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Discovery Learning Model with Flipbook-interactive Media on Critical Thinking Ability and Desire to Know

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Abstract

This investigation was motivated by the low levels of critical thinking and desire to know among elementary school pupils. This study describes the disparities in fourth-grade students' comprehension of square and rectangular shapes before and after using the Flipbook-interactive media. The method of investigation employed is quantitative research. This study employs a Pre-test and Post-test design with a control group. This study employed assessments, questionnaires, observations, and documentation for data collection. Statistical analysis consisting of normality tests, homogeneity tests, paired sample t-tests, independent sample t-tests, and ANOVA tests was used to perform data analysis techniques. The study results showed that students' critical thinking skills obtained a sig. of 0.000 > 0.05, Ha is accepted, and Ho is rejected, so students' critical thinking after using the Flipbook-interactive media is better than before. In the discovery learning paradigm with Flipbook-interactive media, students have a more inquisitive disposition than before. Meanwhile, critical thinking skills and a desire to know obtained F 2.916 with a sig. equal to 0.000 > 0.05, then Ha is accepted, and Ho is rejected, so critical thinking skills and desire to know are better after using the Flipbook-interactive media than the cooperative model with visual media.

INTRODUCTION

Mathematics supports science and technology and contributes to solving life's problems [1]–[4]. Therefore, mathematics is anticipated to equip students with rational, analytical, systematic, critical, inventive, creative, and collaborative thinking skills and the ability to work in teams. Fortunately, many students still view mathematics as a scary, difficult and uninteresting subject, which impacts their low achievement at school. Mathematics education aims to perfect and train students to think logically and apply knowledge to real-world situations [5]. Not only that, but according to [6], learning mathematics also has several benefits, namely fostering a desire to know, attention, and interest, as well as a tenacious and confident attitude to solve a problem.

The use of learning models in the classroom is one of the factors that can determine the success or failure of an educational process. Apart from that, what can also cause low student learning outcomes are critical thinking skills, students' desire to know, and the learning media

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chosen by the teacher. Mathematics learning fosters critical thinking skills and a desire to know in students. According to Amalia and Pujiastuti [6], critical thinking is based on ideas and thoughts expressing reasons for concluding and solving problems. Thus, applying critical thinking in mathematics learning requires students to understand the concepts used to solve problems with their reasons and thoughts [7], [8]. An innovative learning model influences mathematical literacy skills through learning mathematics. Mathematical literacy skills indirectly learn about several aspects, including identifying mathematical aspects in mathematics reading. This study aims to prove the effectiveness of the discovery learning model of mathematical literacy abilities.

According to [9], the desire to know, a trait that makes students more sensitive in detecting various events or happenings around them, can also be used to show students' interest. According to the definition of an attitude and behaviour that continuously seeks to know more deeply and widely about something studied, observed, or heard, the desire to know helps students become more accustomed to observing various phenomena and events around them. Like the desire to know and the drive for new things. The character of desire to know is also essential for students to have as people who are learning.

Fourth-grade students at SD Permata have low critical thinking skills when solving mathematics problems given by their teacher. Many students do not understand the meaning of these questions or how to solve them. As a result, their critical thinking skills in mathematics are still lacking. Based on the results of the HOTS (Higher Order Thinking Skill) at SD Permata as a validity test, the questions were declared valid. In the beginning, the critical thinking level of elementary school (SD) students shows that class IV students at SD Permata have not yet reached the critical thinking stage. Researchers observed low grade IV odd semester midterm test scores at Permata Elementary School for the 2022–2023 academic year. Of all class IV students, 30% got a MID score above the KKM, while the remaining 70% still got a score below the KKM. Students tend to experience difficulties and make mistakes when stating problems in square and rectangular problems in mathematics learning.

To overcome students' low critical thinking skills and desire to know, the best effort that can be made is to apply learning models and choose appropriate learning media. Meanwhile, Kusumadewi [10] describes the learning model as a process intended to communicate material to students in a way that encourages effective learning and enjoyment among students to achieve the most outstanding results that can be achieved from the learning process. The learning model chosen must be able to increase student participation in the learning process. One of the available learning models is inquiry learning. Discovery paradigm learning is a means of actively developing students' learning processes through self-discovery and self-investigation so that students can develop their own understanding of learning [11]. The Discovery Learning model is suitable for improving critical thinking skills and fostering desire to know in students [12]–[15].

Apart from using learning models, the existence of learning media can also influence and play an essential role in increasing students' critical thinking and desire to know. Learning media are tools used in the learning process to convey material or information to students to help achieve learning goals [16]–[18]. The media used is Flipbook*;* Flipbook *is* an interactive media that can change the appearance of a PDF to make it more attractive like a book and can include motion animations, photos, videos and audio so that when used, students feel as if they are

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reading the full version [19]. So, it can be concluded that with this software, when we carry e-books, it is no longer monotonous and is more enjoyable.

The material used in this research is the perimeter of squares and rectangles because it uses the discovery Learning model, which is very suitable and makes it easier for students to improve their critical thinking skills and desire to know how to solve problems related to the material. The discovery model-based mathematics module with the Flipbook-interactive media is expected to maximize students' potential, especially regarding critical thinking skills and desire to know.

METHODS

A quantitative approach is a research method used to obtain data in the form of numbers from a population or sample. This research uses a control design group pre-test and post-test design. This method is used to find out data before and after treatment. Treatment is given using the Discovery model Learning with the Flipbook-interactive media. Before learning activities, students were given a pre-test critical thinking skills test and a pre-test desire-to-know attitude questionnaire. After the lesson, students were given a post-test critical thinking ability test and a post-test desire-to-know attitude questionnaire. The Discovery learning model is the independent variable, while critical thinking skills and desire to know are the dependent variables. The design form can be described as follows:

Table 1. Control Group Pre-test and Post-test Design Research Design

O_1	X	O_2
O_3	X	O_4

Permata Elementary School is based in the District Colomadu Regency Karanganyar with accreditation A. The population of this research is students in the fourth grade of elementary school. Cluster random sampling is a technique used to take samples. Sample investigation consists of two classes to four classes. The control class, IV A, had 32 students, while the experimental class class, IVB, had 30 students. In this research, the independent variable is the Flipbook-interactive media, and the dependent variables are critical thinking and the desire to know. Critical thinking is believing that students give solutions to problems to find answers.

The data is collected through test techniques, questionnaires, observation, and documentation. The author uses the following Normality Test to analyze the data in this research. This test is carried out to determine whether the sample studied is normally distributed. The author uses the Liliefors test to test data normality. Homogeneity test: the homogeneity test is carried out to determine whether the population in the study has the same variance. In this research, the hypothesis was tested using the Paires method sample t-test to determine whether it was accepted or rejected. Hypothesis testing aims to determine whether the independent variable affects the dependent variable. ANOVA test. The purpose of one-way ANOVA with different cells is to determine the independent variable's impact on the dependent variable by comparing the means of several populations.

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RESULTS AND DISCUSSION

Based on observations made during three meetings, it can be seen that students show activeness in learning activities. Before the first meeting, students were given a critical thinking skills Pre-test and a desire-to-know questionnaire. At the second meeting, students seemed enthusiastic about participating in the learning process, with many students asking questions, answering questions and expressing their opinions. At the third meeting, students were given a Post-test critical thinking ability test and a post-test desire-to-know questionnaire to determine the impact after the learning was implemented.

Figure 1. Students apply Flipbook-interactive media

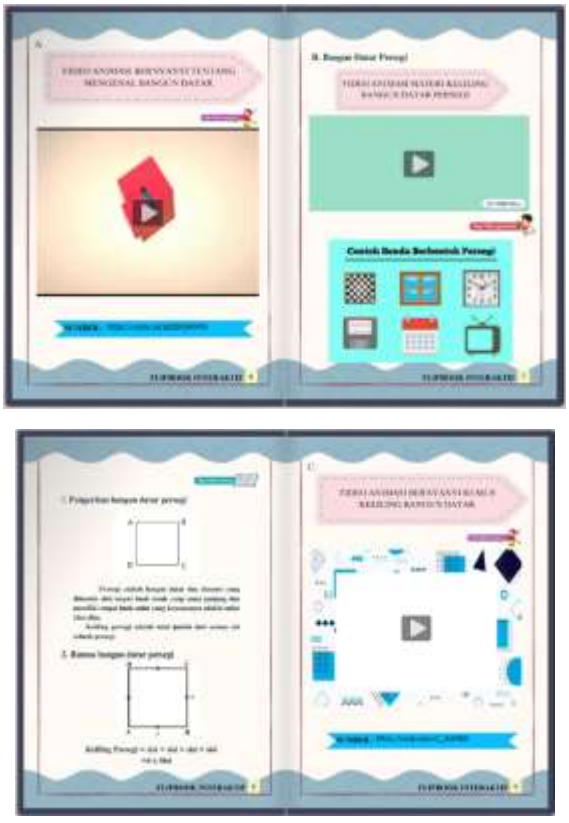

Figure 2. Learning media Flipbook-Interactive

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A series of studies that have been conducted have determined the influence of the Flipbook interactive media on the ability to think critically and the desire to know students. Data collection tests critical thinking ability after the end of the learning process at a meeting.

Then, the ANOVA test was carried out to determine which learning models influence critical thinking ability. The third sample, the normality and homogeneity tests, were carried out using the Liliefto method to ensure the data's normality and consistency. After confirming that the data is normally distributed and its variance is homogeneous, the *SPSS* program is used for an ANOVA test. The following are the results of the data analysis tests obtained :

Table 2. Test Normality

Variable	Sig.	Information
Control Class		
Pre-test Critical thinking	0.283	Normal
Post-test Critical thinking	0.054	Normal
Pre-test Feelings of desire know	0.068	Normal
Post-test Feelings of desire know.	0.055	Normal
Experimental Class		
Pre-test Critical thinking	0.220	Normal
Post-test Critical thinking	0.070	Normal
Pre-test Feelings of desire know	0.070	Normal
Post-test Feelings of desire know	0.074	Normal

The normality test results are contained in Table 2; all data can be considered normal if the sig value. > 0.05. The normality test showed that the sig value. Critical thinking Pre-test data, critical thinking Post-test, desire to know Pre-test and desire to know Post-test > 0.05. So, it can be concluded that the data used is normal because of the value. > 0.05

Table 3. Homogeneity Test

Variable	Sig.	Information
Critical thinking Pre-test-Post-test experiment	0.552	Homogeneous
Want to know Pre-test-Post-test experiment	0.850	Homogeneous
Critical thinking Post-test control - experiment	0.967	Homogeneous
Want to know Post-test control -experiment	0.710	Homogeneous

Based on the results of the homogeneity test, if the sig. > 0.05 All data can be said to be homogeneous. The homogeneity test shows that the sig value. Pre-test data critical thinking Pre-test-Post-test experiment, desire to know Pre-test-Post-test experiment, critical thinking Post-test control-experiment and desire to know Post-test control-experiment. > 0.05. So, it can be concluded that the data used is homogeneous because of the sig value. > 0.05.

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Table 4. Paired Samples t-test

Critical thinking	Mean	Difference	t_{count}	Sig	Information
Pre-test	67.73	21.2	-14.835	0.000	H_a Accepted
Post-test	88.93				

The results of the paired sample t-test in Table 4 obtained a t-count of 14.835 > 2.059 with a significance equal to 0.000 < 0.05. It means that learning that uses the discovery Learning model, the Flipbook-interactive media and the cooperative model with tool visual media tool Viewed from the average scores, students experienced an enhancement of 21.2, which was before Flipbook-interactive media have the average value is 67.73 and after Flipbook-interactive media increased to 88.93.

Table 5. Paired Samples t-test

Desire to Know	Mean	Difference	t count	Sig	Information
Pre-test	74.00	11	-18.137	0,000	H_a accepted
Post-test	85.00				

Based on the results, hypothesis 2 paired sample t-test in Table 5 was obtained t-count 18.137 > 2.042 with significance equal to 0.000 < 0.05, so H_0 is rejected, and H_a is accepted. This shows that using Flipbook-interactive media and a cooperative model with visual media have different influences on the desire to know the fourth-grade students of Permata Elementary School. Viewed from the average results of the scores, students experience enhancement 11. The one before Flipbook-interactive media had an average value of 74.00; after it was given Flipbook-interactive media, it increased to 85.00.

Table 6. Independent t-test

Variables	Sig.	Difference	t_{count}	Sig.	Information
Critical thinking					
Control Pre-test	67.97	0.24	0.103	0.918	H_a Rejected
Pre-test experiment	67.73				
Desire to know					
Control Pre-test	74.22	0.22	0.131	0.896	H_a Rejected
Pre-test experiment	74.00				

Based on independent test results, The sample t-test in Table 6 shows the difference before giving Flipbook-interactive media. The difference in the results shows this: the average value is 0.24, with the control class average value of 67.97, and the average value of the experimental class was 67.73. Independent sample t-test results show that The t value is 0.103 and the Sig value is 0.918. Then Ha is rejected, so that No. There is a significant difference between the control and

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experimental classes before Flipbook-interactive media was given to critical thinking ability and desire to know.

Table 7. Anova Test

Variable	F_{count}	Sig.	Information
Post-test	2,916	0.037	H_a Accepted

Based on the ANOVA results in Table 7, the F-count is 2,916 with a significance equal to 0.037 < 0.05, so Ha is accepted. This shows that learning that uses Flipbook interactive media and a cooperative model with visual media tools influences critical thinking ability and desire to know the fourth-grade students of Permata Elementary School.

The significant difference to using the Flipbook-interactive media is that it effectively increases understanding of concepts in the material flat. Flipbook-interactive media fulfil the criteria For proper use. This appropriateness is based on value validity from media experts and experts. It is valid and practical, as obtained from student and teacher responses. It is a convenient and learner-based test of critical thinking ability to stay effective [20]. Use the discovery learning model with Flipbook interactive media, including categories excellent and effective, so that student activity occurs and an enhancement percentage is achieved every meeting to increase critical thinking ability [8], [18]. The use of the Discovery model Learning with Flipbook-interactive media has been proven with average Pre-test and Post-test results, and they grow imaginative and productive, capable of practicing critical thinking ability and solving problems with students [21].

The application of Flipbook-interactive media in learning, getting up to room square and square long, positively impacts the experience and understanding of students, especially critical thinking ability. Based on the results of the observation activity, students excel in the experimental class during the learning process, knowing that more experimental class students are enthusiastic about studying and asking questions on existing tests. Student instructed For can finish related issues get up flat square and build flat frequent geometry found in life every day. Through explanation, they can conclude that paradigm discovery learning with Flipbook-interactive media on wake up flat square and square long is influential and significant for students with critical thinking ability. Students' involvement in the educational process creates enjoyment and efficiency, making the learning process more valuable and meaningful.

The discovery learning model has steps: 1). Give stimulation, 2). Identification problem, 3). Data Collection, 4). Data Processing, 5). Verification, and 6). Conclusion [22]. Stages of the discovery model learning allow students to demonstrate every indicator of their critical thinking ability and desire to know. At the first stage, Student given problem or situation problematic that will be give rise to questions; stage second student trained critical thinking For determine relevant issues or relevant; student stage third gather appropriate information from various sources; student stage fourth, processing data or existing information; stage fifth student do activity to prove correct or or not information said; and stage sixth student interesting or look for conclusion for same problem. The advantages of learning model discovery are: 1) students active

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in activity learning with critical thinking and use their abilities to find results end; 2) more accessible and faster; and 3) it create a feeling of joy in students Because growing desire to know and succeed [23]. As for the advantages from Flipbook Interactive media is as interesting digital book students' attention can be gained beneficial in learning can form text sentences, images, videos, audio, etc animation [24]. So the experimental class uses module mathematics, which is said effective and proven, has a significant influence on enhancing the students' critical thinking ability and desire to form square and square long.

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CONCLUSION

From the whole series of studies that have been carried out done, start from stage planning and implementation until stage data analysis and testing hypothesis, author can conclude that: Found exists the influence of the discovery learning model with Flipbook-interactive media, the discovery model learning with Flipbook-interactive media and cooperative model with tool show to Skills critical thinking and desire to know the material get up flat and square long fourth grade students at Permata Elementary School. Skills critical thinking and desire to know get results best in classes that apply the Flipbook-interactive media compared to with learning classes others.

Based on research findings, mathematics instructors must implement the discovery learning model that can increase critical thinking and the desire to know. Teachers can also choose effective and interesting teaching materials, such as Flipbook-interactive media, to conveying content education. Compared to a cooperative model, the discovery Learning model and Flipbook-interactive media have more impact on critical thinking ability and inquiry. The expected colleague writer will conduct additional research with more coverage.

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