



The influence of the PBL model with digital comic media on the critical thinking skills and science learning outcomes of elementary school students

Zulfi Ainun Zakiyah

Magister Pendidikan Dasar, Fakultas Keguruan dan ilmu Pendidikan, Universitas Negeri Jember

zulfizakiyah15@guru.sd.belajar.id

Bevo Wahono

Fakultas Keguruan dan Ilmu Pendidikan, Universitas Negeri Jember

bevo.fkip@unej.ac.id

Pramudya Dwi Aristya Putra

Fakultas Keguruan dan Ilmu Pendidikan, Universitas Negeri Jember

pramudya.fkip@unej.ac.id

Submitted: 2021-00-00

Revised: 2021-00-00

Accepted: 2021-00-00

ABSTRACT

The low PISA 2022 scores of Indonesia highlight deficiencies in critical thinking skills, which are essential for everyday life and interdisciplinary learning, particularly in Natural Sciences and Social Sciences (IPAS). This study examines the impact of problem-based learning (PBL) assisted by digital comic media on elementary students' critical thinking skills and learning outcomes in sciences. The research employed a quasi-experimental method with a posttest-only control group design. The population comprised all fourth-grade students, with a sample of 50 students from School Cluster 1, Pasrujambe District, Lumajang Regency. Students were divided into Class A (control group) and Class B (experimental group), each containing 25 students. Data analysis using the Independent Sample t-test revealed that both variables rejected the null hypothesis and accepted the alternative hypothesis. The significance values obtained were 0.009 for critical thinking skills and 0.001 for learning outcomes, both below the 0.05 threshold. These results demonstrate statistically significant differences between the control and experimental groups. The process of creating and presenting work within the PBL framework during classroom instruction. This process are development of critical thinking skills, subsequently impacting learning outcomes positively. Significant differences were observed between groups in both critical thinking abilities and science learning achievements. The study concludes that PBL syntax, particularly the components involving creating and presenting work combined with digital comic media, significantly influences students' critical thinking skills and science learning outcomes. This approach offers promising implications for improving educational quality and addressing Indonesia's critical thinking challenges in elementary education.

Keywords: PBL; Digital Comic; Critical Thinking; Learning Outcomes.

ABSTRAK

Rendahnya skor PISA 2022 di bawah standar yang menunjukkan kemampuan berpikir kritis negara Indonesia masih rendah. Kemampuan berpikir kritis penting karena dapat diterapkan dalam kehidupan sehari-hari. Hal ini juga penting dalam pembelajaran yang berhubungan dengan kehidupan sehari-hari seperti Ilmu Pengetahuan Alam dan Ilmu Pengetahuan Sosial (IPAS) yang

sifatnya interdisipliner. Tujuan penelitian ini adalah untuk mengkaji pengaruh model *problem-based learning* (PBL) berbantuan media komik digital terhadap kemampuan berpikir kritis dan hasil belajar IPAS peserta didik di sekolah dasar. Penelitian ini menggunakan metode *quasi experiment* dengan rancangan *posttest only control group design* dengan populasi seluruh peserta didik kelas IV dan sampel penelitian sebanyak 50 peserta didik di Gugus Sekolah 1, Kecamatan Pasrujambe, Kabupaten Lumajang. Kelas dibagi menjadi 2, Kelas A sebagai kelompok kontrol sedangkan kelas B sebagai kelompok eksperimen dengan jumlah masing-masing kelas ada 25 peserta didik. Data dianalisis dengan menggunakan uji-t Sampel Independen, kedua variabel sama-sama menolak H₀₁ dan meneri H_{a1} dengan hasil analisis didapatkan nilai signifikansi keterampilan berpikir kritis adalah 0,009 dan untuk hasil belajar adalah 0,001 (keduanya kurang dari 0,05). Proses menciptakan dan menyajikan karya pada PBL saat pembelajaran di kelas mendorong keterampilan berpikir kritis berkembang sehingga berdampak pada hasil belajar. Hasil tersebut juga ditunjukkan dengan hasil signifikan antara kelompok kontrol dengan kelompok eksperimen dalam keterampilan berpikir kritis maupun hasil belajar IPAS. Maka, dapat disimpulkan bahwa sintaks yang digunakan model PBL terutama menciptakan dan menyajikan karya dipadukan dengan media komik digital memiliki pengaruh yang signifikan terhadap keterampilan berpikir kritis dan hasil belajar IPAS peserta didik.

Kata Kunci: PBL; Komik Digital; Berpikir Kritis; Hasil Belajar.

INTRODUCTION

The 4Cs (critical thinking, creativity, collaboration, and communication) are a key focus of 21st-century education. These 4Cs are crucial for students to be prepared to face current and future challenges (Sani, 2019). The 2022 PISA results indicate that Indonesia's critical thinking skills are still low, scoring only 19 points, compared to 33 points for OECD countries (OECD, 2023). The independent curriculum demands that teachers implement innovative learning strategies to develop the 4Cs, including critical thinking. Science and Natural Sciences (IPAS) is one of the subjects that utilizes critical thinking skills in learning activities. Students need to master critical thinking skills to understand and understand scientific concepts related to real-life situations (Marudut et al., 2020). The importance of critical thinking skills presents a new challenge for elementary school science and science teachers in the classroom, enabling them to enhance critical thinking skills, which in turn will improve Indonesia's PISA score.

Researchers still encounter learning using conventional or outdated learning models during observations in several schools. This is also directly proportional to the low learning outcomes of students in some of these schools. Learning outcomes can be improved through innovative learning models (Dwipranoto et al., 2025). Innovative learning models must be implemented in the independent curriculum, one of which is the problem-based learning (PBL) model. This problem-based learning (PBL) model focuses on solving real-life problems in the learning process, encouraging students to think critically. After solving the problem, students review their understanding of the concepts learned, and evaluations are conducted to measure their progress (Zainal, 2022). This model is appropriate for application in science and science learning in the classroom. According to Safitri et al. (2023) PBL is an innovative learning model that is very appropriate for use in science and science subjects because it allows students to think critically in solving problems related to events in the surrounding environment. PBL can be implemented in classroom learning with the help of various learning media. According to Puspitasari et al. (2022) PBL can be implemented with the help of learning media in various forms.

Comics are a form of media that combines interesting images and text, but are rarely used in learning. Comics have two versions: comics in book form and comics in digital form.

Researchers want to apply this attractive comic display as a form of learning media in the classroom that is still rarely used. Digital comics are one form of learning media that can be used in the classroom (Ratnasari & Ginanjar, 2019). Digital comics are an interesting and effective learning medium for creating a fun learning experience. Comics have a significant impact on the cognitive and affective development of students because their use in learning is in accordance with the constructivism theory put forward by Jean Piaget and Lev Vygotsky (Sutomo & Kusmaryono, 2025). According to Khusniyah et al. (2022) digital comics are illustrated stories that use distinctive characters to convey information or messages through electronic devices. The implementation of PBL at the elementary school level can be implemented by using interesting media, one of which is digital comics. Dewi et al. (2024) suggested that digital comics can be integrated with the PBL model and have a positive impact on students' critical thinking skills when understanding the material. Lishetiyana et al. (2025) concluded that student enthusiasm increased with the use of digital comics, which influenced learning motivation and improved student learning outcomes (Kurino et al., 2024).

Pasrujambe 01 Public Elementary School, Pasrujambe District, showed moderate learning outcomes in science and natural sciences (IPAS), but an interview with one of the teachers stated that student learning outcomes could be improved. Based on the final summative score data for the science and natural sciences semester, 36% or 18 out of 50 students scored below the minimum competency standard (KKTP) of 70. KKTP needs to be achieved through innovative learning (Dwipranoto et al., 2025). Improved learning outcomes can be achieved through innovative learning by teachers (Wulandari & Nisrina, 2023). Several previous studies have examined the impact of the PBL model combined with comic media. Research Dewi R. A. M. et al. (2024) found that when studying photosynthesis material, the application of the PBL model with digital comics on the critical thinking skills of fourth-grade students had a positive impact. Meanwhile, in line with that, Wahdania et al. (2024) concluded that there was a significant and positive influence of the application of the PBL model with comics on critical thinking skills and student learning outcomes. Ariani (2020) concluded that the problem-based learning model during classroom instruction can improve elementary school students' critical thinking skills. Based on the previous research mentioned above, it can be concluded that the PBL model using digital comics has an impact on critical thinking skills and learning outcomes. However, these variables will be re-examined using different methods, regions, and approaches to demonstrate the robustness of the study's findings (Rahayu, 2025).

Based on the description of the background, the importance of the PBL model with digital comic media is linked to critical thinking skills and learning outcomes. This study aims to examine and determine the effect of the PBL model with digital comic media on the critical thinking skills and science learning outcomes of elementary school students.

METHODS

Type and Design

This research method applies quantitative methods. Sugiyono (2023) Quantitative methods involve collecting statistical data from a specific population or sample using research instruments. The chosen model is a quasi-experimental model with a posttest-only control group design. The quasi-experimental model was chosen because the researcher will conduct real-life research on classroom events during learning. One characteristic of the quasi-

experimental model is that the researcher conducts the research naturally, and all external factors that occur during the research remain present (Anantasia & Rindrayani, 2025). This posttest-only control group design was used because the researcher would only treat one group (class) in learning through digital comic media in a problem-based learning model, while the other groups would be taught without using digital comic media and a problem-based learning model. Posttest-only control group design is a study that provides special treatment to one group (the experimental group), while the other group is not given any treatment (the control group). (Sugiyono, 2019). Specifically, the design form is explained in table 1..

Table 1. Posttest Only Control Group Design Plan

Group	Treatment	Posttest	Information
Experiment	X	O ₁	Learning using the PBL model with digital comic media
Control	-	O ₂	Learning without using the PBL model with digital comic media

(Source: Sugiyono (2014))

Data and Data Sources

The data processed is quantitative data. The research data was collected since July 22, 2025 and was carried out for two weeks with a duration of 2 hours of lessons in 4 meetings at SDN Pasrujambe 01 Pasrujambe Village, Pasrujambe District, Lumajang Regency. The population of this study was all fourth-grade students at seven public elementary schools in guslah 1 Pasrujambe District, Lumajang Regency, in the 2025/2026 academic year. The results of the homogeneity test (one-way anova) calculation of the initial ability data from the Social Studies subject scores in the even semester of grade III showed that there were 6 homogeneous classes ($0.448 > 0.05$). The sample was determined through the Cluster random sampling technique with the samples used being students from 2 classes IV at SDN Pasrujambe 01, Pasrujambe District, Lumajang Regency, namely classes IVA and IVB, each with 25 students, so the total was 50. This selection was carried out because of the similarity of student characters to minimize the potential for bias that arises due to variations in differences in background, character, and student abilities.

Data collection technique

Data collection for this study was conducted through documentation and tests. Documentation was used to obtain student data, as well as end-of-semester summative grades, teaching modules, photographs, and other supporting documents. The tests in this study were used to obtain data in the form of questions, which were administered at the end of the lesson or in the fourth meeting, lasting two hours, and were directly supervised by the researcher.

The questions given contain 6 descriptive questions used in the critical thinking ability test and for learning outcomes using 20 multiple choice questions. The goal is to measure students' critical thinking abilities and learning outcomes after being given treatment in learning activities. The indicators of critical thinking abilities used are interpretation, analysis, evaluation, inference, explanation and self-regulation. Learning outcome indicators include

knowing the definition of magnets correctly, explaining the properties of magnets correctly, applying the concept of magnetic force, analyzing the benefits of magnetic force in daily activities and concluding the results of the magnetic force discussion critically. The assessment for multiple choice questions is correct with a score of 1 and wrong with a score of 0, while for essays the score is used on a scale of 1-4.

Expert and practitioner validators will test the validity level of the instruments in this study. The validators of this research instrument are Dr. Singgih Bektiarso, M.Pd., M.CE as a lecturer at the Faculty of Teacher Training and Education, Master of Elementary Education Study Program, University of Jember and a competent class teacher. Both validators were asked to assess the suitability of the instrument (test questions) with the research objectives, variable indicators, and curriculum materials. The questions created were not pre-tested according to the validator's suggestion because the question creation had been adjusted to the research objectives and variable indicators to be achieved. The level of question reliability was not calculated because in multiple-choice questions there are clear achievement indicators for learning outcomes, while in essay questions are subjective to measure critical thinking skills.

Data analysis

All statistical analyses were processed using the Statistical Package for the Social Sciences (SPSS) application, including descriptive analysis and quantitative data analysis using the t-test. The significance level (α) was set at 0.05. The decision to reject or accept the null hypothesis (H_0) was based on a comparison of the p-value with α . If the p-value is <0.05 , the hypothesis is rejected, indicating a statistically significant difference or influence.

RESULTS AND DISCUSSION

The Influence of the PBL Model with Digital Comic Media on Critical Thinking Skills

The influence of the PBL model with digital comic media on critical thinking skills using indicators of interpretation, analysis, evaluation, inference, explanation, and self-regulation. The posttest results from the experimental class and the control class on critical thinking skills can be seen in Table 2.

Table 2. Posttest Results of Critical Thinking Skills of Experimental Class and Control Class

Indicator	Experiment Class				Control Class			
	\bar{X}	SD	X_{max}	X_{min}	\bar{X}	SD	X_{max}	X_{min}
Interpretation	89	12.67	100	75	82	13.54	100	50
Analysis	88	12.75	100	75	80	12.50	100	50
Evaluation	85	12.50	100	75	83	15.68	100	50
Inference	84	12.25	100	75	78	15.00	100	50
Explanation	88	12.75	100	75	77	14.29	100	50
Self regulation	79	11.81	100	50	73	14.29	100	50
Average	85.50	8.68			78.83	7.97		

Based on the data in table 2 on the critical thinking skills of 25 students in the experimental class on the "interpretation" indicator got an average score of 89 and the control class was 82, this data shows a difference in the ability to re-explain related to the problems presented. Likewise, the "analysis" indicator shows a difference with an average score of 88 which shows the ability to identify problems is superior to the control class whose average score reaches 80.

The "evaluation" indicator shows that students are able to evaluate arguments and get an average score of 85 in the experimental class compared to the control class whose average score is 83. Likewise, the "inference" indicator, in the experimental class achieved an average score of 84 and the control class got an average score of 78 which shows the ability of students to make conclusions in the experimental class is higher. The "Explanation" indicator of the experimental class shows the ability to explain results and provide higher reinforcement, namely achieving an average score of 88 compared to the control class with an average score of 77. Finally, the "self-regulation" indicator in the experimental class received an average score of 79 indicating that they can review and correct themselves, higher than the control class which achieved an average score of 73.

Below is a data visualization graph in the form of a bar graph to make it easier to see the comparison.

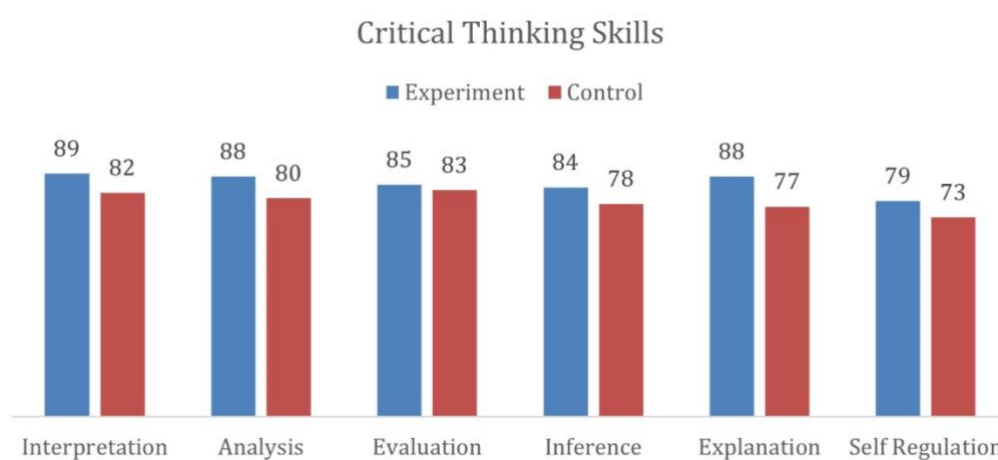


Figure 1. Comparison of Posttest Results of Control and Experimental Classes on Critical Thinking Skills

The overall results obtained from the critical thinking ability indicators show that there is a difference between the experimental class and the control class, which is shown in the average score obtained by the experimental class of 85.50, which is greater than the average score obtained by the control class, which is 78.83 and there is a difference of 6.67.

Before data analysis (hypothesis testing) on student learning outcomes, a normality test using the Kolmogorov-Smirnov test and a homogeneity test using the Homogeneity of Variance test in Levene Statistics were conducted. The significance value for the normality test in the experimental class was 0.081, and the significance value for the normality test in the control class was 0.200, indicating a normal distribution (significance >0.05). The results of the homogeneity test showed a significance value of 0.246 (>0.05). Thus, homogeneity between the experimental and control classes for posttest score variance was achieved.

The posttest scores of students' critical thinking skills in the experimental class and the control class during the hypothesis test obtained results that can be seen in Table 3.

Table 3. Posttest t-test scores for Critical Thinking Skills of Students in the Experimental and Control Classes

Independent Samples Test							
	t	df	Sig. (2- tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
						Lower	Upper
Equal variances assumed	-2,708	48	0.009	-6,480	2,393	-11,292	-1,668
Equal variances not assumed	-2,708	47,348	0.009	-6,480	2,393	-11,294	-1,666

Based on table 3, it shows that the calculation of the hypothesis test obtained a significance value (2-tailed) of 0.009 which states that H_0 is rejected (less than 0.05) so that H_a is accepted, so it is proven that there is a difference between the average critical thinking ability of students in the control class and the experimental class. So it can be concluded that there is a significant influence on the PBL model with digital comic media on the critical thinking ability of elementary school students. A significant influence is shown from the results of the data analysis of the PBL model with digital comic media on the critical thinking ability of students in grade IV of the Elementary School Science subject ($t(48)=-2,708$, $p=0.009$). The similarity of the results with the research of Dewi et al. (2024) which concluded that there is a positive impact that arises on critical thinking ability when digital comics are used in the PBL model to understand the material.

Theoretical Discussion on the Influence of the PBL Model with Digital Comic Media on Critical Thinking Skills

The PBL model using digital comics as a medium has an impact on students' critical thinking skills. This was realized during the implementation of the PBL stages in the experimental class through five syntaxes. First, students are given a problem as a starting point. Second, students are organized to study and work in groups. Third, they conduct investigations independently or in groups to find solutions. The fourth stage is to create and present a product or work as a result of the investigation. Finally, they are asked to analyze and evaluate all stages of problem-solving that have been implemented (Arends, 2012). Students are initially presented with a problem related to a real-life context, namely why some objects are attracted to magnets and how magnets are not and how to utilize magnets in everyday life. Then, in groups, students solve the problem by finding solutions. The application of the PBL model positions the center of learning activities on students and confronts them with a variety of real-life problems, which then encourages them to find and determine solutions to these problems (Meilasari & Yelianti, 2020). In the implementation of PBL, students are given full responsibility for their own learning process directly with teacher guidance. The problems presented will accustom students to critical thinking when solving them during learning activities. Critical thinking is the ability to analyze ideas or concepts in greater detail, select and differentiate them in detail, then identify them, and finally conduct a study (Wijaya, 2010). The problems presented are problems frequently encountered in real life. The problems presented are contextual to align with one of the goals of current education: to

enable students to think critically in problem-solving so that learning outcomes can also be maximized.

Teachers play a crucial role in the learning process, where they are responsible for the learning process. In 21st-century education, teachers need to implement innovative, creative learning, and integrate digital devices in line with technological advancements. The use of digital comics in experimental classes provides students with the experience of learning science material and presenting high-level analytical problems. Digital comics play a role in students' critical thinking processes. The digital comic "Adventures with Magnets" contains story sections that students can solve and stimulates their critical thinking skills. Students' critical thinking skills in experimental classes using the PBL model and digital comics can improve, enabling them to master various aspects of critical thinking, such as interpretation (deciphering meaning), analysis (identifying), evaluation (examining ideas and opinions), inference (making conclusions), explanation (stating results), and self-regulation (reviewing and correcting oneself) (Fasione, 2015). The "interpretation" indicator is demonstrated when students decipher the meaning of phenomena from the comic. The "analysis" indicator is demonstrated when students identify the properties of magnets from the comic and experiments. The "evaluation" indicator is demonstrated when students examine ideas/opinions or suggestions across groups. The "inference" indicator is demonstrated when students draw tentative conclusions from the magnetic force experiment data they have conducted. The "explanation" indicator is demonstrated when students state the results of their discussion/experiment in a presentation. Finally, the "self-regulation" indicator is demonstrated when students reflect on the entire learning process, identify errors, and understand how to improve them in the future.

In contrast, in the control class, conventional learning tended to be less stimulating for students' critical thinking. The teacher, as the center of learning, passively engaged students, as they only received material from textbooks or lectures and completed rote exercises. As a result, critical thinking indicators were underdeveloped.

The Influence of the PBL Model with Digital Comic Media on Science Learning Outcomes

The learning outcomes of students in the experimental class and the control class were analyzed descriptively, which can be seen in Table 4 below.

Table 4. Science Learning Outcomes of Students in the Experimental Class and Control Class

Class	Posttest Data			
	\bar{X}	SD	X_{max}	X_{min}
Experiment	83.20	8.40	100	70
Control	73.60	5.87	85	65

Based on the data in table 4, in the experimental class the average learning outcome was 83.20 consisting of the highest score of 100 and the lowest of 70. For the control class, it had an average of 73.60 with the highest score of 85 and the lowest of 65. After the posttest value was obtained, a normality and homogeneity test was carried out, which in the normality test obtained results on the learning outcome value in the experimental class with a significance value of 0.66 and 0.60 in the control class so that it was proven to be normally distributed (the significance value was >0.05). The posttest value of the learning outcomes of the experimental class and the control class were tested for homogeneity, which then obtained a significance value of $0.060 > 0.05$, so it can be concluded that the posttest value of the learning outcomes of the experimental class and the control class were homogeneous.

The next step is to conduct a t-test to compare the averages of the two data groups. The following data shows the results of the difference test for the average post-test scores for the science learning outcomes.

Table 5. Posttest t-test of Learning Outcomes of Experimental Class and Control Class

Independent Samples Test							
	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
						Lower	Upper
Equal variances assumed	-4,684	48	0.001	-9,600	2,049	-13,721	-5,479
Equal variances not assumed	-4,684	42,909	0.001	-9,600	2,049	-13,733	-5,467

Based on table 5, the calculation of the significance value of the hypothesis test (2-tailed) is 0.001, so H_0 is rejected (<0.05) so that H_a is accepted, which is proven by the difference between the average learning outcomes of students in the control class and the experimental class. Thus, it is concluded that there is a significant influence on the PBL model with digital comic media on the science learning outcomes of elementary school students. A significant influence was obtained from the results of processing data on science learning outcomes using the PBL model with digital comic media on elementary school students ($t(48)=-4,684$, $p=0.001$). This was realized during the implementation of the treatment in the experimental class, the role of students in learning became more active due to the use of the right innovative learning model. (Murray-Harvey, 2013) active learning can be created through the application of the problem-based learning model.

Theoretical Discussion on the Influence of the PBL Model with Digital Comic Media on Science Learning Outcomes

Glatthorn and Craft-Tripp's theory states that constructivism theory is the basis of the problem-based learning model so that students are interested in learning and always actively participate in learning activities (Pecore, 2012). Researchers integrate digital comic media into PBL steps to create a more interesting and enjoyable learning atmosphere. In addition to improving material understanding, digital comics also support strengthening student self-confidence in learning. Thus, the creation of an interesting and enjoyable learning atmosphere to encourage students to be more enthusiastic and active in learning. Learning motivation can be increased through the use of digital learning media, which can be a means to create a dynamic and attractive learning environment (Widiastari & Puspita, 2024). This can be a foundation for teachers and learning developers to consider visual-narrative media as part of a fun, meaningful, and positive learning strategy (Putri & Sukasih, 2025). Digital comic media can motivate students in learning and help them transform narratives into illustrations. This makes information easier to remember in the long term. Illustrations also help students understand specific forms or examples of the material, and can increase interest in reading (Agesti et al., 2024).

The application of digital comic media in the experimental class is found in two initial syntaxes of PBL, namely: orienting students to the problem and organizing students in

learning. Digital comic media contains stories and images covering the topic "Magnetic Force". The use of this digital comic media is very easy and flexible, thus supporting students in learning. Researchers can also introduce simple technology through digital comics. The effectiveness of digital comics in learning is seen by the increase in student learning outcomes (Narestuti et al., 2021). Through PBL and digital comic media, students can hone their cognitive abilities. Learning objectives can be an indicator of successful learning outcomes because they can be achieved through activities in classroom learning. Learning can be said to be successful if the learning objectives are achieved, both individually and in groups (Qasim & Maskiah, 2016). Through reading digital comics, students can understand the definition of magnets and can explain the properties of magnets. Experimental activities and discussions in class by students in applying the concept of magnetic force so that discussions facilitate students in analyzing the differences in the benefits of magnetic force in daily activities.

Conventional learning in the control class failed to maximize their cognitive development. The teacher-centered learning resulted in students' learning objectives being less than optimally achieved. This was due to the lack of stimulating learning models and media..

This study faced limitations in that the digital comics used were still online, meaning that internet connection issues rendered the comics unusable. The devices used by researchers to access the digital comics were laptops, Chromebooks, and mobile phones, resulting in different displays that were confusing for students. Furthermore, the tests were still paper-based, making them less efficient.

Given the aforementioned weaknesses, further research is expected to develop digital comics in both online and offline formats to avoid the impact of internet connection quality, using uniform devices to achieve a consistent appearance and avoid confusing students, and creating digital question formats to increase learning effectiveness. Other steps that can be taken to implement this model and media in other subjects across all classes.

CONCLUSION

Based on the results obtained in the study, there is a significant influence of the PBL model with digital comic media on the critical thinking skills of elementary school students. For critical thinking skills, there is a difference in the average of the control class and the experimental class ($t(48)=-2,708$, $p=0.009 <0.05$). This shows that the influence of PBL with digital comic media on critical thinking skills occurs during the science learning activities, especially in the analysis and explanation indicators. These two indicators are a form of student outcomes in thinking critically to find a solution to the problems faced. In the science learning outcomes, there is a difference in the average learning outcomes of the control class and the experimental class ($t(48)=-4,684$, $p=0.001 <0.05$). This provides an illustration that the innovative learning model combined with interesting media (digital comics) makes learning in the classroom more active because the focus of learning is on students so that at the end of the learning the learning outcomes get satisfactory results. Comparison of critical thinking skills and learning outcomes obtained by the experimental class with the control class can be one solution to improve education through innovative learning models with interesting media.

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