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The Influence of Pop-up Card Media on Students' Learning Abilities in Science Learning at the Kampung Bharu Malaysia Learning Center

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Abstract: This study aims to determine the effect of using Pop up card media on students' learning abilities in science learning at the Kampung Bharu Learning Center, Malaysia. The background of this study is based on the low learning abilities of students caused by the lack of variation and effectiveness of learning media, so that learning tends to be abstract and less interesting. This study uses a quantitative approach with a quasi-experimental design in the form of One Group Pretest-Posttest Design. The subjects of the study were all 9 students of grade IV of the Kampung Bharu Learning Center, Malaysia, with a sampling technique using saturated sampling. The research instrument was a learning ability test given before (pretest) and after (posttest) treatment. Data were analyzed using the Shapiro-Wilk normality test and paired sample t-test hypothesis test with the help of SPSS version 25. The results showed that the average value of students' learning abilities increased after the application of Pop up card media, from an average pretest value of 10.11 to an average posttest value of 11.44. The results of the hypothesis test showed a significance value (Sig. 2-tailed) of 0.001, which is smaller than the significance level of 0.05, so H_0 is rejected and H_1 is accepted. Thus, it can be concluded that the use of Pop-up card media has a significant effect on students' learning abilities in science learning. Pop-up card media has been proven to be able to present material visually and concretely, increase learning motivation, and encourage active student involvement during the learning process.

Keywordi: Pop up card media, Science learning, Learning skills

PRELIMINARY

Education is a conscious and planned effort to create a learning atmosphere and learning process so that students actively develop their potential to have spiritual religious strength, self-control, personality, intelligence, noble morals and skills needed by themselves and society. In the study and thinking about education, it is first necessary to understand two terms that are almost the same form and are often used in the world of education: namely pedagogy means "Education" while pedagogik means "Science of education." The word pedagogos, which originally meant service, later changed to a noble

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work. Because the meaning of pedagogy (from pedagogos) means someone whose task is to guide children in their growth to the area of independence and responsibility (Education and Makassar 2022).

Law Number 20 of 2003 concerning the National Education System, for example, emphasizes that student learning outcomes are assessed systematically, with academic performance still receiving insufficient attention. This demonstrates a gap between normative regulations in legislation and implementation in the field, with improving the quality of the learning process a key focus. The learning process in question is not limited to formal teacher-student interactions in the classroom but also encompasses strategies, methods, and tools used to achieve educational goals. This law emphasizes that education is a conscious and planned effort aimed at creating a learning environment and learning process that enables students to actively develop their potential. This potential includes spiritual aspects, self-control, intelligence, noble character, and the skills necessary for life in society, the nation, and the state (Handayani et al. 2025).

Learning is an interaction or reciprocity between teachers and students in the learning process. Learning is a teacher's effort to help students develop their intellectual potential to its optimal potential (Krisyuliani et al., n.d.). Currently, elementary schools use Natural Sciences (IPA), now known as Natural and Social Sciences (IPAS), as one of the disciplines taught in teaching and learning activities. Social Studies in the independent curriculum for elementary schools has been replaced by Natural and Social Sciences (IPAS). Therefore, a new subject, IPAS, is introduced because elementary school children still see everything as integrated and unified. The integration of these two subjects, IPAS, aims to empower students to manage their natural and social environments holistically. This integration is called IPAS, which begins at the elementary school level (Rahman, Sugiyanto, and Afrom 2025).

The curriculum is a series of lessons and various learning programs implemented at each stage of education (Pertiwi et al., 2022). The curriculum serves as a guideline or set of rules for conducting the learning process in the classroom, in an effort to achieve educational goals efficiently and effectively. The independent learning curriculum is still relatively new in Indonesia. Its implementation is expected to improve the quality of student learning outcomes because the learning process is conducted independently, tailored to the needs of students in each educational institution (Belajar 2022).

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In science and science learning, the goal is to develop attitudes and social skills that benefit individual progress and participation in society. Based on this explanation, teachers must shift from teacher-centered to student-centered learning. The goal is to make students more active and engaged during learning (Rus'an, 2019). Furthermore, students are expected to achieve not only cognitive learning objectives in school but also affective and psychomotor aspects. This allows students to apply the knowledge they gain in everyday life. (Ningsih, Dompu, and Barat 2024).

However, learning science (natural and social sciences) at the elementary school level is important to support students in understanding natural and social phenomena in an integrated manner. Furthermore, science material is often considered complex and immaterial, so students require learning media that are interesting, concrete/real, and easy to understand. The purpose of learning using the science approach is to improve skills and provide experiences. Learning in science and social studies is integrated into science under an autonomous curriculum. In an autonomous curriculum, science aims to foster curiosity, interest, and active involvement in addition to the potential to advance knowledge and abilities. In fact, because the science content is aligned with experiences connected to everyday life, there is a strong interest in learning science, learning will be more enjoyable, and students achieve the desired learning outcomes. Science is actually seen by elementary school students as a fun and simple subject (Ummah and Mustika 2024). Another opportunity that can be utilized to improve science learning is training and professional development for teachers. According to Suryani (2024), improving teacher competency in teaching science is crucial so that they can implement a more integrative and effective learning approach. Training programs that focus on innovative learning strategies, the use of technology, and the development of teaching materials aligned with the Independent Curriculum can help teachers overcome the challenges they face in teaching science (Parisu & Sisi, n.d.).

Learning is a process of interaction between teachers and students in a learning environment. In this context, learning media plays a crucial role as a tool in delivering teaching materials. Engaging and interactive media can increase learning motivation and help students understand the material more deeply. According to Sadiman in Hasan (2021), student passivity can be minimized through the use of varied media that are

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appropriate to the characteristics of the material (Pratiwi, Susiloningsih, and Nurani 2025).

Learning is a conscious and intentional process of change. This refers to a planned activity to bring about changes in a person for the better. Throughout the learning process, students will be involved in various aspects related to learning, and all changes that occur are not merely educational, but rather shifts in learning. The goal is to achieve improvement. Therefore, if a child breaks their leg after falling from a tree, this is not considered a learning phase. Learning is more focused on a transformation that is better than before. For example, a child learning to read will experience a positive change in their ability to recognize letters, spell, and read well. (T. D. Putri, Haq, and Gusmaneli 2025).

Learning media is a key example of a learning process. It also encompasses tools, teaching materials, equipment, and school facilities that can be used in learning. Teachers can implement many learning media in the learning process, including books, teaching aids, 3D media, images, social media, and online/e-learning. The use of learning media can be considered an element that can influence the success of the learning process. These media are closely related to teaching and learning activities in schools or madrasas. A variety of media in the learning process can support teachers in interacting with students, increase learning focus, and assist teachers in conveying material easily. Learning media can be various things around us that can help educators in transferring information to students (Azkia et al. 2023).

The use of appropriate media can support students' learning processes according to their abilities while making the material more clearly presented. The role of media goes beyond simply serving as a tool for conveying messages, fully controlled by the teacher, but can also partially replace the educator's role in presenting learning materials. Media can also represent concepts or information that might be difficult for a teacher or educator to express through specific words or sentences. Especially for abstract material, the use of media allows these concepts to be realized or illustrated more concretely, facilitating student understanding. (Research 2022).

Based on observations conducted in fourth-grade students at the Kampung Bharu Malaysia Guidance Center on October 27, 2025, it was shown that Natural and Social Sciences (IPAS) learning was not running optimally. Some students appeared less active,

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had low learning motivation, and their understanding of the material was not yet well developed. This situation emphasizes the need for more innovative and interactive learning strategies to encourage students to participate actively and to enable them to understand IPAS concepts in depth. As an alternative, teachers can utilize pop-up cards. This media takes the form of a folding card that, when opened, displays information in a visual, engaging, and easy-to-understand manner. Pop-up cards serve as a means to clarify abstract and contextual concepts in science, enabling students to be more focused, motivated, and engaged in the learning process. Furthermore, the use of this media can foster curiosity and strengthen understanding through a fun learning experience.

By implementing pop-up cards, it is hoped that the quality of science learning will improve, students will be more enthusiastic in participating in learning activities, and their understanding of the material will significantly improve. This research was conducted at the Kampung Bharu Malaysia Learning Center as part of an effort to influence the influence of innovative learning media on improving the quality of science learning.

Science learning requires an integrated understanding of concepts that link natural and social phenomena. At the elementary school level, students still require concrete and visual representations to understand concepts more meaningfully. Learning that utilizes visual media is considered effective because it can make abstract concepts more tangible and helps students build connections between the material and everyday experiences. Learning media plays a crucial role in improving the quality of the learning process. According to Arsyad (2020), learning media serves to clarify messages, attract attention, and increase student motivation and engagement in learning. Similarly, Susilanti and Riyana (2021) emphasize that media developed according to student characteristics can enhance learning activities, facilitate comprehension, and strengthen memory of the material. Particularly in conceptual learning, such as science subjects, the use of visual media is an important strategy for linking concepts to real-world phenomena that students can directly observe.

One suitable visual medium for learning is pop-up cards. Pop-up cards take the form of cards or books with three-dimensional displays that move when opened, creating a realistic impression of the object being studied. According to Daryanto (2020), three-dimensional visual media can help students build clearer mental images, improve focus, and foster learning motivation. Meanwhile, research by Pratiwi and Rahmawati (2022)

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DOI: https://doi.org/10.29407/jpdn.v11i2.27921

demonstrated that using pop-up cards in the learning process can increase student participation, facilitate conceptual understanding, and make learning more enjoyable. With their concrete, visual, and interactive nature, pop-up cards are well-suited to the cognitive developmental stage of elementary school students.

To improve students' learning abilities in science, teachers can utilize a variety of engaging learning media. One effective medium is pop-up cards, a three-dimensional medium that presents material visually, making it easier to understand and more motivating for students. This medium is a development of the pop-up book, a paper-covered image folded in such a way that it displays a three-dimensional shape (Johan, 2020:49). According to Sari et al. (2019:116), pop-up cards are paper designs visualized with images, thereby increasing student engagement in the learning process. With an interactive and easy-to-understand display, pop-up cards can help students be more focused, motivated, and active in participating in learning. Thus, the use of pop-up cards has an impact on increasing student motivation, engagement, and learning abilities in science subjects. The use of pop-up cards is expected to simultaneously improve students' learning abilities in science lessons at the Kampung Bharu Malaysia Learning Center.

Pop-up cards are a modification of pop-up books in the form of three-dimensional illustrated paper that can appear from inside the paper that was originally folded (Johan, 2020:49). According to Ningtiyas et al. (2019:116), pop-up media is a three-dimensional paper design with a display of learning materials illustrated using images. Based on this opinion, it can be concluded that pop-up media has elements of images or illustrations in its use. The use of pop-up cards can arouse students' interest in the learning process. When the Pop-up Card is opened, a sense of surprise is created by the appearance of various illustrations. This media will undoubtedly leave a positive impression on elementary school students. It is also hoped that this media can provide a solution for teachers amidst the numerous administrative tasks that hinder optimal learning management (Card 2021).

Pop-up card media is a media that has never been used in the Kampung Bharu Malaysia Learning Studio. Pop-up cards are designed with attractive colors and images, three-dimensional shapes, the images are interesting, unique, and give a special impression so that students will be more enthusiastic about following the learning process. (G. F. Putri and Pranata 2018). The use of Pop-up card media can be determined by teachers in the Science Subject in the material on the Stages of Human Growth, by

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describing how the stages in human growth. By using Pop-up card media, it can help students to better understand abstract concepts more concretely and visually. This purpose is to find out Efforts to Improve Students' Learning Ability through Pop-up card media in the Kampung Bharu Malaysia Guidance Studio. Pop-up card is a combination of card media and pop-up books. The definition of Pop-up is an interesting form of paper art that forms a three-dimensional structure when opened and a two-dimensional structure when closed. Pop-up cards are more than just creating 3D shapes; they utilize movements that engage the reader. According to the Great Dictionary of the Indonesian Language, a card is a thick, rectangular piece of paper used for various purposes. A card is a thick piece of paper containing specific images or writing that can be used to develop engaging biology learning.

This study aims to examine the effectiveness of using pop-up cards in science learning, specifically in the topic of human development. Pop-up cards were chosen because they display raised images that change when opened, providing a more engaging and concrete learning experience for students. This study hopes that pop-up cards can help students understand the concept of human development more easily, increase their engagement in the learning process, and provide a creative alternative for teachers in delivering material. Furthermore, this research is expected to contribute to the influence of visual-based learning media that can simplify abstract material and motivate students to be more active in learning.

METHOD

The method in this research is using a quantitative approach. The quantitative approach is one of the research approaches that uses data in the form of numbers to answer research questions. This approach emphasizes objective measurement, standardized data collection, and the use of statistical analysis to test hypotheses or explain a phenomenon. Quantitative research is often used to study the relationship between variables, measure frequency, or identify patterns in a particular population (Waruwu et al. 2025). By using a quasi-experimental design with a One-Group Pretest-Posttest Design. In this design, the sample group is given an initial test (pretest) to determine the initial abilities of students. Then given treatment in the form of the use of Pop-up Card media in science learning, after which students are given a final test (posttest) to determine their abilities after

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treatment. Where in this design there is a pretest before being given treatment and a posttest after being given treatment or this design sample is a research design where only one experimental class without a control class is given a pretest test sheet before being given a posttest treatment.

$$O_1 \rightarrow X \rightarrow O_2$$

explanation:

O_1 = Pretest

X = Treatment (learning using pop-up card media)

O_2 = Posttest

This research was carried out in a tutoring studio located on Jl. Raja Alang, Chow Kit, 50300 Kuala Lumpur Federal Territory of Kuala Lumpur Malaysia.

The data analysis technique in this study used a normality test and a paired simple t-test for hypothesis testing. This study included dependent variables. The independent variable in this study was the pop-up card media (x). The dependent variable in this study was student learning ability (y). The sampling technique in this study used saturated sampling, which is a sampling method that involves using all members of the population as samples. In this study, the sample was all fourth-grade students at Sanggar Belajar Kampung Bharu Malaysia.

A population is defined as a generalized area consisting of objects or subjects with certain characteristics that will be studied to draw conclusions (Subhaktiyasa 2024). According to Creswell (2014), a population is a group of individuals with similar characteristics, which serves as the basis for collecting research data. This definition emphasizes the importance of considering three main components in research: the subject, the object, and the research location. The research subject is the individual, object, or organism that serves as the source of information in data collection. The research object refers to the nature or condition that is the focus of attention and the target of the research, which can include certain behaviors, activities, opinions, or processes. The research location, on the other hand, is not only the place where the research is conducted, but also the place where data about the subjects and objects are collected. This location plays a crucial role in the success of the research because it is related to the ease of access to the population being studied. (Subhaktiyasa 2024). The population in this study were 9

ISSN 2579-6461 (Online) ISSN 2460-6324 (Print)
DOI: https://doi.org/10.29407/jpdn.v11i2.27921

fourth-grade students of the Kampung Bharu Malaysia tutoring center. The research instrument was a test.

RESULTS

This research was conducted in fourth-grade students at the Kampung Bharu Malaysia Learning Center, located at the tutoring center on Jl. Raja Alang, Chow Kit, 50300 Kuala Lumpur, Federal Territory of Kuala Lumpur, Malaysia. The sample size for this study was 9 students.

Validity and Reliability Testing

Validity testing is the process of determining the extent to which an instrument or measuring tool meets its intended purpose. An instrument is considered valid if its items accurately and consistently reflect the established indicators. Practically, validity testing ensures that the data obtained from the measuring tool can be used to accurately answer the research problem. Instrument validity testing was conducted to determine the extent to which the questions used in the study accurately and precisely measure students' learning abilities, in line with the research objectives. The instrument used in this study was a student learning ability test, which served as a pre-test and post-test. The aim was to measure students' learning abilities before and after the Pop-up Card learning intervention.

Based on the pre-test results, the lowest score was 4 and the highest score was 13, with an overall score of 91 and an average score of 10.11. These results indicate that students' learning abilities before being given the learning treatment were still relatively low. Furthermore, the post-test results showed an increase, with the lowest score of 7 and the highest score of 15, and an overall score of 103 and an average score of 11.44. The increase in the lowest, highest, and average scores indicates an increase in students' learning abilities after being given the learning treatment.

The data from the pre-test and post-test results were then used in calculating the validity test of the instrument in calculating the validity test of the instrument using the Pearson product moment correlation technique with the help of SPSS 25 for Windows at a significance level of $\alpha = 5\%$ (0.05). The basis for making decisions in the validity test is by comparing the calculated r value with the table r value. Based on 9 students as respondents, the r table value was 0.666 with 7 degrees of freedom (df = n - 2 = 7). A test

ISSN 2579-6461 (Online) ISSN 2460-6324 (Print)
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item is considered valid if the calculated r value is greater than the table r value. The validity test results indicate that all test items have a calculated r value greater than the table r value (0.666).

Therefore, all 15 test items are considered valid and suitable for use as research instruments. This indicates that the student learning ability test instrument is able to accurately measure student learning abilities both during the pretest (before treatment) and posttest (after treatment). Furthermore, the research instrument can be used to collect pretest and posttest data. Valid pretest and posttest data are then used in the research data collection process to determine the effect of pop-up card media on student learning abilities in science learning in Kampung Bharu Malaysia.

Table 1 Reliability Test Results

Reliability Statistics

Cronbach's Alpha	N of Items
.839	15

Normality Test

The normality test is a crucial step in quantitative research data analysis, aimed at determining whether the data obtained comes from a normally distributed population. This normality test is necessary as a prerequisite before researchers use parametric statistical analysis techniques, such as the paired sample t-test. If the data is normally distributed, parametric tests can be used appropriately, and the analysis results can be scientifically justified. This test is used to determine whether samples drawn from the population are normally distributed. The data normality test is a prerequisite for analysis before hypothesizing.

The Shapiro-Wilk test was used in this study because of its high accuracy for small to medium-sized samples. The basis for decision-making in this normality test is determined based on the significance value (Sig.) with the following conditions: if the Sig. value is > 0.05, the data is considered normally distributed. If the Sig. value is ≤ 0.05, the data is considered non-normally distributed. The normality test analysis in this study used SPSS 25.0 for Windows. The decision-making criteria for the normality test with a value of α = 5% (0.05) is that if the significance value ≥ α then the data is not normally distributed. The following is the calculation of the normality test :

ISSN 2579-6461 (Online) ISSN 2460-6324 (Print)
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Table 2 Normality Test

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Learning Ability Pretest	.229	9	.189	.875	9	.139
Learning Ability Posttest	.180	9	.200*	.968	9	.873

Based on Table 3, it shows that the normality test value of the Pre-Test and Post-Test of Class IV uses the Shapiro Wilk Test. In Table 3 above, the significant value (sig) before the Pre-Test is 0.139. This shows that the Pre-Test data. The significance value is greater than the predetermined significance level, which is 0.05 (0.139 > 0.05). This means that the significance value of the pretest results is smaller, while after the application of Pop-up card media to class IV students of Sanggar Belajar Kampung Bharu Malaysia. While the significant value (sig) after the Pre-Test is 0.873. This shows that the Post-Test data. The significance value is greater than the predetermined significance level, which is 0.05 (0.873 > 0.05). This means that the significance value of the results (Post-Test) is greater. Thus, the results of the normality test indicate that the research data is normally distributed.

Hypothesis Testing

After the normality test was conducted, data analysis was conducted to test the proposed hypothesis. The hypothesis test was conducted to determine whether the use of Pop-up Card media had an effect on students' learning abilities in science learning at the Kampung Bharu Malaysia Guidance Studio. The hypothesis test in this study used a paired sample t-test with the help of SPSS 25.0 for Windows. The decision making in the t-test is that if the sig value (2-tailed) <0.05 then Ha is accepted and Ho is rejected. Then the hypothesis test can be carried out as seen in the table below:

Tabel 3 Tabel Hipotesis

Paired Samples Test

		Paired Differences				
					95% Confidence Interval of the Difference	
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper
Pair 1	Pretest - Postest	-8.00000	5.07445	1.69148	-11.90056	-4.09944

Paired Samples Test

		t	df	Sig. (2-tailed)
Pair 1	Pretest - Postest	-4.730	8	.001

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Based on table 5 related to the results of the hypothesis test, it can be seen that the level of significance of this test result is supported by a p-value of 0.001 in a two-tailed test (Sig 2-tailed). This value is smaller than the significance level of 0.05 (0.001 < 0.05). In addition, the calculation results show that the calculated t value is greater than the t table value at a significance level of 5% with degrees of freedom (df) of n - 1, where n is the number of research samples. Thus, based on these two criteria, it can be concluded that H_0 is rejected and H_1 is accepted. This shows that there is a significant difference between students' learning abilities before and after the implementation of Pop-up card media in science learning at the Kampung Bharu Malaysia Learning Studio.

This study aims to examine the influence of pop-up cards on students' learning abilities in science learning at the Kampung Bharu Malaysia Learning Center. The results of this study outline a discussion to answer the following research problem.:

1. Student learning abilities before and after the implementation of Pop-up card media. The results of the study showed that the average value of student learning abilities in the pre-test stage reflected relatively low initial abilities, while in the post-test stage there was an increase in the average value after students participated in learning using Pop-up card media, indicating an increase in student learning abilities.
2. to determine whether there is a significant effect of the use of Pop-up card media on student learning abilities. Based on the results of the hypothesis test using a paired sample t-test analyzed with the help of SPSS version 25, a significance value of 0.001 was obtained, which is smaller than the significance level of 0.05, so the null hypothesis was rejected and the alternative hypothesis was accepted. These findings indicate that Pop-up card media has a significant effect on student learning abilities because it is able to present learning materials visually and concretely, thereby supporting conceptual understanding and increasing student engagement during the learning process.

DISCUSSION

Students' learning abilities are influenced by various factors, both internal and external. Slameto (2020) emphasized that learning media is an external factor that can influence students' concentration, understanding, and learning success. Meanwhile,

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Sitorus, Daeli, & Ningsih (2025) argue that the application of innovative and interactive media can increase students' attention, motivation, and active participation in learning activities. Therefore, selecting appropriate media plays a crucial role in supporting students' learning abilities.

Based on pre-test and post-test data, it is clear that there was a significant improvement in students' learning abilities after using pop-up cards. This is in line with the advantages of pop-up cards: they attract attention and increase motivation, facilitate visualization, encourage active involvement, and are flexible and affordable (Regina and Wulandari 2025).

According to Putri et al. (2023), the use of pop-up cards in learning serves as an effective learning stimulus because they can concretize abstract concepts through engaging and interactive three-dimensional visual displays. This media helps students connect learning materials with more real-life learning experiences, thus facilitating the process of understanding and remembering the material. Furthermore, pop-up cards can also increase student learning motivation because they present an element of surprise, curiosity, and active student involvement in the learning process. This involvement encourages students to be more focused, enthusiastic, and actively participate during learning activities. Thus, the use of pop-up cards not only contributes to increased learning motivation but also has a positive impact on improving students' learning abilities, both from the cognitive, affective, and psychomotor aspects (Laraskana 2024).

CONCLUSION

Based on the research results and data analysis that have been conducted, it can be concluded that the use of Pop-up cards has a significant impact on students' learning abilities in science learning. This is evident from the increase in the average value of students' learning abilities after the application of Pop-up cards, where the posttest score is higher compared to the pretest score obtained before the use of the media. This increase indicates that Pop-up cards can help students understand the learning material better and encourage active student involvement during the learning process. The results of the hypothesis test show a significance value (Sig. 2-tailed) of 0.001. This significance value is smaller than the predetermined significance level of 0.05 ($0.001 < 0.05$). Thus, H_0 is rejected and H_1 is accepted, which means there is a significant difference between

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students' learning abilities before and after the use of Pop-up cards. Therefore, the research objective to determine the effect of using Pop-up cards on students' learning abilities has been achieved. Overall, Pop-up cards can be declared effective for use in science learning because they are able to optimally improve students' learning abilities. Pop-up cards are effective in helping students understand learning materials because they present concepts visually and concretely, making abstract material easier to understand. Furthermore, the use of this media can increase students' attention, interest, and motivation to learn, as well as encourage active student involvement during the learning process. However, this study is limited by its relatively small sample size, so the results cannot be widely generalized. Therefore, it is recommended that future researchers conduct research with a larger number of subjects and expand the use of pop-up cards across different materials and educational levels to obtain more comprehensive research results.

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