Development of Integrated Flipbook Learning Media with 2-Dimensional Quartet Cards (KAKASIBOOK) to Improve Student Learning Outcomes in IPAS Learning Content

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Abstract: This study used a research and development method (Research and Development) referring to the Borg and Gall model. This study was conducted with the aim of developing and testing the feasibility, practicality and effectiveness of the Kakasibook learning media. This study involved 26 students with 6 students as small-scale trial subjects and 20 students as large-scale trial subjects of SD Negeri Gondoriyo. The data collection techniques used were test techniques (pretest-posttest) and non-tests in the form of observation results, questionnaires, interview results and document data. The validation results were carried out by media expert validators and material experts which showed that the Kakasibook learning media had met the valid criteria with a score of 90% by the media expert validator, and 95% by the material expert validator. Based on the pretest-posttest results, it is known that Kakasibook is effective in improving student learning outcomes as evidenced by the results of an increase in the average pretest score of 42.85 to 85.14 at the time of the posttest and the results of the n gain test obtained $<g>$ a gain value of 0.74 with a high category. Based on the results of the distributed response questionnaire, a very positive response was obtained from teachers and students. Based on these results, it can be concluded that the Kakasibook learning media is effective in improving learning outcomes in science subjects and is feasible and practical to be applied in student learning.

Keywords: Flipbook; Learning outcomes; Quartet cards

Introduction

Education plays an important role in forming a superior generation that is intelligent, critical thinker, creative, and able to solve problems. One important factor in creating quality education is the role of teachers, who provide space for students to develop and learn. With the abilities possessed by teachers, the process of student growth and development in honing their skills can run optimally. Therefore, efforts are needed to create an active, creative, interactive, and enjoyable learning atmosphere in order to improve student skills.

In accordance with the provisions contained in Permendikbudristek Number 16 of 2022 concerning Education Process Standards, especially in Chapter III Article 9 paragraph (1), the learning process must be carried out in an atmosphere that encourages interaction, provides inspiration, and creates a fun and challenging learning experience. Learning is also expected to be able to motivate students to be actively involved and provide adequate space for the development of initiative, creativity, and independence. All of this must be adjusted to the talents, interests, and physical and psychological development of each student (Permendikbudristek, 2022).

In addition to being based on Permendikbudristek Number 16 of 2022 concerning Education Process Standards Chapter III Article 9 paragraph (1), the success of education is also greatly determined by the implementation of the right curriculum. This is in line with Law Number 20 of 2003 concerning the National Education System, Chapter I Article 1 Paragraph (19), which states that the curriculum is a set of plans and arrangements regarding objectives, content, teaching materials, and methods used as guidelines in implementing learning activities in order to achieve national education goals (Nasional, 1982).

To realize optimal learning tools, teachers as the main determinants in packaging learning, need the right steps to choose learning tools that are appropriate to the material to be taught (Raupu et al., 2022). In this case, teachers need to develop an interesting, effective and efficient learning tool (Maulida et al., 2022). Learning media as a tool in learning can help teachers in realizing an effective and efficient teaching and learning process.

Learning media is a physical tool that is useful for conveying the contents of learning materials (Alika & Radia, 2021). In Batubara (2020), learning media is all forms of objects and tools that can be used to support teachers in implementing learning. Learning media is a method or tool used with the aim of transmitting knowledge to improve students' learning skills. Media also plays a role as an effective achiever of educational goals to improve the quality of student learning (Hasibuan & Fatmawati, 2021). Learning media can be in the form of videos, text, audio, visuals and manipulative objects (Handayati, 2020; Pradani & Aziza, 2019).

The development of technology and information can be utilized by teachers to create technology-based learning media in order to foster students' interest and motivation to learn. One effort to increase students' learning motivation is by creating innovative teaching materials (Ilafi et al., 2023). Teachers can create technology-based interactive media as a companion to teaching materials to support and complement the conventional teaching and learning process, in terms of methods, material objectives, methods, and assessment tools (Ambarwati & Darmawel, 2020). In addition, learning must involve the use of integrated, systematic, and effective technology and information so that it can be adjusted to the situation and conditions to increase efficiency and effectiveness in learning (Marini et al., 2022). By utilizing technology-based learning media, it can clarify abstract material or concepts into concrete because some media that are designed in one whole can contain images, text, audio, animation, simulations, and games (Deliany et al., 2019). One example of learning media that can be utilized by teachers in addition to being a learning medium as well as a source of teaching materials is Flipbook.

Flipbook is a learning media in the form of an innovative and interactive digital book that presents reading text and images that complement the reading text with a design that is made in such a way as to make it more attractive. According to Aprillia et al. (2017) in Setiadi et al. (2021), Flipbook is a book that contains several different and interesting images. Flipbook is a computer-based learning media that contains images, and covers along with graphic videos that are usually created using Adobe Reader or Sigil which contain text, html, and equb formats. According to Rajab et al. (2024), Flipbook is a form of sophisticated technology that is packaged in a concise and efficient manner which is used as a means of displaying information in the form of text, images, videos, audio, and other multimedia.

Flipbook is chosen because it allows teachers to present varied materials and can make it easier for students to understand the material through components that can be integrated into Flipbook such as audio, images, and learning videos (Gaol et al., 2019; Hanikah et al., 2022). Interesting text and image elements in flipbooks can increase students' motivation to learn and make it easier for students to understand the material, thus providing a different experience in the learning process (Musdalifah et al., 2024). The presence of flipbooks plays an important role in improving learning outcomes, making learning effective and efficient, and not being outdated like printed books (Anwar et al., 2021).

In creating Flipbook designs, teachers can utilize various platforms. One platform that can be easily utilized to create Flipbook designs is Canva and Hayzine. According to Rizanta & Arsanti (2022), Canva is an online design program that is here to provide various tools such as presentations, resumes, pamphlets, posters, brochures, graphics, infographics, banners, bookmarks, bulletins and so on. Another opinion was conveyed by Holisoh et al. (2023), Canva is a design application that can be easily accessed via a laptop or mobile device, its use can be used by various age groups even those who are not millennials, because it has an intuitive interface and easy-to-use features. The attractive design of the Canva learning media display can help make it easier for students to learn (Nurhalisa & Sukmawarti, 2022). The Canva application has advantages, including being able to increase teacher creativity in designing learning media. offers various graphic designs, templates, and animations, and can be easily accessed not only via laptop, but also via smartphone (Dewi & Setyasto, 2024).

The presence of Canva according to Triningsih (2021) can make it easier for teachers and students to

support the implementation of learning process activities by utilizing technology, skills, creativity, and other benefits. Utilizing technology as a medium for learning will spark interest, enthusiasm, and great curiosity about the material to be studied and can affect learning outcomes. Kakasibook learning media can improve students' grades or learning outcomes (Kusumayuni & Agung, 2021).

According to Oemar (2010) learning outcomes are learning achievements, while learning achievements are indicators of changes in student behavior. Students can be declared to have completed learning if the learning outcomes have achieved the learning objectives or minimum completion criteria set by the teacher. According to Magdalena et al. (2023), assessment of learning outcomes is a very important component for evaluating student progress and achievement. There are two factors that influence learning outcomes, namely internal factors and external factors of students. Another factor that influences learning outcomes is student learning activities in the learning process (Hardiansyah & Mulyadi, 2022).

Based on observations and interviews conducted by researchers with the homeroom teacher of class IV of SD Negeri Gondoriyo, researchers found several students who still had difficulty in understanding the material in the Natural and Social Sciences (IPAS) subject on the diversity of Indonesian culture, which affected students' learning outcomes. The class IV teacher also said that there were several factors that influenced the low learning outcomes of students, such as students who were not focused during the learning process, students had difficulty in understanding and remembering the material, lack of motivation in students, and lack of instilling a sense of competition in themselves so that students tended to give up on the learning outcomes obtained. When the learning process took place, teachers more often applied the PBL (Problem Based Learning) learning model with the lecture method, so that students easily got bored and their focus was diverted to other things. Teachers have applied technology-based learning media, but their use is not often due to limited facilities and infrastructure, this causes the learning process to sometimes run less than optimally.

Based on the problems that have been described, a learning media is needed that can attract students' attention by developing a variety of technology-based learning media so that it can influence learning outcomes to be even better. Researchers will develop learning media in the form of Flipbooks and 2-Dimensional Quartet Cards called Kakasibook which are made using the Canva application. Flipbooks can be combined with innovative learning models that are considered capable of improving student learning

outcomes (Susanti et al., 2021). Quartet Cards are learning media that can be collaborated during learning which can influence students' learning interests in learning activities (Ramadhani, 2021).

This media was developed as a tool to help students understand learning resources well. Kakasibook learning media contains several important components that support the learning process, such as materials on Indonesian cultural diversity, quartet cards on Indonesian cultural diversity, and student worksheets. The presence of images and quartet cards in the Kakasbibook learning media can make it easier for students to understand and remember the material. In addition to understanding the material through theory, students can easily remember the material through the process of making teaching aids directly in the classroom. Based on the background above, the researcher is interested in taking a study entitled "Development of Integrated Flipbook Learning Media with 2-Dimensional Quartet Cards (KAKASIBOOK) to Improve Student Learning Outcomes in the IPAS Learning Content".

Method

This study uses a research and development method or Research and Development (R&D). The researcher used a research and development procedure that had been adapted and modified from Borg and Gall in Sugiyono (2020) which consisted of 10 steps, but the researcher only limited it to step 8 due to time and cost constraints. The steps in this study include: analysis of potential and problems, collecting information, product design, product validation, design revision, product trial, product revision, and usage trial.

At the stage of potential and problem analysis, the researcher has conducted interviews with grade IV teachers of SD Negeri Gondoriyo, classroom observations, and data collection of documents in the form of learning outcomes in the assessment of the subject of science on the subject of Indonesian diversity. This is done to determine the characteristics and needs of students, and to find solutions to overcome problems that occur in the learning process. The next step is to find information to plan a product that will be developed to overcome the problems found by distributing student needs questionnaires. After analyzing the student needs questionnaire, the researcher began to design the product. The product design is adjusted to the student needs questionnaire and adjusted to the problems found. The product design is also adjusted to the material in the learning outcomes that have been determined. In the next step, namely design/product validation, at this stage the researcher presents several

experts or experts who have experience in their fields, namely media experts and material experts to assess the new design that has been designed by filling out the validation sheet that has been prepared by the researcher. After the design is validated by the validator, the next step is product revision. Product revision is carried out by improving the product according to the input given by the expert validator so that the product can be tested.

The next stage is product trial. At this stage, the researcher tested the product in class V with a small scale group of 6 students using a purposive sampling technique based on different levels of cognitive ability. At the product trial stage, learning was carried out by implementing the Kakasibook media. Then after the learning was completed, the researcher distributed a response questionnaire to the Kakasibook media. After the teacher and students filled out the response questionnaire to the Kakasibook media, the researcher analyzed the questionnaire, if there was input, it was used as material for improving the product that had been tested. The last stage that the researcher did was the trial usage stage. At this stage, the researcher retested the revised product on a larger scale group in class IV with 26 students. This stage was carried out with the aim of determining the effectiveness of the product that had been developed based on the learning outcomes that had been obtained.

The type of data used in this study is primary data. This study uses qualitative and quantitative research methods. In qualitative data, researchers collect data in the form of observations, interviews with grade IV teachers, distribution of teacher and student questionnaires, and documentation of learning outcomes. In quantitative data, researchers collect test data in the form of student pretest-posttest results, expert validator questionnaires, teacher and student media response questionnaires to the media. The research design used in this study is pre-experimental design, with a one group pretest-posttest design model. This form of experiment aims to measure student knowledge before and after being treated. Data collection techniques used are non-test and test techniques. Non-test techniques include observation, structured interviews, and student needs questionnaires.

In the test technique, data collection includes expert validator questionnaires, teacher response questionnaires to the media, student response questionnaires to the media, and 25 multiple-choice test questions that are tested on students. To determine the feasibility of the product being developed, researchers analyze data in the form of assessments from media expert validators and material expert validators with a Likert scale. To determine the practicality of the product, the researcher used a questionnaire of teacher and student responses to the Kakashibook media. Then, to determine the effectiveness of the product developed, the researcher analyzed the data using a gain test based on the results of the pretest-posttest which was tested on students in small and large scale groups.

Result and Discussion

Potential and Problems

Based on the results of the pre-research, the researcher found several problems, namely students who had difficulty understanding and remembering the material, and the use of learning media that was not optimal and less interesting for students. In addition, there were still learning outcomes of grade IV students in the subject of Social Sciences that had not met the Minimum Completion Criteria (KKM) where the KKM set by the school was 80. It is known that the total number of 26 students, 9 (33.33%) of whom had met the KKM score in the subject of Social Sciences of Indonesian Diversity while the remaining 18 (66.66%) students had not met the KKM score. So, a new innovation is needed in the learning media that will be used, in order to improve the quality of learning for grade IV students, especially in the subject of Social Sciences.

Gathering Information

The initial data collection was carried out by researchers by distributing questionnaires on student needs for the learning devices to be developed. When analyzing the student needs questionnaire data, data was found that students preferred learning media in the form of interesting animations, educational games, and lecture and group discussion learning methods. In this case, researchers are interested in developing learning media that focus on teaching materials containing animated illustrated materials by implementing the Project Based Learning (PjBL) learning model.
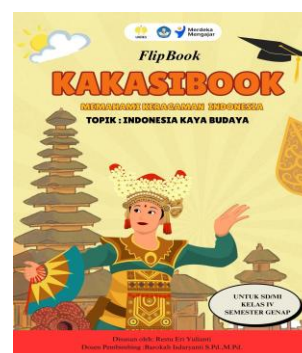
Product Design

Figure 1. Product cover   **Figure 2.** Material Contents

Kakasibook is designed according to the learning achievements and learning objectives to be achieved. This media is developed with the concept of teaching materials that contain learning materials and LKPD, which consist of writing and images that are in accordance with the characteristics of students so as to attract the attention and motivation of students to learn. This learning media is designed using the Canva application with a product ratio in the form of a website, and contains illustrated material. After the media design is ready, the design is exported in the form of a website link and printed on the quartet card in concrete form.

In designing the product, the steps taken by the researcher were preparing the material, design layout and design format, product creation, and application of the Kakashibook media.
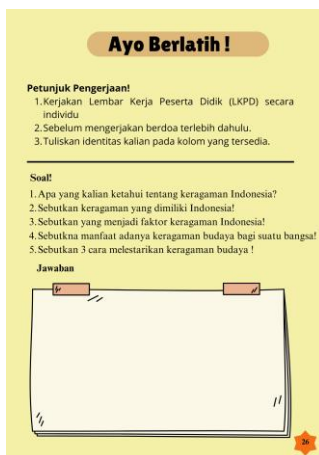

Figure 3. Product contains materials

Figure 4. Product contains LKPD

Figure 5. Quartet card product cover
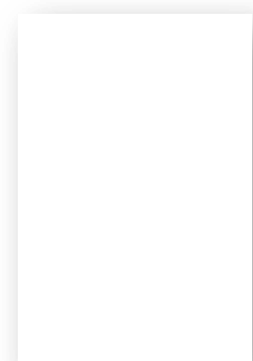
Figure 6. Product contains materials

Figure 7. Back cover of the product

Kakasibook Product Design Validation Eligibility

At this stage, the researcher validates the product to a competent media and material expert validator to test the feasibility of the product that the researcher developed. The learning media expert in this study is a lecturer in the elementary school teacher education study program, and the material expert in this study is a lecturer in the elementary school teacher education

study program in the field of science. After the media developed is assessed by the validator, input will be received as an improvement to the product being developed.

Table 1 shows that the validation results provided by the validator have valid results because they obtained values above 75% which are included in the very feasible criteria (Ghaisani & Setyasto, 2023).

**Table 1.** Results of expert validator assessments on the Kakashibook learning media

Feasibility aspects	Validation index (%)	Description
Media view	90	Valid
Material	95	Valid

The development of the Kakasibook media was declared valid in terms of overall content or material, appearance or media, and ready to be tested. This is in line with research of Sulaeman et al. (2023) that the results of the validation of the Kakasibook media they developed were valid overall. The development of the kakasibook media received a validation score of 91% "very feasible, and a material expert validator score of 90% "very feasible". Another study was conducted by Rosmiati et al. (2024) that the results of the validation of the kakasibook media that was developed, obtained a score of 95.4% from media experts, then obtained a score of 94.2% from material experts. So that the kakasibook learning media is very suitable for use as a learning

medium. Other research on the development of kakasibook was conducted by Khofifah et al. (2025) that the results of the media expert validation obtained a score of 91.6% and material validation 90%. Thus, the kakasibook media that was developed is categorized as a media that is very suitable for use.

Product Revision

Researchers received input from media and material experts as improvements to the products being developed. The input given to the media expert was a change in the form of the media ratio on the 2-dimensional quartet card. Then the input given by the material expert was the addition of material to the learning media.
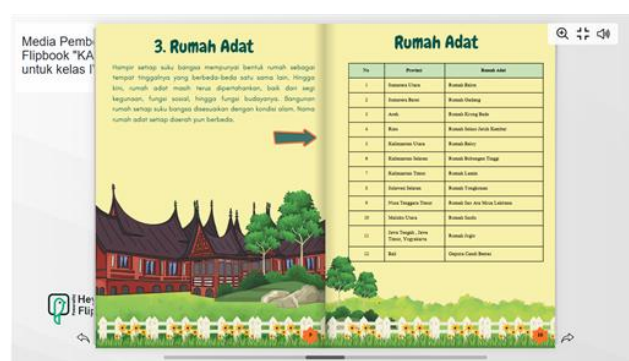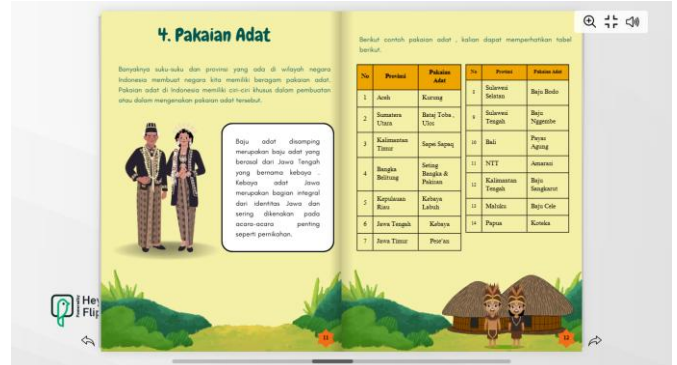

Figure 8. Product material content before revision
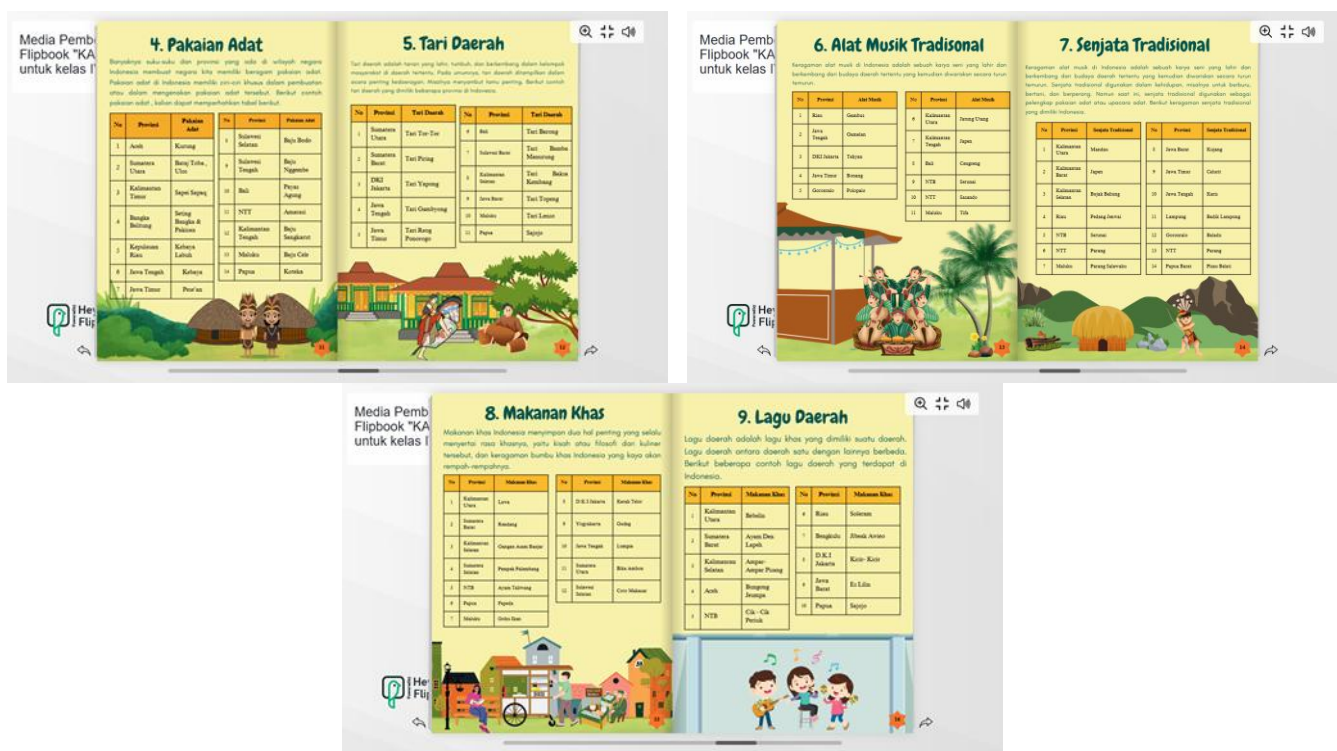
Figure 9. Content before revision

Figure 10. Quartet card ratio before revision

Figure 11. Back cover before revision

Figure 12. Product material after revision

Figure 13. Quartet card ratio after revision

Figure 14. Back cover of the quartet card after revision

Practicality of Kakashibook Learning Media

At this stage, the researcher conducted a trial on a small-scale group with 6 fourth-grade students. Students were selected heterogeneously based on the level of student learning outcomes, namely 2 students with the highest scores, 2 students with medium scores, and 2 students with the lowest scores. After the learning was completed, students on a small scale were given a response questionnaire to the Kakasibook media that had been used. Then the teacher was also given a response questionnaire to the Kakasibook media. The response questionnaire has 15 questions containing 2 aspects, namely, media quality, and material content. To test the practicality of the media, the questionnaire that had been distributed to students in small-scale groups and teachers was then analyzed to find the final results of the data. The recapitulation to measure the percentage of teacher response questionnaire answers to the Kakasibook media is as follows.

$$NP = \frac{R}{SM} \times 100\% \qquad (1)$$

Table 2. Results of teacher and student responses in small-scale groups to the Kakashibook media

Respondents	Practicality index (%)	Description
Teacher	100	Very positive
Student	87.78	Very positive

Table 2 shows that the results of teacher and student responses to the Kakasibook media have very positive results because they get scores above 75% (Ghaisani & Setyasto, 2023). So, the Kakasibook media is declared very positive and practical, so there are no revisions and it can be tested on large-scale groups.

Table 3. Results of teacher and student responses in large scale groups to the Kakashibook media

Respondents	Practicality index (%)	Description
Teacher	100	Very positive
Student	85.2	Very positive

Table 3 shows that the results of teacher and student responses to the Kakasibook media have very positive results because they get a score above 75% (Ghaisani & Setyasto, 2023). So, the Kakasibook media is stated to be very positive and practical to use as a learning medium. This is in accordance with the research that has been conducted which explains that the questionnaire responses of teachers and students to the Kakasibook learning media that was developed obtained results above 70%, thus showing very positive results which means that the Kakasibook media is practical to use in research (Saputra et al., 2020; Sulaeman et al., 2023; Sesnawati et al., 2024; Pradanasty et al., 2024). Another study on Flipbook learning media was conducted by Kristi & Andriani (2023) that the results of teacher responses to the media developed obtained a percentage of 100% with a very positive category and student responses obtained a percentage of 97% with a very positive category. This proves that the Kakasibook learning media is practical to use in learning.

Effectiveness of the Trial of Using Kakashibook Media

Product trials were conducted on large-scale groups to determine the effectiveness of the product based on student learning outcomes. The research design used was a pre-experimental design with a one-group pretest-posttest design model, namely a pretest before treatment was given and a posttest after treatment was given.

Table 4. Results of the pretest and posttest of students in the trial of using the Kakashibook media

Types of tests	Average	Average difference
Pretest	42.85	42.28
Posttest	85.14	

Based on Table 4, it is known that the average learning outcomes of students showed an increase of 42.28 in the large-scale product trial. The data shows that there is a difference in the learning outcomes of students in the subject of Social Sciences on the material of the Indonesian diversity system and there is a difference before and after using the Kakasibook learning media. To determine the criteria for increasing the average pretest and posttest, the researcher analyzed the data using the N-gan test by comparing the difference in SMI with the pretest.

Table 5. Average test results (N-gain)

Average difference	N-gain	Criteria
42.28	0.74	High

Based on Table 5, the average difference between the pretest and posttest results is 42.28. This shows that the scores of grade IV students at SDN Gondoriyo have increased by an average of 0.74 and are included in the high criteria. This average increase shows that the Kakasibook learning media has succeeded in improving the learning outcomes of students in class SDN Gondoriyo. This is in accordance with research conducted by Chercules et al. (2023) that the results of their research n-gain values showed a figure of 0.8 with a g limit > 0.7 and above and are included in the high criteria. This proves that kakasibook learning is very effective in being developed to improve student learning outcomes. Another study was conducted by Setyani et al. (2024) who developed the Kakasibook IPA PBL model learning media. The results of the study showed that the Kakasibook IPA PBL model developed can improve students' creative thinking skills as evidenced by the normalized gain test of 0.7 with a high category.

Conclusion

Based on the research that has been conducted, it can be concluded that the Kakasibook learning media can improve the learning outcomes of grade IV students of SDN Gondoriyo, in science learning. This result is proven by the expert validator's assessment of the feasibility of the Kakasibook media which obtained a product validation score of 93% which means that the product is very feasible to be used as a learning medium. The results of the teacher's response to the media showed a percentage of 100% and the student's response to the media showed a percentage of 86.49% which means that the product is very practical to use. Analysis of student learning outcome data on the pretest-posttest scores increased with an average difference of 42.28 and an N-gain of 0.74 which is included in the high category. After analyzing the data from the feasibility test, product practicality, and product effectiveness, it can be concluded that the Kakasibook media is stated as a feasible, practical, and effective media to improve the learning outcomes of grade IV students in IPAS subjects.

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