Description: P = Total percentage of students who experience changes, F = Number of students who have changed, and N = Total number of students. A class is said to have completed learning if the class has 80% of students who have achieved a score of 65.

RESULT AND DISCUSSION

This study aims to collect data and evaluate and improve student learning outcomes by using the demonstration method in science subjects in Grade 2 Elementary School 173606 Pangururan. Before being given the action, students were given a pretest to determine their initial ability about science and its application. There are 20 questions in the form of multiple choice. The pretest took place with an allotted time of 60 minutes. The number of students who were given the pretest was 21 students. Based on the results of the students' pretest answers after the analysis, briefly the students' pretest scores are presented in the table 2. From the table 2, it can be seen that the proportion who received complete and incomplete learning outcomes. The following describes the results of students' pretest scores in tabular form.

From table 2 and table 3 it can be seen that the level of students' ability in mastering science material is still low, with an average student score of 52.61. Of the 21 students, there were 17 students (80.95%) who obtained low learning outcomes (unfinished) and 4 students (19.05%) in the complete category on science material. To calculate the classical student success rate, you can use the formula.

$$P = \frac{f}{N} \times 100\%$$

$$\text{Complete} = 4/21 \times 100\% = 19.05\%$$

$$\text{Incomplete} = 17/21 \times 100\% = 80.95\%$$

Comparison of student learning outcomes in the pre-test can be seen in the diagram below in the figure 2. Based on the table data and bar graph above, it can be seen that the students' ability in mastering science material and its application is still low with the class average score reaching 52.61 from 21 students, there are 19.05% students who achieve good learning outcomes (complete) and 80, 95% of students are said to have low learning outcomes (unfinished). From the data above, it can be seen the location of students' difficulties in working on multiple choice test questions.

Table 2. Student Learning Outcomes in the Pre-Test (Pre-Test)

No. Respondent (Student)	Total Score	Score	Information	
			Complete	Not Completed
01	12	60		Not Completed
02	9	45		Not Completed
03	11	55		Not Completed
04	15	75	Complete	
05	10	50		Not Completed
06	11	55		Not Completed
07	10	50		Not Completed
08	11	55		Not Completed
09	16	80	Complete	
10	7	35		Not Completed
11	7	35		Not Completed
12	7	35		Not Completed
13	13	65		Not Completed
14	10	50		Not Completed
15	9	45		Not Completed
16	14	70	Complete	
17	8	40		Not Completed
18	12	60		Not Completed
19	8	40		Not Completed
20	7	35		Not Completed
21	14	70	Complete	
amount	221	1105	4 students	17 students
Average		52,61		
Completeness			19,05%	80,95%

Table 3. Distribution of Learning Outcomes in the Pre-Test

Score	Frequency	Percentage%	Information	
			Complete	Not Completed
90-100	-	-	-	-
80-89	1	4,77%	Complete	
70-79	3	14,28%	Complete	
60-69	3	14,28%		Not Completed
0-59	14	66,67%		Not Completed
amount	21 students	100%	19,05%	80,95%

Researchers improve learning by continuing the first cycle by using the demonstration method to improve student learning outcomes in science subjects in Grade 2 Elementary School 173606 Pangururan. Observing student activities during class. The following are the results of student observations obtained during learning using the demonstration method can be seen in the table 4.

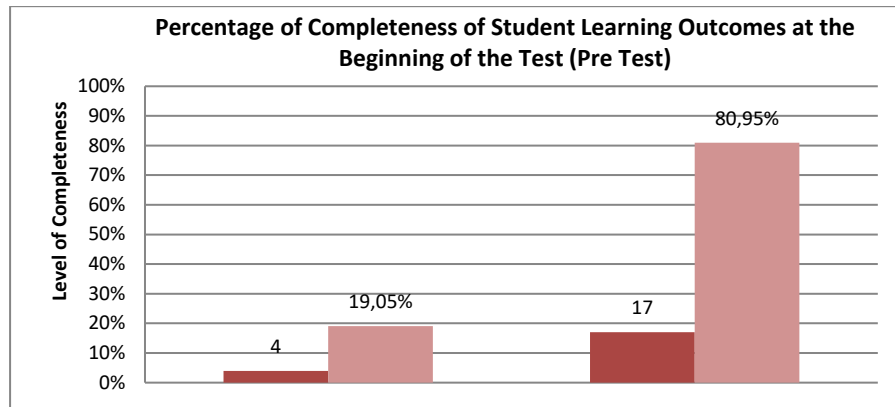


Figure 2. Pre Test Diagram Diagram

Table 4. Student Learning Outcomes in Post Test Cycle I

No. Respondent (Student)	Total score	Score	Information	
			Complete	Not Completed
01	14	70	Complete	
02	9	45		Not Completed
03	15	75	Complete	
04	15	75	Complete	
05	10	50		Not Completed
06	14	70	Complete	
07	11	55		Not Completed
08	11	55		Not Completed
09	16	80	Complete	
10	7	35		Not Completed
11	7	35		Not Completed
12	7	35		Not Completed
13	14	70	Complete	
14	12	60		Not Completed
15	9	45		Not Completed
16	18	90	Complete	
17	14	70	Complete	
18	14	70	Complete	
19	14	70	Complete	
20	12	60		Not Completed
21	15	75	Complete	
Amount	258	1290	11 student	10 student
Average		61,42		
Completeness			52,4%	47,6%

From the results of the analysis in cycle I, it may be known how many percentages of students have received complete and incomplete learning outcomes. Table 5 describes student results in tabular form.

From table 4 and table 5 it can be seen that the students' ability in mastering science material is still low, with an average score of 61.42 students. Of the 21 students, there were 10 students (47.6%) who had low learning outcomes (unfinished) and 11 students (52.4%) who were included in the complete category on the material properties of light. To calculate a student's classical success rate, you can use the formula:

$$P = \frac{f}{N} \times 100\%$$

$$\text{Complete} = 11/21 \times 100\% = 52.4\%$$

$$\text{Incomplete} = 10/21 \times 100\% = 47.6\%$$

Comparison of student learning outcomes in the pre-test can be seen in the diagram below in the figure 3.

Table 5. Distribution of Learning Outcomes in Post Test Cycle I

Score	Frequency	Percentage%	Information	
			Complete	Not Completed
90-100	1	4,77%	Complete	
80-89	1	4,77%	Complete	
70-79	9	42,86%	Complete	
60-69	2	9,5%		Not Completed
0-59	8	38,1%		Not Completed
amount	21 student	100%	52,4%	47,6%

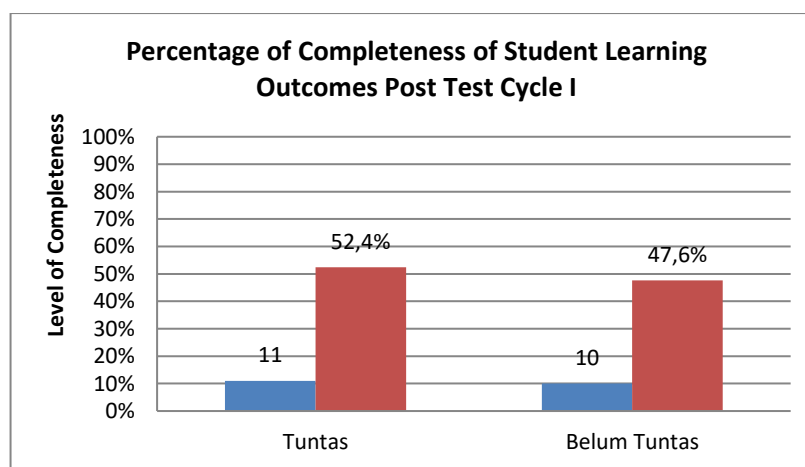


Figure 3. Post Test Cycle I

Discussion

Based on the implementation of the action in the first cycle, it was found that the student learning outcomes after using the demonstration method were 10 students (47.6%) who were declared complete compared to the students' learning mastery before the action (pre test) was held, namely 4 students (19.05%). which is declared complete means an increase of 28.55%. However, the students' scores are still not satisfactory. This can be seen by the students' ability to answer questions about the material properties of light. In the second cycle planning is done after knowing the weaknesses in the first cycle. In the first cycle, the researcher's efforts to overcome the weaknesses and shortcomings in the first cycle is by studying the demonstration method.

In cycle II, the demonstration method was carried out in accordance with the RRP that had been prepared. The learning steps arranged in the lesson plan are in accordance with the steps of the demonstration method that have been determined. The implementation of the second cycle of action consisted of 2 meetings. In this stage, material development is carried out and at the end of the action a post test is held.

Activities carried out by researchers during teaching will begin at the second cycle meeting, namely at the second cycle meeting. All students were asked to put science books on the table. Apperception carried out by researchers in this action, students are reminded again about the previous lesson, namely light that can penetrate clear objects and light that can be reflected. When students are given appreciation, students get motivated by informing the learning objectives, as well as the benefits of learning materials. The teacher then explains whether the science subject matter can be described through demonstrations and the use of media.

Researchers explain that light material can propagate in a straight line by providing examples through demonstrations. After the nature of light that can propagate in a straight line is explained, students are given the freedom to ask questions to the teacher. Then, the teacher explains that light material can be refracted by giving examples through demonstrations and students are also given the freedom to ask questions to the teacher. Next, the teacher will explain the light material that can be described using the media. Students pay attention and try to understand the material explained by the teacher.

After the nature of light can propagate in a straight line, light can be refracted, and light can be described explained. Students are divided into 4 groups, where one group consists of 5 people and 3 groups consist of 4 groups. Each group is given a student worksheet in the form of questions based on the material properties of light, namely light can propagate in a straight line, light can be refracted, and light can be described. . Students read worksheets, understand problems individually, and take small notes.

Furthermore, observations were made to improve student learning outcomes by using the demonstration method in science subjects for grade 2 elementary school 173606 Pangururan. From the results of observations in cycle II, it can be seen that the progress achieved by students is good, most students play an active role in completing LKS. The experimental results also show how students work well together in conducting experiments.

Table 6. Student Learning Outcomes in Post Test Cycle II

No. Respondent (Student)	Total score	Score	Information	
			Complete	Not Completed
01	17	85	Complete	
02	15	75	Complete	
03	15	75	Complete	
04	16	80	Complete	
05	16	80	Complete	
06	15	75	Complete	
07	14	70	Complete	
08	17	85	Complete	
09	16	80	Complete	
10	12	60		Not Completed
11	14	70	Complete	
12	15	75	Complete	
13	16	80	Complete	
14	14	70	Complete	
15	14	70	Complete	
16	18	90	Complete	
17	14	70	Complete	
18	15	75	Complete	
19	17	85	Complete	
20	13	65		Not Completed
21	15	75	Complete	
Amount	318	1590	19 student	2 student
Average		75,71		
Not Completed			90,48%	9,52%

From the results of the analysis of the table 6, it can be seen what the percentage of students who get complete and incomplete learning outcomes is. Table 7 describes the results of the second cycle posttest in tabular form.

From table 6 and table 7 shows that the students' ability to master the material properties of light is still low, with the average score of students reaching 75.71. Of the 21 students, there were 2 students (9.52%) who got low learning outcomes (unfinished) and 19 students (90.48%)

students in the complete category on the material properties of light. To calculate the classical success rate of students, you can use the formula:

$$P = \frac{f}{N} \times 100\%$$

Complete = $19/21 \times 100\% = 90.48\%$

Incomplete = $2/21 \times 100\% = 9.52\%$

Comparison of student learning outcomes in the post test cycle II can be seen in the diagram below in the figure 4. The efforts that have been made in learning Natural Sciences (IPA) in cycle II are getting better during the teaching and learning process. Based on observations, students have good learning outcomes in the implementation of the teaching and learning process by applying the demonstration method which has changed students to be active in learning. It can be seen from the student results that there are 2 students (9.52%) who get low learning outcomes (unfinished) and 19 students (90.48%) in the complete category.

Table 7. Distribution of Learning Outcomes in Post Test Cycle II

Score	Frequency	Percentage (%)	Information	
			Complete	Not Completed
90-100	1	4,77%	Complete	
80-89	7	33,33%	Complete	
70-79	11	52,38%	Complete	
60-69	2	9,52%		Not Completed
0-59	-	-	-	-
amount	21 student	100%	90,48%	9,52%

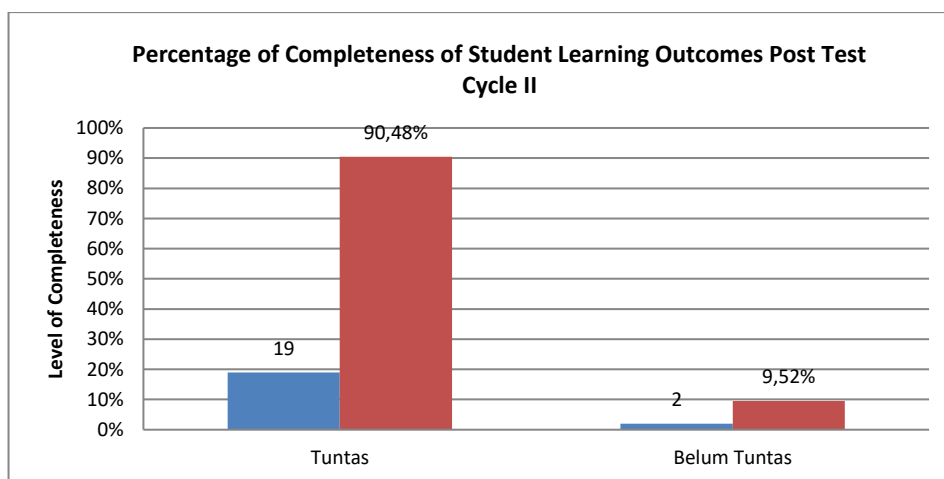


Figure 4. Percentage of Completeness of Student Learning Outcomes Post Test Cycle II

Based on the initial test (pre-test) conducted on 21 students, there were 17 students (80.95%) who got low learning outcomes (unfinished) and 4 students (19.05%) in the complete category. In the first cycle there were 10 students (47.6%) who got low learning outcomes (unfinished) and 11 students (52.4%) students in the complete category. The teacher's efforts to overcome difficulties improve learning by focusing students on questions related to the given test and also providing instructions and instructions as well as more motivation for students to solve problems. From the test of learning outcomes obtained by students in the second cycle, there are 2 students (9.52%) who get low learning outcomes (not yet completed) and 19 students (90.48%) students in the complete category on the material properties. the nature of light.

The results of this study are in accordance with the results of research conducted by Nujanah, (2017) entitled Efforts to improve student learning outcomes through demonstration methods on the concept of various forms of energy and benefits in everyday life in science subjects grade 2 SD Negeri. Where in his research, he explained that the application of demonstration methods and concrete teaching aids can improve student learning outcomes in the science learning process. In the same study, a researcher in his journal stated that the method demonstrations can improve the quality of learning science subjects, namely: student activities and student learning outcomes at the elementary level (Weruin, 2019).

Therefore, the researcher concludes that using the demonstration method can improve student learning outcomes in science subjects for class 2 Elementary School 173606 Pangururan. The action thus ended and was declared successful, so there was no need to continue in cycle III.

CONCLUSION

Based on the results of the research that using the demonstration method in science learning the material properties of light and its application can improve student learning outcomes. In the implementation of the first cycle of action, the researcher began to use the demonstration method during the learning process and the teacher gave the first cycle post test to the students. Then in the implementation of the second cycle the activities were not much different from the activities in the first cycle, but the researchers corrected the deficiencies found in the first cycle. At the end of the second cycle, the researchers also gave the second cycle post-test to the students to measure the students' understanding of the material presented. So the researchers concluded that the use of the demonstration method can improve student learning outcomes in science subjects Class 2 Public Elementary School 173606 Pangururan

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REFERENCES

- Ananda, R., & Fadhilaturrahmi, F. (2018). Peningkatan Kemampuan Sosial Emosional Melalui Permainan Kolaboratif pada Anak KB. *Jurnal Obsesi : Jurnal Pendidikan Anak Usia Dini*, 2(1), 20. <https://doi.org/10.31004/obsesi.v2i1.3>
- Cahyani, K. A., Jampel, I. N., Ujianti, P. R., & Psi, S. (2015). Penerapan Metode Demonstrasi untuk Meningkatkan Perkembangan Kognitif Anak dalam Pengenalan Sains. *Jurnal Pendidikan Anak Usia Dini Undiksha*, 3(1).
- Carter Andrews, D. J., Bartell, T., & Richmond, G. (2016). *Teaching in dehumanizing times: The professionalization imperative*. SAGE Publications Sage CA: Los Angeles, CA. <https://doi.org/10.1177/0022487116640480>
- Cohen, R. S., & Helling, I. K. (2014). *Felix Kaufmann's Theory and Method in the Social Sciences*. Springer. <https://doi.org/10.1007/978-3-319-02845-3>
- Dadds, M. (2020). *Passionate Enquiry and School Development*. Routledge. <https://doi.org/10.4324/9781003059073>
- Deng, L., & Yu, D. (2014). Deep learning: methods and applications. *Foundations and Trends in Signal Processing*, 7(3-4), 197-387. <https://doi.org/10.1561/2000000039>
- Gasong, D. (2018). *Belajar dan pembelajaran*. Deepublish.
- Gumay, O. P. U., & Bertiana, V. (2018). Pengaruh Metode Demonstrasi terhadap Hasil Belajar Fisika Kelas X MA Almuhajirin Tugumulyo. *SPEJ (Science and Physic Education Journal)*, 1(2), 96-102. <https://doi.org/10.31539/spej.v1i2.272>

- Gunawan, I. (2017). Indonesian Curriculum 2013: Instructional Management, Obstacles Faced by Teachers in Implementation and the Way Forward. 128(Icet), 56-63. <https://doi.org/10.2991/icet-17.2017.9>
- Hizbi, T. (2019). Pengaruh metode demonstrasi menggunakan laboratorium virtual dan riil terhadap keterampilan proses sains siswa. Kappa Journal, 3(1), 50-57. <https://doi.org/10.29408/kpj.v3i1.1533>
- Ibanez, M.-B., Di-Serio, A., & Delgado-Kloos, C. (2014). Gamification for engaging computer science students in learning activities: A case study. IEEE Transactions on Learning Technologies, 7(3), 291-301. <https://doi.org/10.1109/TLT.2014.2329293>
- McGrath, C. H., Guerin, B., Harte, E., Frearson, M., & Manville, C. (2015). Learning gain in higher education. Santa Monica, CA: RAND Corporation. <https://doi.org/10.7249/RR996>
- Nahdi, D. S., Devi, A. Y., & Nurul, F. (2018). Upaya Meningkatkan Pemahaman Konsep Siswa Melalui Penerapan Metode Demonstrasi Pada Mata Pelajaran IPA. Jurnal Cakrawala Pendas, 4(2). <https://doi.org/10.31949/jcp.v4i2.1050>
- Nihayatuzzahra, N. (2020). Penerapan metode demonstrasi dalam meningkatkan minat belajar siswa pada mata pelajaran Fiqih di kelas III MI NW Badrussalam Sekarbela Tahun Pelajaran 2019/2020. UIN Mataram.
- Nujanah, N. (2017). Upaya Meningkatkan Hasil Belajar Siswa Melalui Metode Demonstrasi Pada Konsep Berbagai Bentuk Energi Dan Manfaatnya Dalam Kehidupan Sehari-Hari pada Mata Pelajaran Ipa Kelas 1 Sd Negeri 58 Rejang Lebong. Jurnal PGSD, 10(1), 22-26. <https://doi.org/10.33369/pgsd.10.1.22-26>
- Nurhasanah, F., Sukandi, U., Kuncoro, A. B., Rusilowati, A., Hastuti, W. S., & Prabowo, A. (2020). Collaborative classroom action research for mathematics and science teachers in Indonesia. Journal of Physics: Conference Series, 1613(1). <https://doi.org/10.1088/1742-6596/1613/1/012024>
- Nurlaela, L., Samani, M., Asto, I. G. P., & Wibawa, S. C. (2018). The effect of thematic learning model, learning style, and reading ability on the students' learning outcomes. IOP Conference Series: Materials Science and Engineering, 296(1), 12039. <https://doi.org/10.1088/1757-899X/296/1/012039>
- O'Dowd, R. (2015). The competences of the telecollaborative teacher. The Language Learning Journal, 43(2), 194-207. <https://doi.org/10.1080/09571736.2013.853374>
- Purba, N., & Gusar, M. R. S. (2020). Clean and Healthy Lifestyle Behavior (PHBS Program) for Children with Intellectual Disability. <https://doi.org/10.21009/IPUD.142.06>
- Radovan, M., & Makovec, D. (2015). Adult learners' learning environment perceptions and satisfaction in formal education-case study of four East-European countries. International Education Studies, 8(2), 101-112. <https://doi.org/10.5539/ies.v8n2p101>
- Ramadhan, N., & Surya, E. (2017). The implementation of demonstration method to increase students' ability in operating multiple numbers by using concrete object. International Journal of Sciences: Basic and Applied Research (IJSBAR), 34(2), 62-68.
- Ranya, Z. A., Jamhari, M., & Rede, A. (2013). Meningkatkan Hasil Belajar Siswa dalam Pembelajaran IPA Pokok Bahasan Panca Indra dengan Menggunakan Metode Demonstrasi pada Siswa Kelas 1VA SDN 5 Pusungi. Jurnal Kreatif Online, 1(2). <https://doi.org/10.24114/seipgsd.v5i1.4155>
- Sadiah, T. L. (2016). Penggunaan Metode Demonstrasi Dalam Pengenalan Sains Pada Anak Sekolah Dasar Kelas I Sdn Karawang Kulon 1 Karawang. Jurnal Sekolah Dasar, 1(1). <https://doi.org/10.36805/jurnalsekolahdasar.v1i1.64>
- Sailer, M., Schultz-Pernice, F., & Fischer, F. (2021). Contextual facilitators for learning activities involving technology in higher education: The Cb-model. Computers in Human Behavior, 121, 106794. <https://doi.org/10.1016/j.chb.2021.106794>
- Sari, Y. (2012). Peningkatan Kemampuan Sains Anak Usia Dini Melalui Metode Demonstrasi Di Taman Kanak-Kanak Tri Bina Payakumbuh. Jurnal Ilmiah Pesona PAUD, 1(5).

- Siahaan, K. W. A., Haloho, U. N., Guk-guk, M. P. A. R., & Panjaitan, F. R. (2021). Implementation of Discovery Learning Methods to Improve Science Skills in Kindergarten B Children. *Jurnal Pendidikan Edutama*, 8(1), 33-40. <https://doi.org/10.30734/jpe.v8i1.1332>
- Siahaan, K. W. A., Lumbangaol, S. T. P., Marbun, J., Nainggolan, A. D., Ritonga, J. M., & Barus, D. P. (2020). Pengaruh Model Pembelajaran Inkuiri Terbimbing dengan Multi Representasi terhadap Keterampilan Proses Sains dan Penguasaan Konsep IPA. *Jurnal Basicedu*, 5(1), 195-205. <https://doi.org/10.31004/basicedu.v5i1.614>
- Sudjana, N. (2014). Penilaian hasil proses belajar mengajar.
- Sullivan, A. N., & Lachman, M. E. (2017). Behavior change with fitness technology in sedentary adults: a review of the evidence for increasing physical activity. *Frontiers in Public Health*, 4, 289. <https://doi.org/10.3389/fpubh.2016.00289>
- Walter, J., Lechner, C., & Kellermanns, F. W. (2016). Learning activities, exploration, and the performance of strategic initiatives. *Journal of Management*, 42(3), 769-802. <https://doi.org/10.1177/0149206313506463>
- Watson, W. R., Kim, W., & Watson, S. L. (2016). Learning outcomes of a MOOC designed for attitudinal change: A case study of an Animal Behavior and Welfare MOOC. *Computers & Education*, 96, 83-93. <https://doi.org/10.1016/j.compedu.2016.01.013>
- Weruin, U. U. (2019). Teori-Teori Etika Dan Sumbangan Pemikiran Para Filsuf Bagi Etika Bisnis. *Jurnal Muara Ilmu Ekonomi Dan Bisnis*, 3(2), 313. <https://doi.org/10.24912/jmie.v3i2.3384>
- Wijaya, O. P., & Bukhori, I. (2017). Effect Of Learning Motivation, Family Factor, School Factor, And Community Factor On Student Learning Outcomes On Productive Subjects. *Jurnal Pendidikan Bisnis Dan Manajemen*, 3(3), 192-202. <https://doi.org/10.17977/um003v3i32017p192>