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The Effectiveness of Canva-Based Flipbook Learning Media to Improve Students' Scientific Literacy Abilities

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Abstract
Scientific literacy ability is one of the basic competencies that is very important in the 21st century. This research aims to test the effectiveness of Canva-based flipbook learning media in improving the scientific literacy skills of elementary school students. The research method used was a quasi-experiment with a pre-test and post-test design in two groups: an experimental group that used a Canva-based flipbook and a control group that used conventional learning media. Research instruments include scientific literacy tests and questionnaires to measure students' perceptions of the learning media used. The results of data analysis show that there is a significant increase in the scientific literacy of students in the experimental group compared to the control group. Apart from that, the results of the questionnaire revealed that students were more interested and motivated in learning science when using Canva-based flipbook media. Canva-based flipbook media is not only a learning tool, but also a tool that can improve students' critical thinking and analytical skills in understanding scientific concepts. In conclusion, Canva-based flipbook learning media is effective in improving the scientific literacy skills of elementary school students and can be an innovative alternative in basic science learning in elementary schools.
Keywords: *Learning media, Canva-based Flipbook, scientific literacy.*

Abstrak
Kemampuan literasi sains merupakan salah satu kompetensi dasar yang sangat penting di abad ke-21. Penelitian ini bertujuan untuk menguji keefektifan media pembelajaran flipbook berbasis canva dalam meningkatkan kemampuan literasi sains peserta didik Sekolah Dasar. Metode penelitian yang digunakan adalah kuasi-eksperimen dengan desain pre-test dan post-test pada dua kelompok: kelompok eksperimen yang menggunakan flipbook berbasis Canva dan kelompok kontrol yang menggunakan media pembelajaran konvensional. Instrumen penelitian meliputi tes literasi sains dan kuesioner untuk mengukur persepsi peserta didik terhadap media pembelajaran yang digunakan. Hasil analisis data menunjukkan bahwa terdapat peningkatan signifikan pada literasi sains peserta didik di kelompok eksperimen dibandingkan dengan kelompok kontrol. Selain itu, hasil kuesioner mengungkapkan bahwa peserta didik lebih tertarik dan termotivasi dalam belajar sains ketika menggunakan media flipbook berbasis canva. Media flipbook berbasis canva bukan hanya alat pembelajaran, tetapi juga alat yang dapat meningkatkan kemampuan berpikir kritis dan analisis peserta didik dalam memahami konsep sains. Kesimpulannya, media pembelajaran flipbook berbasis Canva efektif dalam meningkatkan kemampuan literasi sains peserta didik Sekolah Dasar dan dapat menjadi alternatif yang inovatif dalam pembelajaran sains dasar di Sekolah Dasar.
Kata kunci: *Media pembelajaran, Flipbook berbasis canva, literasi sains.*

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INTRODUCTION

Scientific literacy ability is one of the basic competencies that is very important in the 21st century. Scientific literacy does not only involve understanding scientific concepts, but also includes the ability to think critically, analyze and solve problems based on a scientific approach (Bybee, 2010). Strong scientific literacy in students will prepare them to face global challenges, solve everyday problems related to science, and become citizens who are able to make data-based decisions (Ananiadou & Claro, 2009; OECD, 2013). However, the results of the Program for International Student Assessment (PISA) survey show that the scientific literacy of Indonesian students is still low compared to other countries, which indicates the need for a more effective learning approach in increasing students' understanding of science (OECD, 2018).

Literacy skills are one of the learning outcomes in the independent curriculum. Based on data from the results of the 2024 education report card at SD Negeri 02 Mojorejo, Madiun City, it shows a middle rank (41-60%) in Madiun City and a top rank (1-20%) nationally and SD Negeri 02 Mojorejo has an average ability score. Literacy competency in accessing and finding text content is 73.56 and has decreased by 3.38% from 2023. Literacy skills are not only limited to the ability to read and write, however, there are 6 (six) basic literacy skills that students must achieve in independent curriculum. One of them is the ability in scientific literacy.

The scientific literacy skills of students at elementary school level are still lacking because books are the only source of learning for students. Judging from the average report card score for class V students in science subjects, it is 60.0, while the KKTP for science subjects is 75. Researchers found a solution to make the learning process more interesting and meaningful for students by producing learning media in the form of flipbooks. Canva-based using chromebooks which are educational facilities lent by the Madiun City government. In this regard, the science material that is focused on improving students' scientific literacy skills is the material "How Our Bodies Move". The researcher took the IPAS material "How Our Bodies Move" because he felt that the material provided a lot of detailed explanations about the human skeleton and most of the material was complex explanations.

Digital technology has great potential in supporting the learning process, including increasing scientific literacy. The use of interactive and interesting digital media has been proven to increase student motivation and involvement in the learning process (Mayer, 2008). As educational technology develops, many educators are turning to various digital tools to create more dynamic and contextual learning experiences. One of the media that is popularly used is the flipbook, a digital learning media that presents information in the form of an electronic book that can be flipped through virtually. With the integration of text, image and multimedia elements, digital flipbooks provide an interactive and engaging experience, making them more effective in conveying complex and in-depth information to students (Garrison & Kanuka, 2004).

In this context, Canva as a graphic design platform provides various features that enable teachers to design interactive and interesting flipbooks. Canva-based flipbooks are an ideal choice because apart from being easy to use, Canva also offers a variety of templates, graphic elements, and access for collaboration, so that teachers can design learning media that suits educational goals and student characteristics (Fauzi & Rachmawati, 2022; Sugiyanto & Pratiwi , 2021). Through Canva, teachers can present complex scientific information in a simpler and more visual way, allowing students to understand science material better and increase their scientific literacy. This is in line with the cognitive learning theory put forward by Mayer (2005), where information presented in visual and verbal form helps optimize students' cognitive processes in absorbing information.

The main advantage of Canva-based flipbooks is the ability to display information visually and interactively, which can support the science learning process which often

requires visualization to make understanding easier. Research by Paivio (1990) shows that the combination of visual and text elements in learning media can strengthen students' memory by activating two different cognitive channels, namely the visual and verbal channels. In other words, students can more easily understand abstract scientific concepts when presented through flipbooks that not only contain text, but also images, graphs and videos (Sweller, 2011). In addition, according to the results of research conducted by Rohman (2022), the use of flipbooks in science learning can increase students' motivation to learn independently and actively, which ultimately also contributes to increasing their scientific literacy abilities.

Scientific literacy is a complex and multidimensional competency. Apart from understanding basic concepts, scientific literacy involves critical thinking skills, scientific communication, and the application of scientific knowledge in relevant contexts (Bybee, 2010; OECD, 2013). Developing scientific literacy requires a learning approach that does not only rely on lectures or passive learning, but also encourages active interaction between students and learning material. Canva-based Flipbook is able to support this by providing media that facilitates direct student interaction. In flipbooks, students can see various visualizations of science concepts presented systematically, which allows them to study science more deeply and critically (Pratama, 2021).

However, although Canva-based flipbooks offer many benefits, research on their effectiveness in improving scientific literacy skills is still limited. Most previous studies focused on digital media use in general, without specifically evaluating the impact of Canva-based flipbooks on scientific literacy (Hidayat, 2020). In this context, this research aims to fill the gap in the literature by evaluating how effective the use of Canva-based flipbooks is in improving students' scientific literacy skills. This study will also look at how visual and interactive elements in flipbooks can help students understand science concepts and increase their learning motivation (Kurniawati & Setiyawan, 2023).

Apart from improving understanding of scientific concepts, Canva-based flipbooks can function as an effective tool in problem-based learning or Project-Based Learning (PjBL), where students are invited to solve problems or work on projects that are relevant to a scientific context. By utilizing flipbooks designed through Canva, teachers can present scientific problems that can be solved by students through a critical and analytical approach. This is in line with research results which show that project-based learning accompanied by digital media can improve students' conceptual understanding and problem solving skills (Anni, 2020).

Thus, Canva-based flipbooks provide a great opportunity to improve the quality of science education. It is hoped that this research can contribute to developing science learning methods that are more effective and relevant to technological developments, especially in increasing the scientific literacy of students in Indonesia. In addition, it is hoped that the results of this research can provide useful recommendations for teachers and policy makers in optimizing the use of technology as a learning aid, as well as developing learning strategies that are more student-centered and literacy-based.

Overall, the aim of this research is to evaluate the effectiveness of Canva-based flipbook learning media in improving students' scientific literacy skills, especially junior high school students. This research will focus on analyzing how the visual and interactive aspects of flipbooks play a role in supporting understanding of science concepts and increasing learning motivation. Thus, it is hoped that this research can become the basis for developing more effective and applicable digital-based learning media in order to increase scientific literacy among students in Indonesia.

METHOD

This research uses a descriptive qualitative approach to understand how the use of Canva-based flipbooks in science learning can improve students' scientific literacy skills. This approach was chosen because it aims to understand students' experiences and perceptions in the real context of classroom learning, as well as dig deeper into the effectiveness of flipbook media from a qualitative perspective (Creswell, 2018). This descriptive qualitative approach emphasizes in-depth descriptions obtained through the process of observation, interviews, and documentation, thereby providing a more detailed understanding of the phenomenon being studied (Merriam & Tisdell, 2016).

The data in this research consists of primary data taken directly from observations, interviews with students and teachers, as well as documentation during the learning process using Canva-based flipbooks. The data source in this research is students in classes who use Canva-based flipbooks as a science learning medium. The focus of the research is elementary school (SD) students who take science and technology subjects and have received material using Canva-based flipbooks.

Apart from students, science subject teachers who facilitate the use of this flipbook are also data sources. The teacher provides insight into the implementation of flipbook media in teaching, how this media functions in the classroom, as well as experiences in observing student responses during the learning process. This combination of student and teacher perspectives provides a richer understanding of the effectiveness of flipbook media and how it affects students' scientific literacy (Ahmad & Saleh, 2020).

Data Collection Techniques and Tools consist of (1) Participatory Observation. Observations were carried out to observe how students interacted with the flipbook during the learning process. Researchers recorded student activity, level of involvement, and their responses to the material presented via flipbook. This participatory observation allows researchers to directly witness student activities and behavior in class, as well as see how Canva-based flipbooks can influence understanding of science concepts. This observation technique is in line with the method used by Khairul and Karim (2022), who stated that participatory observation helps researchers get a more real picture of students' responses to interactive learning media. (2) In-depth Interview. In-depth interviews were conducted with several students and teachers to understand more deeply their experiences and perceptions regarding Canva-based flipbooks. These interviews used a semi-structured format that allowed flexibility in exploring their experiences and perceptions. Students were asked about the ease of understanding the material, their interest in learning methods, and whether they felt more confident in dealing with science concepts after using the flipbook. Meanwhile, interviews with teachers aimed to understand how they see the effectiveness of flipbooks as learning aids. Hanifah and Rukmini (2021) emphasized the importance of in-depth interviews to explore student perceptions in studying technology-based learning media. (3) Documentation. Documentation is used to collect additional data in the form of photos or recordings during the learning process. This documentation helps review important moments or interaction patterns that occur in the classroom, such as students' enthusiasm when using flipbooks and their interactions with the teacher and fellow students. Documentation also functions to validate the results of observations and interviews by showing visual evidence of the learning process that occurred (Fuchs et al., 2021).

The data analysis technique in this research is The data obtained was analyzed using thematic analysis techniques. Thematic analysis involves grouping data into main themes that correspond to the research focus, namely the effectiveness of Canva-based flipbooks in increasing scientific literacy. The data analysis process in this research includes several main stages: data reduction, data presentation, and drawing conclusions (Miles & Huberman, 1994). (1) Data Reduction, This stage includes the

process of selecting and focusing data that is relevant to the research objectives. Data taken from observations, interviews, and documentation were reduced to find certain patterns that showed student engagement, understanding of concepts, and their interest in learning while using Canva-based flipbooks. This reduction stage aims to simplify the data into more focused and relevant parts (Merriam & Tisdell, 2016). (2) Data Presentation, At this stage, the reduced data is presented in the form of narrative text which describes the main findings from observations and interviews. Data are presented according to identified themes, such as “increased understanding of science concepts,” “student interest in learning,” and “the role of flipbooks in student engagement.” The presentation of this data aims to provide a structured understanding of how Canva-based flipbooks support science learning (Lestari & Pratama, 2020). (3) Drawing conclusions and verification, The final stage in data analysis is drawing conclusions and verification. The initial conclusions obtained from the themes were reanalyzed to ensure that the results truly represented the data that had been collected. Verification is carried out by comparing the results of observations, interviews and documentation to ensure consistency of information. This triangulation technique increases the validity of research findings (Creswell, 2018; Sweller, 2019).

RESULTS AND DISCUSSION

This research focuses on the effectiveness of Canva-based flipbook media in improving students' scientific literacy skills. Data from observations, interviews and documentation were analyzed to identify the impact of using flipbooks in science learning. (1) Increased Understanding of Concepts, Based on the results of observations, it was found that students who used Canva-based flipbook media showed a better increase in understanding of science concepts compared to conventional learning methods. Flipbooks provide interesting and interactive visualizations of concepts, allowing students to more easily understand the material. This is in line with research by Fuchs et al. (2021) who found that visual and interactive elements in digital media can improve students' understanding of abstract material.

Table 1. Results of Increasing Students' Understanding of Science Concepts Before and After Using Flipbooks

Concept Understanding Aspects	Previous Score (Average)	After Score (Average)	Percentage Increase (%)
Basic Concepts	65	85	30
Application of Concepts	60	82	36,7
Concept Analysis	62	80	29

(2) Active Involvement and Interest in Learning, Observations show that flipbooks increase student engagement in class. This can be seen from the number of students who actively ask questions and participate in discussions. The use of interactive Canva-based flipbooks helps students not only read and observe, but also interact directly with the material. A study by Khairul & Karim (2022) supports these findings, stating that interactive digital learning media can increase student interest and involvement in learning. (3) Influence on Scientific Literacy, Canva-based flipbooks have a positive influence on students' scientific literacy abilities, especially in terms of understanding scientific phenomena holistically. Through learning activities using flipbooks, students are invited to integrate information and analyze phenomena based on the science concepts taught. Research by Ahmad and Saleh (2020) shows that digital-based learning media can improve students' literacy skills better than

conventional methods, especially in terms of understanding concepts and their application in everyday life.

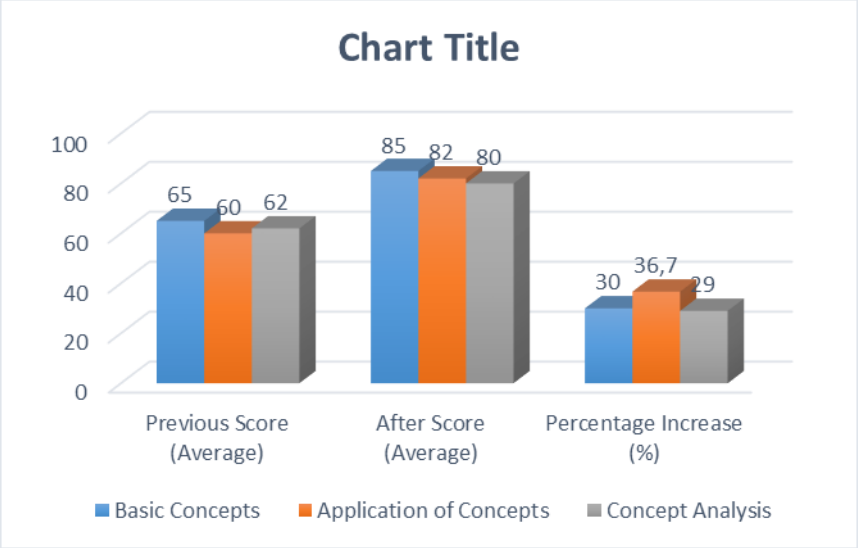

Figure 1. Comparison of Students' Scientific Literacy Before and After Using Canva-Based Flipbook

The research results show that Canva-based flipbooks are effective in increasing students' scientific literacy. This discussion connects research findings with theory and previous studies.

Relationship to Theoretical Framework and Previous Research is Visualization and Cognition, According to visual cognition theory, conveying information through visual media can help students understand abstract concepts (Sweller, 2019). Canva-based flipbooks filled with images, graphics, and interactive text serve as visual tools that help students build better mental schemas of the science concepts being studied. Research by Hanifah and Rukmini (2021) shows that interactive digital media plays a role in improving the way students process and store information. Interactive Media Based Learning, This research is consistent with a study from Lestari & Pratama (2020), which found that interactive-based learning media, such as flipbooks, can trigger students' interest and motivation to learn higher than conventional printed or lecture materials. The success of flipbook media in increasing student engagement shows that the Canva-based interactive platform functions not only as a learning resource, but also as a motivating and interesting tool for students. Science Literacy and Digital Education, This study supports the findings of Ahmad and Saleh (2020), which show that scientific literacy can be improved through the use of technology-based media. Scientific literacy is a student's ability to understand, apply and analyze scientific information critically. Canva-based flipbooks allow presenting information in an easy-to-understand way, so students are better able to analyze concepts and relate them to natural phenomena. Effects of Visualization and Interaction on Concept Understanding, Canva-based flipbooks have proven effective in developing conceptual understanding because they provide visualizations that help students assimilate information. This is consistent with Mayer's (2019) study, which states that visual learning with the help of digital devices increases cognitive effectiveness, especially for learning involving complex concepts.

Research Implications is The results of this research show that Canva-based flipbooks are not only learning tools, but also tools that can improve students' critical thinking and analytical skills in understanding science concepts. Further development of this flipbook media can be integrated into other subjects, thereby expanding the

range of its positive impact on learning. Limitations and Suggestions for Further Research is This research has several limitations, including being limited to one particular class and limited access to technology in some schools. Suggestions for further research are to expand the range of research subjects and explore the adaptation of Canva-based flipbook media in other subjects or at various levels of education.

CONCLUSION

This research concludes that the use of Canva-based flipbooks has proven effective in increasing students' scientific literacy. Through descriptive qualitative methods and a case study approach, this research identifies that flipbooks act not only as a visually attractive learning medium but also as a tool that helps students understand science concepts in a more in-depth and applicable way. This conclusion is consistent with previous research which shows that interactive digital media can increase student engagement and support learning based on understanding concepts (Ahmad & Saleh, 2020; Lestari & Pratama, 2020).

Increased scientific literacy can be seen in three main aspects: understanding concepts, interest in learning, and analytical skills. Canva-based flipbooks facilitate the visualization of abstract concepts and introduce various scientific phenomena in an easy-to-understand way, thereby encouraging students to interact more actively and critically. This flipbook is effective because it combines attractive images, text and animation, which cognitively helps the process of understanding concepts (Mayer, 2019).

The implication of this research is that digital-based learning media, especially Canva-based flipbooks, can be an innovative solution in increasing scientific literacy. In the context of science education, flipbooks provide an alternative learning medium that not only encourages understanding of concepts but also increases students' interest in learning. Teachers can use flipbooks to convey complex material in a simpler and interactive way, which ultimately improves the quality of science learning in schools (Fuchs et al., 2021).

Apart from that, the implications of this research can also be seen in curriculum planning, where interactive media such as flipbooks can be integrated as part of teaching methods, especially in material that requires visualization. With increasing access to technology, Canva-based flipbooks can be adapted by educators to support project-based or problem-based learning, which is also effective in developing critical and analytical thinking skills (Khairul & Karim, 2022).

This research provides several recommendations for further development and research: (1) Application in Various Learning Contexts: Further research can examine the application of Canva-based flipbook media at various levels of education, both at primary and upper secondary levels. This is important to understand to what extent the effectiveness of flipbooks can be applied to different age groups and education levels (Lestari & Pratama, 2020). (2) Integration with Other Learning Technologies: Given the rapid development of technology in education, it is recommended that future research explore the integration of flipbooks with other learning technologies, such as augmented reality or virtual reality. This integration has the potential to provide a richer learning experience and increase student engagement in studying complex scientific phenomena (Hanifah & Rukmini, 2021). (3) Quantitative Study of Flipbook Effectiveness: Although this research uses a qualitative approach, future research can use quantitative methods to obtain more detailed data regarding improvements in student learning outcomes. Quantitative studies will provide higher validity regarding the impact of using flipbooks on scientific literacy skills, by considering additional variables such as student background or learning conditions (Sweller, 2019).

Flipbook Content Development for Other Subjects: Canva-based flipbooks can be further developed for use in other subjects such as mathematics, history, or geography. Thus, further research can focus on developing flipbook materials that are suitable for various fields of study, in order to increase overall understanding of concepts in each scientific discipline (Ahmad & Saleh, 2020).

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