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Development of IPAS Smart Light Properties Box (Kosifcas) Trainer to Improve Scientific Thinking Ability

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Abstract: This study aims to develop and test the effectiveness of Smart Light Properties Box (Kosifcas) learning media in improving the scientific thinking ability of fifth grade students of SDN Grogolan Boyolali on light and its properties. This research uses the Research and Development (R&D) method with the ADDIE model, which includes the stages of needs analysis, media design, prototype development, implementation in learning, and effectiveness evaluation. The validation results show that Kosifcas is very feasible to use, with a feasibility score of 95% for media experts and 93% for material experts, resulting in an average of 94% (very feasible category). The small group trial showed a positive response with a 100% acceptance rate, while the large group trial obtained a 100% response from teachers and 98% from students. The effectiveness of this media is reflected in the improvement of learning outcomes, with an average pretest score of 47 (low category) increasing to 86.75 (high category) on the posttest. The t-test showed a significance of 0.001 (<0.05), indicating a significant difference before and after the use of the media. The N-Gain value of 0.7452 (high category) and the N-Gain percentage of 74.52% indicate high effectiveness. Thus, Kosifcas proved to be effective in improving students' understanding of the concept of light and its properties.

Keywords: Kosifcas; Learning Media; Nature of Light; Science; Scientific thinking

Introduction

Education in children is very important because education can be interpreted as a provision for learning in our lives and an indispensable need until old age and the end of life. Through education can produce quality individuals (Lestari & Sunarso, 2024) and improve the quality of life (Setiawan et al., 2023). Education is a process of learning about one's attitudes and behavior to mature through training and learning (Marasabessy & Latukau, 2022). Education can help the progress of a nation by creating a moral, educated and useful young generation. With education, young people can build and hone their ability to adapt to their environment. According to (Ekaningtyas, 2022), researchers explain that education is a process of self-development carried out consciously by a person. This process includes the growth of individual thinking and socializing abilities. Education, according to the National Education System Law No. 20 of 2003, is defined as a conscious and planned effort to create an atmosphere and learning process that allows students to actively develop their potential to have intellectual, spiritual, and religious strength. Education in science learning is an important education in everyday life, we learn it from elementary school to college.

Science is a lesson related to the surrounding environment. This lesson is in the form of experiments and theories related to science in everyday life (Lusidawaty et al., 2020). One of the subjects that plays an important role is Natural and Social Sciences (NSP), where students are introduced to basic concepts about nature and the surrounding environment (Budiwati et al., 2023). One of the materials in IPAS learning is the

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properties of light, which is not only relevant in everyday life, but also supports students' understanding of more complex science concepts in the future (Amakraw & Kartika, 2022). In learning IPAS, teachers also play a very important role because the right technique or way of delivering IPAS material from teachers will affect students' understanding of the material.

Quality learning requires creative and innovative teachers (Tawil et al., 2013) in implementing learning. This is so that students can easily understand the material being taught and are motivated to participate more in the learning process (Mauladani, 2017). Teachers are someone who plays an important role in the world of education (Uliyandari & Lubis, 2020). However, the reality on the ground shows that current education is still dominated by the paradigm that knowledge is memorization (Sudarsana, 2018). In addition, the role of the teacher is still considered the main source of knowledge, and lectures are still the main method in conventional learning (Ahmad Zaki, 2020). This research says (Astuti et al., 2022), that if the teacher teaches using the same method continuously (monotonous), it can result in a lack of student interest in learning. Teachers are a factor in the success of classroom learning. In addition, student factors, available facilities, tools, and media, as well as environmental factors can also affect the learning process (Kartini et al., 2019). In order for learning to be effective and efficient, learning media can serve as an intermediary between teachers and students in understanding the subject matter. Teachers must think and make science learning more active so that students can get a significant impression of the lessons they have learned (Okpatrioka & Nusantari, 2022). One way to make learning more active is by using media in learning.

Learning media can also be used as a source of messages (Hutauruk & Simbolon, 2018). Media props box properties of light is a tool or object that can help mennjang in learning science on the material of light and its properties. This media serves as a tool to explain the material of various properties of light concretely in science concepts. According to (Wahyu et al., 2020) states that the use of learning media can change the learning paradigm, because it can increase student confidence to be more participatory, collaborative, and interactive so that learning is more meaningful. When teachers use cosifcas media, students become more enthusiastic in learning about light and its properties, because students tend to have high curiosity in learning to understand the material on the nature of light (Prasetya & Muhroji, 2022). Cosifcas media is a teaching aid that contains material and experiments on various properties of light. With this media, students become more active and creative in learning and with kosifcas media can increase students' enthusiasm for learning.

The use of learning media is one of the factors that influence the learning process (Tafonao, 2023). Media Learning media facilitates the delivery of material or learning objectives (Isdayanti et al., 2022). With the development of 3D media boxes of light properties, student learning outcomes are improved (Faradhita & Rofiqoh, 2022). This kosifcas media is useful to facilitate students in understanding the material of light and its properties in a real or concrete way. With its form and function, this media can help students understand the material better (Rozie, 2018). With the media delivering children's understanding at a better stage (Rastal et al., 2022). With the props of this light properties box also brings many benefits, such as avoiding boredom in learning, preventing students from getting sleepy, and making the learning process more active through good cooperation (Purba & Anas, 2024).

By using this cosifcas media in learning the material of light and its properties, students become easier in understanding the material with concrete media, with this media students become aware of the real and concrete application of the nature of light is true, because with this media there are already parts and objects that can prove that the nature of light is true if proven concretely and real. With this cosifcas media students can also think critically because students can prove the nature of light in real terms not just imagine it. One of the problems in Indonesia is the weak learning process. Students are not encouraged to develop thinking skills to understand concepts, and learning activities in the classroom are only aimed at retention of information.

Research from Hamidah et al. (2023), explains that the use of light properties box media can improve students' critical thinking. This media is designed to help students understand how light behaves through various experiments that can be done directly by students (Sufiyanto & Hefni, 2021). Learning media used in learning activities also contribute to attracting students' interest in learning so that it can increase student understanding (Doyan et al., 2020). This is in line with constructivist learning theory which states that students will more easily understand and remember information if they are actively involved in the learning process (Nugrahanti et al., 2022). In understanding science concepts, mistakes often occur because teachers only invite students to memorize the material provided (Susilawati et al., 2020). Because science learning needs experiments in every material so that students are actively involved in learning in class.

Based on observations at SDN Grogolan Boyolali, the scientific thinking skills of grade V students still need to be improved, especially in understanding IPAS

(Natural and Social Sciences) concepts related to the nature of light. Often, students have difficulty understanding abstract material, so they need concrete and interactive tools to stimulate their understanding and scientific thinking skills. The development of the "Smart Light Properties Box" (KOSIFCAS) teaching aid aims to help students understand the properties of light, such as reflection, refraction and absorption, visually and experientially. Thus, it is hoped that this teaching aid can be an effective means of improving the scientific thinking skills of fifth grade students of SDN Grogolan Boyolali. Scientific thinking itself is a process of thinking about something that actually happens. Therefore, students must master the ability to think scientifically so that they can learn and understand science learning well. With the ability to think scientifically, they can show and feel science concepts in real life. Textbooks are not the only source of learning. However, it can still be achieved in the environment around learners. In addition, the meaning of the environment can provide knowledge from experience (Dzalila et al., 2020).

Based on the results of interviews conducted on February 19, 2024 with the fifth grade homeroom teacher of SDN Grogolan Boyolali, namely Mrs. Wiwin Kurniawati, S. Pd. Pd obtained information that teachers still have difficulty implementing learning media updates so that students are easily bored with the media they often use, the lack of availability of less innovative learning aids which causes a decrease in student interest in learning, the media used is less creative and is only limited to 2-dimensional images in student books and media already available at school, teachers are less active in inviting students to conduct experiments or experiments by directly trying more innovative and concrete teaching aids so as to limit the development of students' scientific thinking skills, many students face difficulties in understanding abstract IPAS concepts, due to the lack of concrete media used by teachers in delivering material in science learning in class V.

With the above problems, it is necessary to develop concrete media that can support learning to improve scientific thinking and student learning outcomes. Thus the researcher wants to conduct research related to "Development of IPAS Smart Light Properties Box (Kosifcas) Props to Improve the Scientific Thinking Ability of Grade V Students of SDN Grogolan Boyolali". The effectiveness of Kosifacas props in improving understanding of the concept of light has been shown in several studies. Research conducted by Prasetya & Muhroji (2022) found that there are benefits for teachers because the use of Kosifacay media can support and assist in delivering science material more easily and increase student motivation to understand the material more quickly. For this reason, teachers must be able to make it easier for students to improve their understanding of the concepts taught by fostering motivation in advance to students, so that students can understand the material taught by the teacher (Khaerunnisak, 2018). This props media is a solution because it is very useful for teachers so that students can more easily understand the material about light and its properties. According to Magdalena et al. (2021), the use of learning media in the classroom can increase students' enthusiasm for learning, which is an effective driving force that sustains their learning activities and guides them to achieve learning goals (Sari, 2006). The results of this study show that students are more enthusiastic and more eager to learn about light and its properties explained by the teacher through direct experimental practice. Therefore, students become easy to understand the material delivered by the teacher through direct practice using kosifcas props media.

Research on the use of Kosifcas media is important to conduct because it can provide innovation in learning that is more interactive and effective. This media has the potential to increase understanding and retention of material for students, so that the learning process becomes more optimal. Grade V students of SDN Grogolan Boyolali need to improve their scientific thinking skills by using KOSIFCAS media. This is important because it can help them understand abstract concepts about the nature of light. Students can learn more about the phenomena of light absorption, refraction and reflection through concrete and interactive props. This enhances their understanding. In addition, experiential learning is more effective than textbook-only learning because it allows students to connect science concepts with real-world situations. Given the importance of scientific thinking in science learning, the use of KOSIFCAS media is expected to help students become better prepared to face academic challenges and problems in everyday life. In applying the kosifcas media, researchers will later use the PBL (Problem Based Learning) and PJBL (Project Based Learning) learning models because the teacher in the IPAS subject has also applied the model in the learning process. When the implementation of learning runs conducive and students easily understand the material.

In this study it can be concluded that the purpose of this research is to develop a teaching aid product called KOSIFCAS, with this media can attract students to be more enthusiastic in learning the material of the properties of light in science subjects. By using this kosifcas media makes learning more active and learning becomes less boring and more fun. This can improve student learning outcomes in learning.

Method

This research uses the ADDIE development model which consists of five stages: Analysis, Design, Development, Implementation, and Evaluation (Setiawan et al., 2021). In the analysis stage, a study was conducted This research uses the research and development (R&D) method which aims to develop Smart Light Properties Box (KOSIFCAS) props to improve the scientific thinking ability and learning outcomes of fifth grade students of SDN Grogolan Boyolali on light and its properties.

In the research model, there are five research steps. The steps used include: First, the analysis stage, in this step interviews and observations are carried out to find out the potential or problems found in schools; Second, the design stage, at this planning stage, the researcher compiles a sketch of the props to be developed, in order to know the desired size and shape and minimize errors in the manufacturing process; Third, the development stage, the development step in this study includes activities to create and modify the Smart Light Properties Box (Kosifcas) props. In the development stage, the conceptual framework is realized in the form of learning media development products that are ready to be implemented in accordance with the objectives; Fourth, the implementation stage, at the implementation stage in this study is the stage for implementing or applying the design of the Kosifcas props media that has been developed. So that the usefulness can be measured and tested in small group and large group trials; Fifth evaluation stage, this evaluation stage is the last stage, this stage aims to assess the quality of the product and the teaching process, both before and after the implementation stage.

Needs of students and teachers through interviews, observations, and document analysis. The design stage involves planning the concept of KOSIFCAS media, including the design of features and materials presented. At the development stage, the product is made and validated by media experts and material experts to ensure its quality. Input and suggestions from validators are used as the main guidelines in improving and revising learning devices, so as to obtain learning devices that are suitable for use in learning (Nerita et al., 2018). Implementation is carried out through limited trials in the classroom, while the evaluation stage is used to measure the effectiveness of the media by analyzing test results and student and teacher responses.

The subjects of this study were 24 fifth grade students of SDN Grogolan Boyolali, while the object of research was the improvement of scientific thinking ability and IPAS learning outcomes on light and its properties through the use of KOSIFCAS media. The data collection techniques used include test techniques to measure student learning outcomes, as well as non-test techniques consisting of interviews and questionnaires. The instruments used include concept understanding-based test questions, interview guidelines, and questionnaires for teachers, expert validators, and students to determine the effectiveness and acceptance level of learning media.

This research was conducted at SDN Grogolan Boyolali in the even semester of the 2025/2026 school year. The main data in this study were obtained through the results of the End of Semester Assessment (PAS) of class V, which were collected using documentation techniques. The main data sources include the fifth grade teacher, the results of classroom observations, as well as questionnaires of teacher needs and expert validators. Data analysis techniques used in this study include quantitative and qualitative descriptive analysis to measure the effectiveness of KOSIFCAS media in improving students' understanding of the concept of light and its properties.

Result and Discussion

Table 1 results of validation assessment by material experts on cosifcas learning media.

Table 1. Material expert validation

Aspect	Number of scores
Learning	20
Language	12
Material	21
Score obtained	53

Table 1 shows the score obtained as much as 53. From the data above, it can be concluded that the results of the total validation of the material are 86% which shows very feasible results. With these results, the Smart Light Properties Box (Kosifcas) learning media is declared feasible to use as an effective and interesting learning tool in the material of light properties.

Table 1 results of validation assessment by media experts on kosifcas learning media.

Table 2. Media expert validation

Aspect	Number of scores
Learning	22
Language	12
Material	22
Score obtained	56

Table 2 shows the score obtained as much as 56. From the data above, it can be concluded that the results of the total media validation are 95% which shows very feasible results. These results indicate that KOSIFCAS

media has met the category of good feasibility to improve student learning outcomes in learning, the use of clear and effective language, and the presentation of appropriate and relevant material.

Table 3 shows the questionnaire responses of teachers and students on the learning media of smart light properties box (Kosifcas) on a small scale.

Table 3. Small scale teacher and student responses questionnaire

Response	Score %	Description
Teacher	100	Very feasible
Student	100	Very feasible

Table 4. Large scale teacher and student responses questionnaire

Response	Score %	Description
Teacher	100	Very feasible
Student	98	Very feasible

Based on the results of teacher and student responses, both in small and large groups, it can be concluded that the media and learning materials received very positive responses. In the small group, teacher and student responses both reached a percentage of 100%, indicating very feasible results. Meanwhile, in the large group, teacher responses remained 100%, and student responses reached 98%, which is also in the very feasible category. This shows that the media and learning materials have been effective and in accordance with the needs of both teachers and students.

Cognitive learning outcomes of pretest and posttest of fifth grade students of SDN Grogolan on cosifcas learning media.

Table 5. Pretest and posttest cognitive learning outcomes

Action	Pre test	Post test
Average	47	86.75
Highest score	65	100
Lowest score	30	70
Number of students Completed	0	20
Learning Completeness	0%	100%

Based on table 5 data on pretest and posttest results in class V SDN Grogolan, there is a significant increase between pretest and posttest results. In the pretest, the average student score only reached 47 with the highest score of 65 and the lowest score of 30. No students achieved learning completeness, so the percentage of completeness was at 0%. However, after being given learning actions, the posttest results showed a drastic increase with an average score of 86.75, the highest score of 100, and the lowest score of 70. All students managed to achieve learning completeness, with the percentage of completeness reaching 100%. This shows that the learning actions provided are very effective in improving students' understanding and learning outcomes. So it can be seen that the average difference between pretests and posttests is 39.75%.

Table 6 tests the normality of pretest and posttest cognitive learning outcomes of class V SDN Grogolan.

Table 6. Normality test

Parameters	Shapiro-Wilk	
	N	Sig.
MoCA-Ina pre test	24	0.066
MoCA-Ina post test	24	0.167

Based on the results above, the normality test with the Shapiro-Wilk test can be stated that the results are greater than $\alpha = 0.05$. And it can be concluded that the pretest and posttest data are normally distributed.

Table 7 Paired t-test of pretest and posttest cognitive learning outcomes of class V SDN Grogolan.

Table 7. Paired t-test

Result	Paired T-Test	
	N	Sig. (2-tailed)
MoCA-Ina pretest post test	24	<.001

The conclusion of the t-test from the data results of the pretest and posttest questions at SD Negeri Grogolan obtained a significance value (2-tailed) of 0.001, which proves that there is a significant difference between the initial variable and the final variable because the value of $0.001 < 0.05$. It is proven that there is a significant effect on the difference in treatment on each variable. We can see the effect seen from the results of the significance value of 0.001. With the results of the t-test it can be stated that the result is 0.001 smaller than 0.05. And it can be concluded that the pretest and posttest data are normally distributed.

Table 8. N-Gain test of pretest and posttest cognitive learning outcomes of fifth grade students of SDN Grogolan.

Table 8. N-gain test

Result	N	Mean
Ngain score	24	74.52
Ngain percent	24	74.52

From the Ngain score results, the mean value obtained is 0.7452. So the value of 0.7452> 0.7, it is stated that the value is included in the high category. Which means the effectiveness is high. Then for Ngain percent the mean value obtained is 74.5190. So it can be concluded that the value of 74.5190 is included in the

category of interpretation of the effectiveness of the N-Gain Score, which is high.

In conclusion, based on the results of this study with data collection through interviews, observations, and documentation, it shows that fifth grade students at SD Negeri Grogolan Boyolali still have many students who have difficulty in understanding the material of properties and light. therefore, with the use of cosifcas media, it is very positive response from the teacher and students in learning because with this student learning outcomes can increase. When learning takes place students should not only be told to listen to explanations from the teacher, it makes students more bored because basically students are more curious about new things and have high curiosity. Therefore, it is necessary to have more innovative activities so that students are more enthusiastic in participating in learning and quickly understand learning. The solution is to observe and practice directly with concrete media in an experiment, it makes students more able to think critically with concrete media through smart light properties box props (kosifcas).

Media Development Design of Smart Light Properties Box (Kosifcas)

The ADDIE method consists of five stages, namely Analysis, design, development, implementation, and evaluation (Akmal & Festiyed, 2023). The following are the stages of developing a smart light properties box (Kosifcas) learning media using the ADDE model.

At the analysis stage, researchers identified problems in learning the nature of light in elementary schools. Based on initial observations, many students have difficulty in understanding the concept of the nature of light because the material is presented abstractly without any supporting props. Therefore, innovative learning media is needed that can visualize the concept more realistically. The needs analysis was conducted by collecting data from teachers and students related to the learning methods used, difficulties faced, and expectations of the teaching aids to be developed. From the results of this analysis, it was found that experiment-based learning media is needed to increase student involvement in learning.

The design stage involves planning the Smart Light Properties Box (Kosifcas) props to suit learning needs. The design of this teaching aid is realized in the form of a three-dimensional based box made of wooden plywood and coated with art paper with attractive colors to increase student interest. Kosifcas is designed with two main parts. First, the smaller box is used for the practice of proving the properties of light, with various tools such as glass, CDs, and clear mica placed between the plywood holes. Second, the larger box is used for advanced learning, equipped with material on the nature of light as well as two educational games: the magic bag and matching the nature of light. In addition, the design also considered safety, ease of use, and durability so that the teaching aids could be used for a long time.

In the development stage, the design is realized in real form through several steps. First, the plywood was cut into several pieces according to the size that had been designed. After that, the plywood was arranged into a box shape using Alteco glue and clear white cable ties to make it strong and sturdy. Next, the box was covered with art paper that had been designed with interesting images, such as illustrations of children and lamp icons as symbols of light sources. After the coloring stage was complete, researchers installed additional components such as flashlights, mirrors, CDs, plastic cups, and clear mica to support learning the nature of light. The making of this teaching aid lasted for two weeks, where each stage was carried out carefully to ensure that the teaching aid could be used effectively in learning.

At the implementation stage, after the Kosifcas teaching aid has been developed, a limited field trial is conducted to see its effectiveness in science learning. This trial was conducted in grade V elementary school using Kosifcas. During the implementation, students conducted various experiments to prove the properties of light. They are given the opportunity to observe phenomena, ask questions, make predictions, and draw conclusions based on their observations. In addition, educational games contained in Kosifcas also increase students' involvement in learning. Based on observation, the use of Kosifcas in learning shows some positive impacts. Students are more active in the learning process and show an increase in scientific thinking skills, such as the ability to ask questions, analyze data, and draw conclusions. In addition, the understanding of the concept of the nature of light becomes better because students can directly observe the phenomena that occur.

The evaluation stage was conducted to measure the effectiveness of Kosifcas in improving students' understanding of the nature of light. This evaluation involves comprehension tests before and after the use of Kosifcas, as well as interviews with teachers and students regarding their experience in using this learning media. The evaluation results show that the use of Kosifcas can significantly improve the understanding of the concept of the nature of light. This finding is supported by previous research which states that experiment-based teaching aids can improve student learning outcomes. As a follow-up, some aspects that need to be improved from Kosifcas are the addition of a variety of experiments so that more concepts can be explained, improving the quality of materials so that the

props are more durable, and developing a guidebook so that teachers can more easily integrate Kosifcas in learning. The following is the kosifcas media that researchers have made.

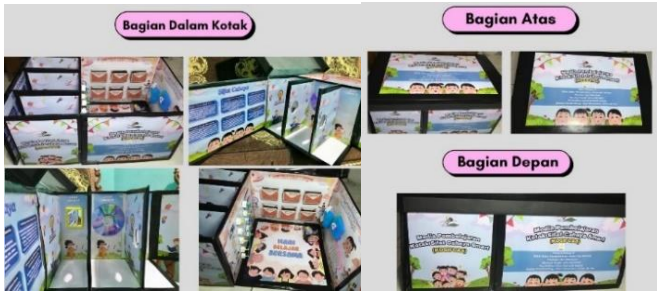

Figure 1. Media Box of smart light properties (kosifcas)

Feasibility of Smart Light Properties Box (Kosifcas) Media

Kosifcas has gone through a validation process by media experts and material experts to ensure its feasibility as a learning tool. The validation results by Mr. Bagas Kurnianto, M.Pd. (media expert) showed that Kosifcas obtained a validity score of 95%, which means that this media is very feasible to use in learning. In addition, validation from Mrs. Dewi Nilam Tyas, S.Pd., M.Pd. (material expert) showed a score of 93%, which is also in the very feasible category. Based on these results, Kosifcas has met the eligibility standards and can be used to help students understand the concept of light properties effectively.

In addition to expert validation, Kosifcas was also tested for practicality through a limited field trial at SDN Grogolan. This trial involved a small group of four students as well as a large group involving one fifth grade teacher and 20 students. The results showed that this media is very practical to use in learning, both in terms of use by teachers and in terms of student involvement in understanding the material. Thus, Kosifcas is not only theoretically feasible, but can also be applied effectively in classroom learning activities.

Based on the results of teacher and student responses in the use of media and learning materials, it was found that students responded very positively. In the small group, teacher and student responses both reached a percentage of 100%, showing very feasible results. Meanwhile, in the large group, teacher responses remained 100%, and student responses reached 98%, which is also in the very feasible category. This shows that the media and learning materials have been effective and in accordance with the needs of both teachers and students.

Data Analysis to Determine the Effectiveness of Smart Light Properties Box Props (Kosifcas)

The effectiveness of Kosifcas is measured by comparing the results of students' pretests and posttests. Before using this media, the average score of students' pretest was only 47, which is included in the low category. However, after learning using Kosifcas, the average posttest score increased dramatically to 86.75, which is classified in the high category. In addition, all students reached the minimum completeness score (KKTP) of 70, which means that learning with Kosifcas succeeded in improving their understanding of the properties of light.

The results of the normality test with the Shapiro-Wilk test can be stated that the results are greater than α = 0.05. And it can be concluded that the pretest and posttest data are normally distributed. The t-test results from the data results of the pretest and posttest questions at SD Negeri Grogolan obtained a significance value (2-tailed) of 0.001, which proved that there was a significant difference between the initial variable and the final variable because the value of 0.001 <0.05. With these results it can be stated that there is a significant effect on the difference in treatment given to each variable. We can see the effect seen from the results of the significance value of 0.001. With the results of the t-test it can be stated that the result is 0.001 less than 0.05. And it can be concluded that the pretest and posttest data are normally distributed.

From the Ngain score results, the mean value obtained is 0.7452. So the value of 0.7452> 0.7, it is stated that the value is included in the high category. Which means the effectiveness is high. Then for Ngain percent the mean value obtained is 74.5190. So it can be concluded that the value of 74.5190 is included in the category of interpretation of the effectiveness of the N-Gain Score, namely the high category.

This research is strengthened by previous research, among others. Research from (Mediawadi, 2022). The results of this discussion in the content validation trial and tested the responses of teachers and students obtained the results that this media development was proven valid with the results of media validation 0.875-1.00 and in the design expert obtained the results 0.875-1.00 and the results of the material expert which is 0.75-1.00.

Previous research written by Sholiha et al. (2018), it can be concluded from the results of the research that has been studied, namely (1) the development of the 4D media model on the material properties of light, (2) the results of the development of this media proved feasible and included good criteria with a percentage value of 90%, The media trial included good criteria, obtained a value of 86.9%, the results of the language test obtained a percentage of 100% of the results for the instructions for using the media, and the results of the user trial were 87.5%, as for the individual media trial with a value of 98.3%, the small group test with a percentage of 94.6%

and the large group test was 96.6%. With this, it can be concluded that media testing has been carried out that the media is well developed when applied in the classroom in teaching the nature of light (Fadhilah et al., 2022).

The results of the media trial of the properties of light material were obtained, namely that the science learning outcomes of fourth grade students of SD Negeri 2 Gedong Air proved that there was an increase when using the media box of the properties of light. In cycle I, of the total number of students, namely 24 students, there were only 13 whose scores reached the KKM, this can be proven because the percentage of the completeness value is 54.16%; in cycle II, the results were 20 students who were found to have completed the KKM with a percentage of the completeness value of 83.3%. With the results obtained, it is evident that there is an increase in the class average value, which was initially 65 in cycle I and there is a significant difference in the results of cycle II, namely with a value of 81.87.

In line with previous research written by Syaipul et al. (2023). Based on this research, the results obtained are the results of student learning outcomes when not using SICABOX media on average 56.5, where these results can be stated as not reaching the KKM. Meanwhile, student learning outcomes obtained an average score of 95 when using this SICABOX media. This shows that there is a very high significant increase in learning efficiency. Therefore, learning the nature of light is so that students understand more about the need for this media in learning.

Conclusion

Based on the results of the research, the Smart Light Properties Box (Kosifcas) media was developed using the ADDIE model which consists of five stages: analysis to identify problems, design in preparing sketches of teaching aids, development by making and modifying media, implementation through trials, and evaluation to assess the effectiveness of the media. The needs of students and teachers were analyzed through interviews, observations, and document analysis. The design stage involves planning the concept of KOSIFCAS media, including the design of features and materials presented. At the development stage, the product was made and validated by media experts and material experts to ensure its quality. Implementation was done through limited trials in the classroom, while the evaluation stage was used to measure the effectiveness of the media by analyzing test results and student and teacher responses. Validation from media experts obtained a score of 95% and material experts 93%, with an average of 94% which falls into the very feasible category. Teacher and student responses in the small group trial reached 100%, while in the large group, teachers remained 100% and students 98%, indicating an excellent response. The effectiveness of Kosifcas can be seen from the increase in pretest scores (47, low category) to posttest (86.75, high category). The t-test showed a significance of 0.001 (<0.05), proving a significant difference in results. The results of the N-Gain Score of 0.7452 (high category) and N-Gain percent of 74.52% (high category) show a significant difference. Thus, Kosifcas media is proven to be effective, feasible to use in learning, and able to improve students' understanding of light and its properties. KOSIFCAS learning media is effective and feasible to use in learning, proven to increase students' understanding of light and its properties.

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Author Contributions

Contributions of the main researcher and author of the article, M.I; collecting data, M.I; making a needs questionnaire instrument and response questionnaire, M.I; conducting media validation assessments and material expert validations, M.I; conducting evaluations, M.I; developing and testing research products, MI; data processing and writing draft articles, M.I. Researcher and second author of the article, D.W; conducting instrument validation and validation of the initial product design before being tested to media expert and material expert validators, D.W; supervisor who guided and directed the first author, D.W.

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Conflicts of Interest
The authors declare no conflicts of interest

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