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The Influence of PJBL-based Student Worksheets on Improving Their Critical Thinking Ability and Digital Literacy

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Pengaruh Lembar Kerja Siswa Berbasis PJBL Tentang Peningkatan Kemampuan Berpikir Kritis Dan Literasi Digital Mereka

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ABSTRACT

This paper examines whether there is a difference in the results of the average scores of those who carry out learning using student worksheets based on the PJBL model and those who do not use student worksheets as well as comparing the efficiency between the use of student worksheets based on the PJBL model and the use of other methods on critical thinking skills and digital literacy in electrical circuit learning material at *VI-grade students of SD Negeri 007 Sekip Hulu. This research is a quasi-experimental research using a post-test control group design. The study used a population of 44 students of class VI, which consists of 22 students in the experimental class (class VIa) who used PjBL-based worksheets, and 22 students in the control class (class VIb) who did not use the worksheets. Data were collected through tests and analyzed using the Paired Sample T-Test. The results indicate that the value of Sig.(2-tailed) 0.000 is less than 0.05, which implies that there is a significant average difference between the class that used PjBL-based Student Worksheets and the class that did not use PjBL-based Student Worksheets on critical thinking skills and digital literacy of students. In addition, the calculation of the N-Gain score test of the experimental class shows 81.0717 or 81.07% with the high and effective category. This value indicates that the use of PJBL-based Student Worksheets efficiently improves students' critical thinking skills and digital literacy in learning at class VI SD Negeri 007 Sekip Hulu in electrical circuit learning material. The conclusion shows that the use of PjBL-based LKPD can improve students' critical thinking skills and digital literacy. The recommendation from the findings conducted by the researcher is that teachers can use PJBL-based LKPD for learning in class or other subjects so that students can be motivated to participate.*

Keywords: worksheets, PJBL, critical thinking, digital literacy

Artikel ini menguji apakah terdapat perbedaan hasil rata-rata skor antara yang melaksanakan pembelajaran menggunakan LKPD berbasis model PjBL dan yang tidak menggunakan LKPD serta membandingkan efisiensi antar penggunaan LKPD berbasis model PjBL dan penggunaan metode lain pada keterampilan berpikir kritis dan literasi digital pada pembelajaran materi rangkaian listrik kelas VI SD Negeri 007 Sekip Hulu. Penelitian ini merupakan penelitian eksperimen semu (kuasai eksperimen) dengan menggunakan desain *post-test control group*. Penelitian menggunakan populasi sebanyak 44 peserta didik kelas VI yang terdiri dari 22 peserta didik kelas eksperimen (kelas VIa) yang menggunakan LKPD berbasis PjBL, dan 22 peserta didik pada kelas kontrol (kelas VIb) yang tidak menggunakan LKPD tersebut. Data dikumpulkan melalui tes dan dianalisis menggunakan uji Paired Sample T-Test. Hasil penelitian menunjukkan bahwa nilai Sig.(2-tailed) 0,000 lebih kecil dari 0,05, yang mengandung pengertian bahwa terdapat perbedaan rata-rata yang signifikan antara kelas yang menggunakan LKPD berbasis PjBL dan tidak menggunakan LKPD berbasis PjBL terhadap kemampuan berpikir kritis dan literasi digital peserta didik. Selain itu, perhitungan uji N-Gain Score kelas experiment menunjukkan 81,0717 atau 81,07%, dalam kategori tinggi dan efektif. Nilai ini menunjukkan bahwa penggunaan LKPD berbasis PjBL secara efisien meningkatkan kemampuan berpikir kritis dan literasi digital peserta didik dalam pembelajaran kelas VI SD Negeri 007 Sekip Hulu dalam pembelajaran materi rangkaian listrik. Kesimpulan menunjukan bahwa penggunaan LKPD berbasis PjBL dapat meningkatkan kemampuan berpikir kritis dan literasi digital. Rekomendasi dari peneliti terkait hasil temuan yaitu guru dapat menggunakan LKPD berbasih PjBL untuk pembelajaran pada kelas atau pelajaran lain sehingga peserta didik dapat termotivasi mengikuti pembelajaran.

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Kata Kunci: ***LKPD, PJBL, berpikir kritis, literasi digital***

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INTRODUCTION

Learning is an activity that is a basic need for every individual. In learning there is a process that is built by the teacher in an effort to improve the moral and intellectual abilities possessed by students, including the ability to think, the ability to solve problems, the ability to be creative and the ability to master material and so on (Nugraha, 2022:34). Learning needs to undergo renewal in order to create quality learning. In the 21st century, learning requires students to play an active role in exploring their own information and knowledge. According to Minister of Education and Culture Regulation number 13 of 2014, the characteristics of the 21st century are that it requires learning with teachers acting as facilitators and motivators for students so that learning activities are student-centered. The success of students in achieving learning goals is determined by the students and the teacher. Learning can be successful if students have the awareness and willingness to learn. Apart from that, teachers play a role in determining the success of learning activities. Teachers not only provide material but teachers must also be able to play a role in facilitating and guiding students (Siahaan et al., 2022:67).

Critical thinking ability is a student's ability to process and analyze information in a systematic, logical and objective way (Saputra, 2020:39). Science learning, critical thinking skills are very important because they allow students to understand abstract concepts and apply them in real world contexts. Through critical thinking skills, students can develop skills to analyze, evaluate and solve problems involving science (Masitah et al., 2022:63).

The expectations and reality of students' critical thinking abilities in science learning are often not aligned. The results of observations made on 44 students at SD Negeri 007 Rengat on December 20, 2022 showed that the Final Semester Examination scores in science lessons were still low and had not yet reached the KKM, namely 72. The low critical thinking ability in science lessons has been identified by several studies (Ekawati et al., 2018). Several studies show that students have difficulty developing critical thinking skills, both in understanding scientific concepts and in making decisions based on evidence and rational arguments (Alvira, 2019:21).

Previous research conducted by Samosir (2019:12) shows that high school students in Indonesia have low critical thinking abilities in learning science. The findings found that students' critical thinking skills still need to be improved, especially in terms of understanding and applying scientific concepts. Other research conducted by Paringin et al., (2016:31) also shows that students' critical thinking abilities in science learning for junior high school students in Aceh are still low. This research shows that students have difficulty identifying valid arguments and making decisions based on evidence and rational arguments.

Apart from students having critical thinking skills, digital literacy is also one of the students' skills. Digital literacy is the ability possessed by an individual to use, understand and participate effectively in the digital world (Sutisna, 2020:53). This involves an understanding of digital technology, the ability to use digital devices and applications, and an understanding of security, privacy and ethics in the use of technology. Digital literacy covers a wide range of skills and

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knowledge, including technical skills, namely the ability to use digital devices, such as computers, smartphones or tablets, as well as operate relevant applications and programs. This includes skills such as navigating the internet, sending emails, using social media, or managing digital files (Kuncoro et al., 2022:26).

In learning activities, teachers are required to have good process skills in presenting material, innovate in making learning centered on students, and encourage creativity in developing the character and potential of students (Himmah et al., 2020:18). The teacher's role in teaching and learning activities is not only as a learning resource, but also as a facilitator, so that a teacher must be able to plan learning with real actions in order to provide a meaningful learning experience and students feel happy by increasing their digital literacy competencies (Silitonga et al., 2022:25).

Based on the description above, the solution proposed to improve students' critical thinking skills and digital literacy is the use of Project Based Learning (PjBL) based student worksheets. Aldiyah, (2021:4) explains that one way to help students in learning activities and process information more effectively is to use student worksheets which are specially designed so that they can help guide and support the learning process. Furthermore, Paramita et al (2019:3) also stated that there are differences and influences in the use of PjBL-based science student worksheets on science learning outcomes. Likewise, Wulandari and Novita (2018) stated that the overall project results using PjBL-based student worksheets can train students' abilities to think critically.

The Project Based Learning (PjBL) learning model is very suitable for increasing students' motivation and skills in various aspects. In PjBL, students are given the freedom to develop creative solutions in solving problems that are relevant to the real world which can provide increased creative and innovative thinking abilities. PjBL involves students in projects or assignments that require real problem solving. This can help students develop skills in identifying, analyzing, and finding solutions to complex problems. In PjBL, students are asked to connect the knowledge they have with real world problems or issues. This helps students to see the connection between learning material and its application in students' lives. In PjBL, students are invited to question, analyze and evaluate the information they encounter in the projects being worked on by students which can improve students' critical and analytical thinking skills. Through projects or assignments in PjBL, students can develop numeracy literacy skills (the ability to understand and use numbers and data) as well as digital literacy (Faridah et al., 2022:2). Compared to conventional learning models, PjBL has the advantage of improving students' skills and understanding because it actively involves them in learning activities that are relevant and meaningful to them. By involving students in direct experience and encouraging critical thinking, PjBL can help students become more independent learners and ready to face real world challenges (Maulidah, 2019:18). Based on the description above, the researcher is focused to investigate "the influence of PjBL-based student worksheets on improving critical thinking ability and digital literacy".

THEORITICAL REVIEW

PjBL Based Student Worksheets

Student worksheets aim to facilitate students' science process thinking skills. Student worksheets are basically done with teacher guidance step by step, especially for students who have never had a worksheet. By developing student sheets, students can provide opportunities for social interaction such as working together, respecting other people's opinions, working in groups. The student worksheet will contain tasks to encourage students to think and measure students' abilities in learning.

Student Worksheets are an extension of LKPD which are sheets of paper related to projects, questions that must be asked during class using the objects and materials studied (Suwastini et al., 2022:27). Preparing the student worksheets consists of several steps. Ariani dan Meutiawati, (2020:45) stated that the preparation steps include: (1) Curriculum Analysis; (2) Preparation of student

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worksheets Needs Map; (3) Determination of the student worksheets title; (4) Formulation of Basic Competencies; (5) Determination of assessment tools; (6) Preparation of teaching materials.

Irfana et al., (2022:65) stated that the Project based learning model is an innovative learning model which has the characteristics of being student centered and positions the teacher as a facilitator and motivator for students so that students are given many opportunities to create a project which is based on what he has learned according to the creativity of each student.

Project Based Learning has the following characteristics: (1) students make decisions about a framework; (2) there are problems or challenges posed to students; (3) students design a process to determine solutions to the problems or challenges posed; (4) students are collaboratively responsible for accessing and managing information to solve problems; (5) the evaluation process is carried out continuously; (6) students periodically reflect on the activities they have carried out; (7) the final product of the learning activity will be evaluated qualitatively; and (8) the learning situation is very tolerant of errors and changes (Hikmah, 2020:28).

According to Hikmah, (2020:28), Student Worksheets have 4 benefits, namely: (1) The teacher's role will be to further activate students with teaching materials. (2) As teaching materials that make it very easy for students to digest the material that has been given. (3) Facilitate the implementation of education for students. (4) As teaching material that is rich in tasks for practice.

The objectives of the student worksheet are: (1) Delivering teaching material that functions to make it easier for students to understand the material presented by the teacher. (2) Presenting students' obligations to improve their mastery of the material that has been presented. (3) Students are trained to act independently in the learning process. (4) Facilitate an educator in giving work or assignments to students. (5) Support and strengthen learning objectives by achieving indicators, basic competencies and core competencies that are the same as the current curriculum. (6) Helping students achieve learning goals (Aldiyah, 2021:5).

In essence, project learning emphasizes results. In contrast, the syntax of the project-based learning model described by Alim, (2022:35) consists of the following steps: (1) Determining Fundamental Questions (starting with important questions), (2) Developing a Project Plan (designing the project), (3) Preparation of schedules carried out in class (making schedules), (4) Monitoring students and the progress of student projects and evaluating the experience that has been gained. Suci et al., (2022:48) stated that there are 3 syntaxes for this learning model. Here is the syntax:

1. Planning, namely the activity of designing a project by presenting a real problem as a problem topic, planning and creating an investigation design.
2. Creating (Implementation), namely developing ideas or thoughts that have been planned and connecting them with various ideas that students have so that they are able to build projects given by the teacher or can produce certain products.
3. Processing. The final stage that can be carried out in the syntax of this learning model is the project presentation and evaluation stage. This stage can be carried out by students by presenting the results of the project that has been created, while in the evaluation stage, the teacher can carry out reflection activities on the project.

Critical Thinking

Critical thinking skills are very important in solving everyday problems. Critical thinking is a reflective thinking skill towards a problem that involves cognitive processes (Saputra, 2020:53). Then, according to Syafitri et al., (2021:34), critical thinking is a process that emphasizes logical and rational beliefs and provides a set of standards and procedures for analysis, testing and evaluation. On the other hand, according to Sumargono et al., (2022:23) critical thinking is the ability to analyze, interpret and evaluate an idea or reason. Today critical thinking is seen as a very useful fundamental skill, like literacy and numeracy. Samosir, (2019:18) shows that critical thinking is thinking that is

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above ordinary thinking and is not only able to remember material but uses and manipulates it in learning the latest things.

Arif et al., (2019:42) stated that there are five indicators of critical thinking, namely (1) providing a simple explanation (elementary clarification); (2) concluding (inference); (3) concluding (inference); (4) make further explanations (advanced clarification); (5) organize strategy and tactics (strategy and tactics), and (6) build basic skills (basic support).

Digital Literacy

There are several opinions that state digital literacy. Ediati et al., (2018) stated that the ability to use digital technology and information effectively and efficiently in various everyday situations is known as literacy. According to Mariani et al., (2022:56) who wrote about digital literacy, it refers to a person's ability to access information via the internet and computer-based media. Dinata, (2021:23) believes that digital literacy refers to a person's ability to access information via the internet and their own personal computer. Then Fidiastuti et al., (2019) said digital literacy is the ability to understand, analyze, collect, analyze, change and evaluate information that has been obtained using digital technology.

Digital literacy is connected to eight key components, according to research by Buckingham (2007) (Kuncoro et al., 2022:27). The first four are representation, language, product, and audience. Another type of digital literacy is visual literacy, which is a skill that can be displayed by integrating the five senses of knowledge. As a result, the Ministry of Communication and Information will produce competencies in the form of digital security by combining cultural and social capabilities.

RESEARCH METHODS

This research was quantitative research with a quasi-experimental design. The instrument used was a test to determine critical thinking skills and digital literacy. Data collection was carried out by giving a pre-test and post-test to the experimental and control classes (Creswell, 2013). The data that had been obtained was then presented in table form. The data that had been obtained was then tested for research prerequisites and then a hypothesis test was carried out using the t test (Moleong, 2016:34). The N Gain Score test was then carried out to see the effectiveness of the treatment that had been carried out. The research population was class VI students at SD Negeri 007 Sekip Hulu, with a total of 44 people divided into two groups. Class VIa with 22 students was the experimental class, while class VIb with 22 students was the control class. Using this research design, the researcher can compare the differences in results between the experimental class, namely the class that uses students worksheets based on the PjBL model and the control class, namely the class that does not use students worksheets based on PjBL. Through statistical analysis, the researcher can test whether the differences were statistically significant.

RESULTS

Data Test Results

A normality test is a statistical procedure used to determine whether a dataset follows a normal distribution or Gaussian distribution. The normal distribution is a specific probability distribution that is characterized by a symmetric, bell-shaped curve. Many statistical methods and tests assume that the data is normally distributed, so normality tests are often conducted to assess whether this assumption is met. The normality test is the Shapiro-Wilk technique. Here are the results:

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Table 1. Result of Normalitas Shapiro-Wilk Test

		Kolmogorov-Smirnova			Shapiro-Wilk		
	Class	Statistic	Df	Sig.	Statistic	Df	Sig.
A	Experiment	.202	22	.020	.753	22	.070
	Control	.227	22	.005	.825	22	.081
B	Experiment	.279	22	.000	.654	22	.063
	Control	.239	22	.002	.851	22	.084

a. *Lilliefors Significance Correction*

The Shapiro Wilk value shows a significance value of 0.070 and 0.081 (Pre test value). The significance values of critical thinking skills and digital literacy in the post test activities of the experimental and control classes were 0.063 and 0.084. Based on the significance value of the Shapiro-Wilk test, it shows that the data from Critical Thinking Ability and Digital Literacy have a normal distribution. The researcher have a strong basis for continuing the analysis with a paired sample t-test which allows comparing the average differences between the experimental and control groups. The homogeneity test was carried out by the researcher. Following are the test results:

Table 2. Levene's Test for Equality of Variance

Variable	Levene's Test for Equality of Variance	Note
Critical Thinking Ability and Digital Literacy Pre Test of Experiment Class	.170	Homogent
Critical Thinking Ability and Digital Literacy Pre Test of Control Class	.285	Homogent

The Levene's Test for Equality of Variance value is greater than 0.05, which indicates that the variance of the experimental and control group data is homogeneous. The data also shows that it is normal and homogeneous so that hypothesis testing can be carried out using the paired sample t test. The Levene's Test for Equality of Variance value shows that the variance of the experimental and control group data is homogeneous. The differences in critical thinking skills and digital literacy between the two groups can be compared fairly by looking at these scores. Apart from that, if the data test results are normal and homogeneous, you can carry out a paired sample t-test. This test compares the average difference between the experimental and control groups in critical thinking skills and digital literacy after using student worksheets based on the PjBL model and without using student worksheets. The paired sample t-test can test whether the observed mean difference between the two groups is statistically significant. These results provide further information regarding the effectiveness of using student worksheets based on the PjBL model in teaching and learning activities in class VI electrical circuits at SD Negeri 007 Sekip Hulu.

T Test Pre-test scores test whether there is a difference in the results of the average scores for critical thinking skills and digital literacy in learning Electrical circuit material in terms of the learning outcomes achieved by class VI students at SD Negeri 007 Sekip Hulu in the experimental and control classes before treatment in the class experiment. This test was carried out using the Paired Sample T-Test because the number of research samples in the control and experimental classes was the same, namely 22 students. The following are the results of the Paired Sample T-Test:

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Table 3. Paired Samples Statistics Pre Test

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Experiment Class	68.36	22	6.321	1.348
	Control Class	67.09	22	3.115	.664

Table 3 shows the average difference in pre-test results carried out for the control and experimental classes. These results show that the control class had an average score of 67.09, while the experimental class was 68.36, so there was no clear difference between the control and experimental classes. The table also shows that descriptively there is no difference in the average results of critical thinking skills and digital literacy between the control class and the experimental class because the average scores for critical thinking skills and digital literacy in the control class are almost the same. Whether the results of the differences in average values are truly significant or not can be seen in the following "paired samples test" output table.

Table 4. Paired Samples Test Pre Test

		Paired Differences					T	Df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Experiment – Control	1.273	6.943	1.480	1.806	4.351	.860	21	.400

Based on the Sig. value (2-tailed), namely 0.400, which is more than 0.05, it means that there is no significant average difference in critical thinking skills and digital literacy in learning electrical circuit material for class VI SD Negeri 007 Sekip Hulu so that the researcher can provide treat the experimental class by providing PjBL-based student worksheets in the experimental class while the control class does not use PjBL-based student worksheets.

The impact of student worksheets on increasing critical thinking skills

The first hypothesis tests whether there is a difference in the results of the average scores of those who carry out learning using student worksheets based on the PjBL model and those who do not use student worksheets on increasing critical thinking skills in class VI of SD Negeri 007 Sekip Hulu. The Paired Sample T-Test was used to test this hypothesis. This test was carried out because the number of control and experimental class research samples was the same, namely 22 students. The Paired Sample T-Test is used to compare differences between two conditions or treatments measured in the same group. The average value of learning outcomes carried out by students in the control class and experimental class was measured to see differences in critical thinking abilities. Using the Paired Sample T-Test can determine whether any differences in the two groups are statistically significant. The results of this hypothesis test will provide information on whether there is a significant difference in critical thinking skills between the control class and the experimental class which uses student worksheets based on the PjBL model. Assuming the data meets the statistical test requirements so that you can continue the analysis using the Paired Sample T-Test to get results that are more specific and can be interpreted statistically. The following are the results of test .

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Table 5. Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Control	92.5909	22	2.97064	.63334
	Experiment	1.1764E2	22	6.34369	1.35248

Based on the information above, there is a difference in the average test results of the control and experimental classes. The average score obtained by the control class was 92.59, and in the experimental class was 117.64. Thus, descriptively, it is clear that there are significant differences in the control and experimental classes in terms of critical thinking abilities. The average value of the experimental class was 117.64, which was higher than the average value of the control class, which was 92.59, which shows that the use of student worksheets based on the PjBL model had a significant positive influence in providing an increase in critical thinking skills. From these findings, it can be concluded that the use of PJBL-based student worksheets can have a positive impact in improving student learning outcomes. However, it is important to remember that the effectiveness of using student worksheets can be influenced by various factors such as the learning context, the quality of student worksheets, and the teacher's ability to implement student worksheets. The results of the differences in average values are truly significant or not can also be seen in the following "paired samples test" output table.

Table 6. Paired Samples Test

		Paired Differences					T	Df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Control – Experiment	-2.50455E1	7.18117	1.53103	-28.22941	-21.86150	-16.359	21	.000

The result of the Sig. (2-tailed) value in the paired samples test is 0.000 which indicates less than 0.05 so that H01 is accepted which states that there is a significant difference in average scores in classes that use student worksheets based on the PjBL model and classes that not using the student worksheets for critical thinking skills in learning activities in class VI electrical circuit material at SD Negeri 007 Sekip Hulu.

The second hypothesis aims to compare the efficiency between the use of student worksheets based on the PjBL model and the use of other methods on critical thinking skills in learning electrical circuit material. This can be answered by looking at the difference in average scores obtained by students in the control and experimental classes using the N-Gain Score. The results of the calculations can be concluded that the use of student worksheets based on the PjBL model is more effective and efficient in providing an increase in students' critical thinking skills in learning electrical circuit material for class VI SD Negeri 007 Sekip Hulu. The following are the results of the calculations that have been carried out:

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Table 7. N-Gain Score

No	Class	Peningkatan Score	Category
1	Experiment	81.0717 or 81,07%,	High and effective
2	Control	40.6099 or 40.60%,	Medium and Less Effective

Based on the data above, it can be concluded that the N-Gain Score test results for the experimental class show a figure of 81.0717 or 81.07%, which is included in the high and effective category. This shows an increase in scores on the second measurement compared to the first measurement. Meanwhile, data for the control class shows that the N-Gain Score value has a minimum range of 71.01 and a maximum of 134.21. The average N-Gain Score for the control class is 40.6099 or 40.60%, in the moderate and less effective category. This range of N-Gain Score values shows variations in changes in scores in the control class. This value shows that the hypothesis is accepted which means that the use of student worksheets based on the PjBL model is more efficient in providing an increase in critical thinking skills. Class VI electrical circuit material at SD Negeri 007 Sekip Hulu, compared to other methods or approaches used in the control class.

The impact of student worksheets on increasing literacy digital

The hypothesis tests whether there is a difference in the results of the average scores of those who carry out learning using student worksheets based on the PjBL model and those who do not use student worksheets on increasing literacy digital in class VI of SD Negeri 007 Sekip Hulu. The Paired Sample T-Test was used to test this hypothesis. This test was carried out because the number of control and experimental class research samples was the same, namely 22 students. The Paired Sample T-Test is used to compare differences between two conditions or treatments measured in the same group. The average value of learning outcomes carried out by students in the control class and experimental class was measured to see differences in digital literacy. Using the Paired Sample T-Test can determine whether any differences in the two groups are statistically significant. The results of this hypothesis test will provide information on whether there is a significant difference in literacy digital between the control class and the experimental class which uses student worksheets based on the PjBL model. Assuming the data meets the statistical test requirements so that you can continue the analysis using the Paired Sample T-Test to get results that are more specific and can be interpreted statistically. The following are the results of test :

Table 8. Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Control	82.7909	22	2.76066	.53334
	Experiment	1.0764E2	22	5.347636	1.25246

Based on the information above, there is a difference in the average test results of the control and experimental classes. The average score obtained by the control class was 82.79, and in the experimental class was 107.64. Thus, descriptively, it is clear that there are significant differences in the control and experimental classes in terms of literacy digital abilities. The average value of the experimental class was 107.64, which was higher than the average value of the control class, which was 82.79, which shows that the use of student worksheets based on the PjBL model had a significant positive influence in providing an increase in critical literacy digital. From these findings, it can be concluded that the use of PJBL-based student worksheets can have a positive impact in improving student learning outcomes. However, it is important to remember that the effectiveness of using student worksheets can be influenced by various factors such as the learning context, the quality of student worksheets, and the teacher's ability to implement student worksheets. The results of the

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differences in average values are truly significant or not can also be seen in the following "paired samples test" output table.

Table 9. Paired Samples Test

		Paired Differences					T	Df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Control – Experiment	-3.60455E1	8.17118	1.63603	-25.22941	-23.87153	-17.458	21	.000

The result of the Sig. (2-tailed) value in the paired samples test is 0.000 which indicates less than 0.05 so that H0 is accepted which states that there is a significant difference in average scores in classes that use student worksheets based on the PjBL model and classes that not using the student worksheets for literacy digital in learning activities in class VI electrical circuit material at SD Negeri 007 Sekip Hulu.

The second hypothesis aims to compare the efficiency between the use of student worksheets based on the PjBL model and the use of other methods on literacy digital in learning electrical circuit material. This can be answered by looking at the difference in average scores obtained by students in the control and experimental classes using the N-Gain Score. The results of the calculations can be concluded that the use of student worksheets based on the PjBL model is more effective and efficient in providing an increase in students' literacy digital in learning electrical circuit material for class VI SD Negeri 007 Sekip Hulu. The following are the results of the calculations that have been carried out:

Table 10. N-Gain Score

No	Class	Increase of Score	Category
1	Experiment	83.2718 or 83,27%,	High and effective
2	Control	41.7098 or 41.70%,	Medium and Less Effective

Based on the data above, it can be concluded that the N-Gain Score test results for the experimental class show a figure of 83.2718 or 83.27%, which is included in the high and effective category. This shows an increase in scores on the second measurement compared to the first measurement. The average N-Gain Score for the control class is 41.7098 or 41.70%, in the moderate and less effective category. This range of N-Gain Score values shows variations in changes in scores in the control class. This value shows that the hypothesis is accepted which means that the use of student worksheets based on the PjBL model is more efficient in providing an increase in critical literacy digital. Class VI electrical circuit material at SD Negeri 007 Sekip Hulu, compared to other methods or approaches used in the control class.

DISCUSSION

The finding showed that there is a significant difference in the results of the average scores in the experimental and control classes regarding the use of PjBL-based student worksheets on students' critical thinking skills and digital literacy in learning activities regarding class VI electrical circuits at SD Negeri 007 Sekip Hulu. This shows that the effective use of PjBL-based student worksheets can contribute to critical thinking skills and digital literacy. Student worksheets based on the PjBL model has proven to be more efficient for use in learning activities in class VI electrical circuit material at SD Negeri 007 Sekip Hulu

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The findings of current study are in line with previous research (Aldi et al., 2022:4). PjBL-based student worksheets is a learning tool used in the PjBL approach. PjBL-based student worksheets is designed to guide students in acquiring knowledge and skills through projects centered on real problems and assignments. PjBL-based student worksheets usually consists of a series of activities or tasks designed to guide students through the stages of PjBL, such as understanding the problem, project planning, project implementation, and reflection. This worksheet can contain step-by-step instructions, guiding questions, reference materials, and assignment instructions appropriate to the project.

There is several previous research using student worksheets based on the discovery learning model assisted by PhET simulations to improve the science process knowledge and skills of class VIII students at SMPN 14 Padang. The research results show that the use of student worksheets based on the discovery learning model assisted by PhET simulations can increase students' science process knowledge and skills (Novebrini et al., 2021:1). Use of STEM-based student worksheets (Science, Technology, Engineering, and Mathematics) and the 6E learning cycle model in learning about water pollution. The research results show that the use of STEM-based student worksheets and the 6E learning cycle model can improve students' scientific literacy skills (Arrohman et al., 2022:23). Research conducted by Sitompul, (2020:15) showed that the use of student worksheets based on the discovery learning model can improve students' ability to understand mathematical concepts.

PjBL-based student worksheets aims to help students develop a deeper understanding of the subject matter, improve critical thinking skills, collaboration skills, creativity and problem solving. By using PjBL-based student worksheets, students are expected to be able to relate the knowledge they learn to real-world contexts, gain practical skills that can be applied, and develop critical thinking through reflective and analytical thinking processes (Aldi et al., 2022:4).

Research by Barasbanyu et al., (2021:6) also explored the use of refutation text-based student worksheets in remediating students' misconceptions about hydrocarbon compound material. The research results show that the use of refutation text-based student worksheets can be effective in remediating student misconceptions. From the results of this research, it can be concluded that the use of PJBL-based student worksheets can have a positive impact in improving student learning outcomes and skills in various subjects. However, it should be remembered that the effectiveness of using student worksheets can be influenced by various factors such as the learning context, the quality of the student worksheets, and the teacher's ability to implement the student worksheets.

Research and development by Ismail et al (Ismail et al., 2021:2) aims to develop teaching materials and student worksheets based on the Project Based Learning (PjBL) learning model and determine the differences in learning outcomes between students who use student worksheets and students who only use the materials teach textbooks. The research results show that the PjBL-based student worksheets that were developed can improve student learning outcomes and the results are proven to be higher compared to learning that only uses textbook teaching materials. Other research conducted by Wakhinuddin et al., (2023:5) aims to show that the adoption or use of student worksheets at SMK Negeri 11 Bekasi City has improved student learning outcomes. The results showed that the average score of the experimental class that used student worksheets was higher than the control class that did not use student worksheets.

The use of PjBL-based student worksheets can provide a more active, involved and meaningful learning experience for students. Through challenging projects, students can learn collaboratively, communicate, take initiative, overcome obstacles, and present the results of their work. This can encourage the development of students' critical thinking skills effectively. Effective implementation of PjBL-based student worksheets also requires the right approach and support from teachers, a well-integrated curriculum, and assessments that are in line with PjBL learning objectives.

Student worksheets have several benefits in learning activities. Student worksheets can help condense learning material into a more structured and organized form (Rahmawati & Wulandari,

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2020:5). Student worksheets can present information systematically, step by step, making it easier for students to understand the concepts being taught. Student worksheets can also function as a study guide that helps students understand the steps that must be followed when doing assignments or exercises. student worksheets can direct students to carry out the learning process independently with clear guidance (Paramita et al., 2019:3). By using student worksheets, students can have more structured learning activities. Student worksheets can direct them to carry out certain steps, such as reading, writing, or answering questions in a predetermined order which helps students stay focused and actively involved in the learning process.

Student worksheets can be used as an assessment tool to measure students' understanding of learning material. By giving assignments or exercises on student worksheets, teachers can see to what extent students have understood the material and provide appropriate feedback. Student worksheets can also be used to provide enrichment activities for students who have mastered the material well. Apart from that, student worksheets can also be adjusted to different levels of student ability to support differentiation in learning (Mursalim & Rumbarak, 2021:4). Student worksheets can function as an independent reference that allows students to access learning materials anytime and anywhere. Students can use student worksheets as an independent learning resource at home or as a reference when preparing for exams. The use of student worksheets in learning activities can provide benefits for students in terms of understanding concepts, improving skills, and developing learning independence (Widyanti et al., 2020:4). Apart from that, student worksheets also help teachers in organizing and directing the learning process effectively.

CONCLUSIONS AND RECOMMENDATIONS

Based on the discussion, it can be concluded that there is a significant difference in the results of the average scores in the experimental and control classes regarding the use of PjBL-based student worksheets on students' critical thinking skills and digital literacy in learning activities regarding class VI electrical circuits at SD Negeri 007 Sekip Hulu. This shows that the effective use of PjBL-based student worksheets can contribute to critical thinking skills and digital literacy. Student worksheets based on the PjBL model has proven to be more efficient for use in learning activities in class VI electrical circuit material at SD Negeri 007 Sekip Hulu. Thus, this research provides evidence that the use of student worksheets based on the PjBL model can effectively improve students' critical thinking skills and digital literacy in learning electrical circuits for class VI SD Negeri 007 Sekip Hulu. It can be recommended that teachers should be able to develop a model of learning characteristics for exploring the cultural potential of the region and developing student creativity in implementing PjBL-based student worksheets. Besides, other researchers need to be conducted regarding the application of PjBL-based student worksheets to other learning materials and different student conditions.

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