JUPERAN: Jurnal Pendidikan dan Pembelajaran
Vol. 03, No. 02, Tahun 2024, Hal. 387 – 398 e-ISSN: 2987 – 3738

Application of Experiment Method Assisted with Kosifacay Learning Media to Improve Learning Outcomes of Class V Students on the Material of Light and Its Properties

Wella Yekti Inkomara[1*], Akhwani[2]
[1,2] University of Nahdlatul Ulama Surabaya
Email: wellayektiinkomara@gmail.com

Article Info

Article history:

Received August 25, 2024
Revised August 29, 2024
Accepted September 11, 2024

Keywords:

Experimental method, kosifacay learning media, learning outcomes, light and its properties

ABSTRACT

This study aims to improve the learning outcomes of grade V students on the material of light and its properties through the application of experimental methods assisted by Kosifacay learning media. This class action research was conducted at SDN Dukuh Kupang II with 27 students as research subjects. This research was conducted in two cycles consisting of planning, action, observation, and reflection. Data were collected through learning outcome tests and learning activity observations. Data analysis was carried out in a qualitative descriptive way, namely by analyzing data on the development of students from cycle 1 to cycle 2. The results showed that the use of experimental methods assisted by Kosifacay media significantly improved student learning outcomes. In cycle I, the percentage of student learning completeness reached 70.37%, and increased to 92.59% in cycle II so that grade V students of SDN Dukuh Kupang Surabaya were said to have completed learning classically.

Article Info

Article history:

Received August 25, 2024
Revised August 29, 2024
Accepted September 11, 2024

Keywords:

Metode eksperimen, media pembelajaran Kosifacay, hasil belajar, cahaya dan sifatnya.

ABSTRAK

Penelitian ini bertujuan untuk meningkatkan hasil belajar peserta didik kelas V pada materi cahaya dan sifat-sifatnya melalui penerapan metode eksperimen berbantuan media pembelajaran Kosifacay. Penelitian tindakan kelas ini dilaksanakan di SDN Dukuh Kupang II dengan subjek penelitian sebanyak 27 siswa. Penelitian ini dilakukan dalam dua siklus yang terdiri dari perencanaan, tindakan, observasi, dan refleksi. Data dikumpulkan melalui tes hasil belajar dan observasi aktivitas belajar. Analisis data dilakukan dengan cara deskriptif kualitatif yaitu dengan menganalisis data perkembangan peserta didik dari siklus 1 sampai siklus 2. Hasil penelitian menunjukkan bahwa penggunaan metode eksperimen berbantuan media Kosifacay secara signifikan meningkatkan hasil belajar siswa. Pada siklus I, persentase ketuntasan belajar siswa mencapai 70,37%, dan meningkat menjadi 92,59% pada siklus II sehingga peserta didik kelas V SDN Dukuh Kupang Surabaya dikatakan tuntas belajar secara klasikal.

Corresponding Author:

Wella Yekti Inkomara
University of Nahdlatul Ulama Surabaya
Email: *wellayektiinkomara@gmail.com*

INTRODUCTION

Education is one of the means to improve human intelligence and skills so that the quality of human resources is highly dependent on the quality of education. Through education, one can develop personal abilities, thinking power and better behavior. The main hope in the educational process is the achievement of effective and meaningful learning for students. In science learning, especially in the material of light and its properties, it is expected that students are not only able to memorize theoretical concepts, but also understand, apply, and explore these concepts in everyday life. Interactive and interesting learning should be able to increase students' motivation and interest in learning so that they can achieve the expected competencies.

The reality in the field shows that learning the material of light and its properties has not achieved the expected results. Based on the results of observations and learning evaluations at SDN Dukuh Kupang II, only three out of twenty-seven students managed to reach the Criteria for Achieving Learning Objectives (KKTP) on this material, while the other twenty-four students could be said to have not reached the Criteria for Achieving Learning Objectives (KKTP). This condition indicates a problem in the learning process that must be addressed immediately. The main problem faced is the low learning outcomes of grade V students on the material of light and its properties. Learners have difficulty understanding abstract concepts such as light reflection, refraction, and light absorption. This has an impact on low test scores and the inability of students to apply these concepts in everyday life.

There are several factors that cause low student learning outcomes in light of its properties. One of them is that the learning methods used still tend to be conventional and less varied. Teachers mostly use the lecture method which does not involve students actively. In addition, the learning media used are less interesting and not contextual, so that students feel bored and less motivated to learn. The implementation of learning should need to use learning methods that allow students to learn directly through real experiences, such as experimental methods. The experimental method is actually very suitable for light material because it allows students to experiment and observe the phenomenon of light directly.

In addition, the cause of low learning outcomes also lies in the lack of innovation in the use of learning media that can facilitate in-depth understanding of concepts. The learning media used so far tend to be monotonous and unable to clearly illustrate the concept of light and its properties. As a result, students have difficulty understanding the material and quickly feel bored. To overcome this problem, the application of innovative and interactive learning media is needed. One of the learning media that can be used is Kosifacay (Light Properties Box). Kosifacay is a box-shaped learning media specifically designed to help students understand the concept of light and its properties. This media is equipped with various props that allow students to conduct various simple experiments related to the properties of light.

Through the use of experimental methods assisted by kosifacay learning media, students can learn actively through fun experimental activities. They can see firsthand how light is reflected, refracted, and absorbed by various surfaces. Through this interactive learning, it is expected that students will be more motivated to learn and be able to understand the concepts taught better. The application of experimental methods assisted by kosifacay learning media can also help teachers in delivering material in a more interesting and effective way. Teachers can direct students to conduct experiments, observe the results, and discuss related concepts. Thus, the learning process becomes more meaningful and students' learning outcomes can improve.

In this study, the implementation of the experimental method assisted by kosifacay learning media will be carried out in class V for the material of light and its properties. This study aims to determine whether the experimental method assisted by kosifacay learning media can improve student learning outcomes and see how this media-assisted experimental method can facilitate an in-depth understanding of the concept of light and its properties. The results of this study are expected to contribute to the development of more innovative and effective learning media, and can be adopted by other schools in improving the quality of science learning.

RESEARCH METHOD

This research is a Classroom Action Research. According to Kemmis and Taggart (1988), classroom action research is conducted through a dynamic and complementary process consisting of: planning (plan), action (act), observation (observe), reflection (reflect). This research is planned to use two cycles to see an increase in students' activities and learning outcomes on light material with the use of the resitation method. If the desired learning outcomes have not been completed, the next cycle is held with the next learning material. The subjects in this study were fifth grade students of SDN Dukuh Kupang II Surabaya in the 2024/2025 academic year, with a total of 27 students. The research instruments used were student activity observation sheets and student learning outcomes test sheets. Data collection techniques in this study used observation methods and student learning outcomes test methods. The data analysis technique consists of analyzing the observation of students' activities and analyzing students' learning outcomes. The results of observation of students' activities were analyzed descriptively quantitatively, namely the results of observations were described to provide an overview of students' activities during learning using kosifacay learning media. On the learner activity observation sheet, there are two implementations, namely yes and no. The learner activity is assessed for quality by using the kosifacay learning media. The students' activities were assessed for quality using a Guttman scale, as presented in Table 1.

Table 1. Guttman Scale on Observation of Learner Activity

Statement	Answer	Value/Scores
Positive	Yes	1
	No	0

(Adaptation Riduwan, 2012)

The percentage of each learner activity is calculated using the following formula:

$$P\ (\%) = \frac{number\ of\ "Yes"\ responses}{total\ score} \times 100\%$$

After being calculated using the percentage formula above, the criteria for learner activity will be determined based on the conversion guidelines listed in Table 2.

Table 2. Interpretation Criteria for Student Activity Score

Percentage (%)	Criteria
0-20	Very Bad
21-40	Bad
41-60	Medium

61-80	Good
81-100	Very Good

(Adaptation Riduwan, 2012)

Data on student learning outcomes consists of quantitative data in the form of student test scores. The test scores obtained by students are compared with the Criteria for Achieving Learning Objectives (KKTP) set at 75. If the value of students' learning outcomes is below KKTP, then students are considered not to have achieved mastery. Classical completeness is calculated based on the percentage of the number of students who have reached the Learning Objective Achievement Criteria (KKTP). The percentage of the number of students who have reached the KKTP value is calculated using the following formula:

$$P\ (\%) = \frac{Students\ who\ scored\ below\ 75}{Total\ number\ of\ students} \times 100\%$$

After being calculated using the percentage formula above, the criteria for students' learning completeness will be determined based on the conversion guidelines listed in Table 3.

Table 3. Criteria for Determining Learning Completeness

Percentage of Learning Completeness (%)	**Criteria**
0-39	Very Bad
40-54	Bad
55-69	Medium
70-84	Good
85-100	Very Good

(Adaptation of Arikunto, 2012)

The success criteria for this class action research if the percentage of students' learning completeness gets very good criteria, namely 85% or as many as 23 students so that grade V students of SDN Dukuh Kupang II Surabaya can be said to have completed learning classically.

RESEARCH RESULTS AND DISCUSSION

This classroom action research (PTK) was conducted in two cycles. In each cycle, it consists of four stages, namely planning, acting, observing, and reflecting. The results of the research will be described based on these stages. The following is a description of the results of the research that has been carried out.

Pre-cycle

The pre-cycle stage was carried out on July 24, 2024 at SDN Dukuh Kupang II Surabaya. In the pre-cycle stage, the teacher made observations to understand the initial conditions of students regarding their understanding of light material and its properties. This observation includes the ability of students to understand concepts such as reflection, refraction, and absorption of light. In the pre-cycle stage, the teacher used conventional learning methods, such as lectures and questions and answers. Learning tends to be one-way, where learners only receive information without active involvement. As a result, students quickly feel bored and less motivated to learn. The learning media used in the pre-cycle stage was also still simple and less interactive. The use of media such as textbooks and pictures is less able to clearly illustrate the concept of light and its properties. Learners have difficulty understanding the material because the media used cannot explain the concept well. The involvement of students in the learning process at the pre-cycle stage was also still low. Learners tend to be passive and only listen to the teacher's explanation without participating much. Learners' learning outcomes at the pre-cycle stage showed that twenty-four out of twenty-seven learners scored below the Criteria for Achieving Learning Objectives (KKTP), so the class average score was said to be still low, and only a small proportion of learners were able to understand the material well. The results of this initial evaluation indicate the need for changes in learning methods and

media so as to improve student learning outcomes.

Cycle 1

Planning Stage

At this stage, the main problem identified was the low learning outcomes of students on light and its properties. The teacher then develops an action plan that involves the use of experimental methods assisted by vocabulary learning media. This plan includes compiling teaching modules that will be used during learning, preparing teaching materials, preparing tools and materials for experiments on the properties of light, making kosifacay learning media, compiling experimental guides that are clear and easy for students to understand, compiling observation sheets to monitor student activities during learning, preparing student learning outcomes test sheets, and designing assessment rubrics to measure student learning outcomes.

Implementation Stage (Acting)

At the implementation stage of cycle 1, the application of the experimental method assisted by kosifacay learning media in the learning process was carried out without reinforcement actions from the teacher according to the action steps described in Table 4.

Table 4. Cycle 1 Learning Activities

Activity Description	Time
Opener 1. The teacher opens the lesson with greetings, asks for news and checks the attendance of students. 2. The class leader leads the prayer in accordance with their respective religions and beliefs. 3. Learners and teachers conduct apperception activities 4. The teacher presents the material to be learned. 5. The teacher conveys today's learning objectives. 6. The teacher provides motivation about the benefits in daily life of the material to be learned.	10 minutes
Stage 1: Stimulation 7. Learners observe the learning video presented by the teacher. 8. The teacher questions the learners by asking some triggering questions. **Stage 2: Problem statement/identification** 9. The teacher guides the learners to open the IPAS package book page 2, and asks the learners to read the dialog and text presented on the page. 10. The teacher and learners identify the problem together 11. The teacher explains to the learners that to answer the problem, we will learn to do experimental activities with the help of kosifacay learning media regarding the properties of light. **Stage 3: Data collection** 12. Learners are divided into 5 heterogeneous groups with 5-6 people in each group. 13. Each group gets an LKPD that has been distributed by the teacher. 14. Learners are introduced to kosifacay learning media 15. Learners listen to the instructions for using kosifacay learning media listed in the steps in the LKPD.	50 minutes

16. Learners collect data on the properties of light through experimental activities assisted by kosifacay learning media.	
Stage 4: Data processing	
17. Students in groups process data by answering each problem question in the LKPD according to the results of their group's experimental activities.	
18. Learners in groups write down the results of the investigation and discussion in the LKPD.	
19. The teacher monitors the discussion in each group and guides students if they have difficulties.	
Stage 5: Verification	
20. Learners present the results of the discussion in front of the class in turn.	
21. Learners can provide feedback and input on the presentation results of the presenting group.	
Stage 6: Drawing conclusions/generalization	
22. Learners are guided by the teacher to evaluate or review the results of discussions that have been carried out and presented as a whole.	
23. Learners together with the teacher make a conclusion about the material that has been learned.	
Closing	10 minutes
24. Learners together with the teacher reflect on the learning that has been done.	
25. Students listen to the teacher's explanation regarding the lesson for the next meeting.	
26. Learners together with the teacher pray according to their respective religions and beliefs.	
27. The teacher says the closing greeting	

Observing Stage

At this stage, the researcher acts as a teacher who carries out the learning process and is assisted by a fellow teacher who acts as an observer. This observation is carried out in accordance with the guidelines in the student activity observation sheet. Based on the observation results, the percentage of each learner activity in cycle I was 71.43%. The results of the calculation of the percentage of learner activity show that the criteria for learner activity in cycle I are included in the good criteria. However, there are some things that have not been done by students according to the student activity observation sheet. Based on this, further evaluation is needed to overcome it so that students are able to carry out learning activities according to the observation sheet provided.

At this stage, it is also explained about the learning outcomes of students in cycle I. Learning outcome tests were conducted at the end of the cycle to measure students' understanding of the material that had been taught. Based on the results of the first cycle test, it shows that as many as 22 students have met the KKTP and as many as 5 students have not reached the KKTP, so that in this first cycle, the percentage of learning completeness is 81.48%. The percentage of completeness can be seen in Diagram 1 below:

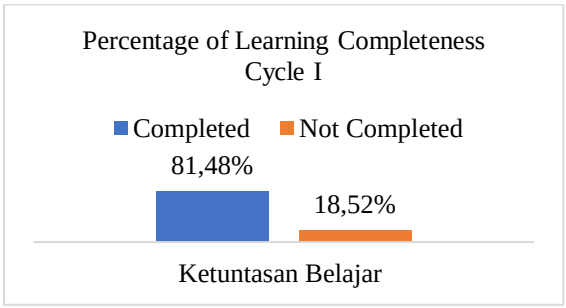

Diagram 1. Percentage of Learning Completion Cycle 1

Based on Diagram 1, it can be seen that grade V students of SDN Dukuh Kupang II Surabaya in cycle I have not met the percentage of learning completeness of 85%, because there are as many as 5 students who still have scores below the Learning Objective Achievement Criteria (KKTP) value, which is below the value of 75. Thus, the next improvement cycle is needed to prove that learning science using the experimental method combined with kosifacay learning media can improve the learning outcomes of students V SDN Dukuh Kupang II Surabaya.

Reflecting Stage

At this stage of reflection, researchers reflect and evaluate by analyzing several important aspects, including:

1. Analyzing the implementation of learning stages with experimental methods assisted by kosifacay learning media: Researchers evaluated the extent to which the stages of learning with experimental methods assisted by kosifacay learning media can be implemented properly. This includes the preparation of tools and materials, clarity of experimentation guidelines, ease of use of learning media and students' involvement in the experimentation process. The researcher found that although students showed high enthusiasm, there were some obstacles such as students' lack of understanding of experimental instructions and time constraints that resulted in some groups not completing the experiment as planned.
2. Analyzing student learning test results: The results of the learner learning test showed an improvement compared to the results of the pretest that had been carried out. However, this improvement has not been evenly distributed across all learners. Most learners experienced an increase in scores, but there were still learners whose scores had not reached the Criteria for Achieving Learning Objectives (KKTP).

Based on the findings above, the teacher plans improvements for the next cycle by providing concept reinforcement at the end of the lesson to strengthen the concept of the material after the experiment, and the teacher will prepare a more structured experiment guide. The teacher will also manage time better so that all groups can complete the experiment as planned.

Cycle 2

Planning Stage

In the second cycle, teachers made improvements based on reflections from the first cycle. The action plan prepared included revising the teaching module that would be used during learning, adding several activities in the learning process, namely applying the experimental method assisted by kosifacay learning media with concept reinforcement actions from the teacher at the end of learning, preparing a clearer and more structured experimental guide, and designing a more detailed observation sheet to monitor the development of students.

Implementation Stage (Acting)

In this implementation stage, the application of the experimental method assisted by kosifacay learning media in the learning process is carried out accompanied by reinforcement actions from the teacher.

The action steps taken are outlined in Table 5.

Table 5. Cycle 2 Learning Activities

Activity Description	Time
Opener 1. The teacher opens the lesson with greetings, asks for news and checks the attendance of students. 2. The class leader leads the prayer in accordance with their respective religions and beliefs. 3. Learners and teachers conduct apperception activities 4. The teacher presents the material to be learned. 5. The teacher conveys today's learning objectives. 6. The teacher provides motivation about the benefits in daily life of the material to be learned.	10 minutes
Stage 1: Stimulation 7. Learners observe the learning video presented by the teacher. 8. The teacher questions the learners by asking some triggering questions. **Stage 2: Problem statement/identification** 9. The teacher guides the learners to open the IPAS package book page 2, and asks the learners to read the dialog and text presented on the page. 10. The teacher and learners identify the problem together 11. The teacher explains to the learners that to answer the problem, we will learn to do experimental activities with the help of kosifacay learning media regarding the properties of light. **Stage 3: Data collection** 12. Learners are divided into 5 heterogeneous groups with 5-6 people in each group. 13. Each group gets an LKPD that has been distributed by the teacher. 14. Learners are introduced to kosifacay learning media 15. Learners listen to the instructions for using kosifacay learning media listed in the steps in the LKPD. 16. Learners collect data on the properties of light through experimental activities assisted by kosifacay learning media. **Stage 4: Data processing** 17. Students in groups process data by answering each problem question in the LKPD according to the results of their group's experimental activities. 18. Learners in groups write down the results of the investigation and discussion in the LKPD. 19. The teacher monitors the discussion in each group and guides students if they have difficulties. **Stage 5: Verification** 20. Learners present the results of the discussion in front of the class in turn. 21. Learners can provide feedback and input on the presentation results of the presenting group.	50 minutes

Stage 6: Drawing conclusions/generalization	
22. Learners are guided by the teacher to evaluate or review the results of discussions that have been carried out and presented as a whole. 23. Learners together with the teacher make a conclusion about the material that has been learned.	
Closing	10 minutes
24. The teacher provides reinforcement to students about the material on the nature of light through the powerpoint media provided by the teacher. 25. Learners together with the teacher sing a song about the properties of light 26. Learners together with the teacher reflect on the learning that has been done. 27. Students listen to the teacher's explanation regarding the lesson for the next meeting. 28. Learners together with the teacher pray according to their respective religions and beliefs. 29. The teacher says the closing greeting	

Observing Stage

Based on the results of observations, the percentage of each learner activity in cycle II was 100%. The results of the calculation of the percentage of students' activities show that the criteria for students' activities in cycle II are included in the very good criteria. This shows that all students have carried out fourteen activity criteria on the observation sheet so that it can be interpreted that students have carried out learning activities well, in accordance with the learning objectives and activities on the student activity sheet and teaching module.

At this stage, it is also explained about the learning outcomes of students in cycle II. Based on the results of the cycle II test, it shows that as many as 25 students have met the KKTP and as many as 2 students have not reached the KKTP, so that in cycle II the percentage of learning completeness is 92.59%. The percentage of completeness can be seen in Diagram 2 below:

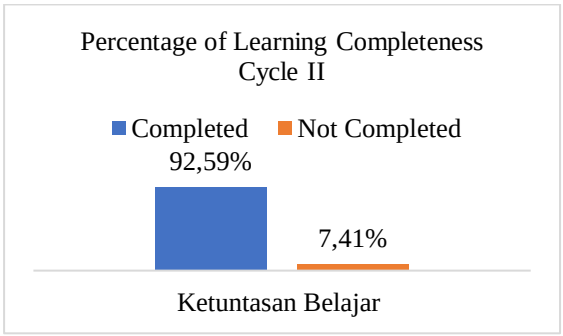

Diagram 2. Percentage of Learning Completeness Cycle 2

Based on Diagram 2, it can be seen that fifth grade students of SDN Dukuh Kupang II Surabaya in cycle II have obtained a percentage of learning outcomes completeness of 92.59% in the very good category. Thus, it can be proven that learning science using the experimental method combined with kosifacay learning media can improve the learning outcomes of fifth grade students of SDN Dukuh Kupang II Surabaya.

Reflecting Stage

At the reflection stage of this second cycle, researchers conducted reflection and evaluation by analyzing several important aspects, including:

1. Analyzing the implementation of learning stages with experimental methods assisted by kosifacay learning media: In the second cycle, the implementation of the experiment went more smoothly compared to the first cycle. A more structured experiment guide and concept reinforcement provided by the teacher at the end of cycle two learning helped students in understanding the task and building stronger students' understanding.

2. Analyzing student learning outcomes tests: Test results in the second cycle showed a significant improvement compared to the first cycle. Most learners achieved or exceeded the Criteria for Achieving Learning Objectives (KKTP), indicating that their understanding of the material was better. Analysis of the test results showed that after the action of strengthening the concept of the material provided by the teacher at the end of the second cycle learning can help learners have a deeper understanding of the concepts taught. This has a huge impact on the test results of students who have increased compared to the test results in the first cycle.

Based on the findings above, the teacher concludes that the experimental method assisted by kosifacay learning media accompanied by concept reinforcement from the teacher at the end of learning is more effective in improving student learning outcomes on light and its properties.

Discussion

This class action research aims to improve students' learning outcomes on the material "Light and its Properties" through the use of experimental methods assisted by Kosifacay learning media (Light Properties Box). This research consists of two cycles, each of which includes planning, implementation, observation, and reflection stages. Each cycle is designed to identify and overcome the obstacles faced in an effort to improve student learning outcomes.

In the planning stage of the first cycle, the main focus was to identify the main problem, namely the low learning outcomes of students. An action plan was developed involving the use of experimental methods assisted by Kosifacay media. Teaching modules, learning materials, experimental tools and materials, and experimental guides were prepared comprehensively. Observation sheets and learning outcome tests were also prepared to monitor students' activities and understanding. After that, the implementation of learning in the first cycle was carried out for 2 × 35 minutes. The teacher implemented the experimental method without any reinforcement action from the teacher. Constraints that arose included learners' lack of understanding of the experimental instructions and limited time to complete the experiment. In this first cycle, the learning test results showed an improvement compared to the pretest results, but this improvement was not evenly distributed across all learners. In this cycle, learners obtained a percentage of learning completeness of 81.48%. Most learners experienced an increase in grades, but some still did not reach the Criteria for Achieving Learning Objectives (KKTP). Learners' activities are considered good with a percentage of 71.43%, but there is still room for improvement, especially in terms of learners' involvement and understanding of the material being taught.

Reflection from the first cycle was used to design improvements for the second cycle. The teaching module was revised and concept reinforcement activities were added by the teacher at the end of the lesson. The experiment guide was made clearer and more structured. A more detailed observation sheet was also prepared to monitor the learning process more effectively. The implementation in the second cycle was also conducted for 2 × 35 minutes. The experimental method assisted by Kosifacay media was implemented with additional reinforcement actions from the teacher. The teacher provides concept reinforcement at the end of learning to ensure students' understanding. The learning test results in the second cycle showed a significant increase compared to the first cycle. In this cycle, students get a percentage of learning completeness of 92.59%. The improvement in learning outcomes was more evenly distributed across all learners. The percentage of

learner activity reached 100%, which is included in the excellent criteria. This shows that learners' involvement and understanding of the material taught has increased optimally.

Based on data on students' learning outcomes in cycles 1 and II, the results of the percentage of students' learning completeness increased from cycle I to cycle II. In the first cycle, 81.48% of students managed to achieve learning completeness. Although there was an increase from the pretest results, this percentage shows that almost 20% of students still did not reach the completion criteria. This was due to a lack of understanding of the experimental instructions and limited time to complete the task properly. While in the second cycle, the percentage of learning completeness increased to 92.59%. This increase shows that most students have been able to achieve the criteria for completeness. Improvements in the experiment guide, time management, and concept reinforcement provided by the teacher greatly influenced this increase. Only about 7.41% of learners have not yet reached mastery, which shows that the learning methods and strategies applied in the second cycle are more effective. The increase in the percentage of learning completeness from cycle 1 to cycle 2 is evidence that improvements in the learning process can result in significant improvements in learners' learning outcomes.

CONCLUSION

Based on the results of classroom action research conducted in two cycles on the material "Light and its Properties" using the experimental method assisted by Kosifacay learning media, several things can be concluded as follows:

1. In the first cycle, the percentage of students' learning completeness reached 81.48%. Although there was an increase compared to previous learning outcomes, some learners still did not reach the Learning Objective Achievement Criteria (KKTP) set.
2. In the second cycle, after improvements were made in the teaching module, experiment guide, and the addition of concept reinforcement by the teacher, the percentage of learning completeness increased significantly to 92.59%. This shows that most students have been able to achieve the Criteria for Achieving Learning Objectives (KKTP).
3. Learners' activities in learning increased from good criteria (71.43%) in the first cycle to very good criteria (100%) in the second cycle. This shows an increase in learner involvement and understanding of the material being taught.
4. The experimental method assisted by Kosifacay media proved effective in improving students' learning outcomes. Clearer and more structured experimental guidelines, as well as concept reinforcement from the teacher, help students understand the material better.

BIBLIOGRAPHY

Angkowo, Robertus dan A. Kosasih. (2007). *Optimalisasi Media Pembelajaran*. Jakarta: PT Grasindo.

Arikunto, Suharsimi. (2012). *Prosedur Penelitian*. Jakarta: Rineka Cipta.

Arsyad, Azhar. (2002). *Media Pembelajaran*. Jakarta: PT Raja Grafindo Persada.

Eveline Siregar dan Hartini Nara. (2011). *Teori Belajar dan Pembelajaran*. Bogor: Ghalia Indonesia

Hamdayana, J. (2017). *Model dan Metode Pembelajaran Kreatif dan Berkarya*. Bogor: Ghalia Indonesia.

Hamzah B. Uno dan Nurdin Muhamad. (2014). *Belajar dengan Pendekatan PAIKEM: Pembelajaran Aktif,*

Inovatif, Lingkungan, Kreatif, Efektif, Menarik. Jakarta: PT Bumi Aksara.

Heri, Sulistyanto dan Edy Wiyono. (2008). *Ilmu Pengetahuan Alam*. Jakarta: Pusat Perbukuan Departemen Pendidikan Nasional

I Gusti Ayu Tri Agustiana. (2014). *Konsep Dasar IPA Aspek Biologi*. Yogyakarta: Ombak.

Kemmis, S. & Mc. Taggart, R. (1988). *The Action Research Planner*. Victoria: Deakin University Press.

Magdalena, Ina., Nur Fajriyanti Islami., Eva Alanda Rasid., & Nadia Tasya Diasty. (2020). Tiga Ranah. EDISI: *Jurnal Edukasi Dan Sains*, 2(1). 132–139

Nur, Hikmah. (2017). *Pengaruh Motivasi Guru terhadap Hasil Belajar Pendidikan Agama Islam (PAI) Peserta Didik SMA Negeri 2 Sungguminasa Kelas XI MIA Kabupaten Gowa*. UIN Alauddin Makassar

Prasetya, Surya Raja dan Muhroji. (2022). Penggunaan Alat Peraga Kotak Sifat Cahaya (Kosifacay) dalam Penguasaan Pembelajaran IPA di Sekolah Dasar. *Jurnal BASICEDU*, 6(3), 4848-4854.

Puskur. (2010). *Panduan Pengembangan Pembelajaran IPA Terpadu*. Jakarta: Balitbang Depdiknas.

Riduwan. (2012). *Metode dan Teknik Menyusun Proposal Penelitian*. Bandung: Alfabeta.

Roestiyah. (2008). *Model dan Metode Pembelajaran*. Jakarta: Bumi Aksara

Rositawaty, S dan Muharam, A. (2008*). Senang Belajar Ilmu Pengetahuan Alam untuk Kelas V Sekolah Dasar/Madrasah Ibtidaiyah*. Jakarta: Pusat Perbukuan Departemen Pendidikan Nasional.

Sagala Syaiful. (2010). *Konsep dan Makna Pembelajaran*. Bandung: Alfabeta.

Somantri, Asep, Nana Djumhana, dan Ani Hendriani. (2018). Penerapan Metode Eksperimen Untuk Meningkatkan Hasil Belajar IPA Siswa Kelas V SD. *Jurnal Pendidikan Guru Sekolah Dasar*, 3(2), 22-29.

Sudjana, Nana dan Ahmad Rivai. (2002). *Media Pengajaran*. Bandung: Sinar Baru Algesindo.