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The Effectiveness of the Problem Based Learning Approach on Critical Thinking Ability in Thematic Learning

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ABSTRAK

Berpikir kritis merupakan salah satu kompetensi yang harus dimiliki oleh siswa. Oleh karena itu, proses pelaksanaan pembelajaran harus mampu meningkatkan kemampuan berpikir kritis siswa. Penelitian ini bertujuan untuk menganalisis perbedaan keefektifan pendekatan pembelajaran berbasis masalah dan pembelajaran konvensional terhadap keterampilan berpikir kritis pembelajaran tematik siswa kelas V Sekolah Dasar. Jenis penelitian ini adalah penelitian eksperimen semu dengan model nonequivalent control group design. Subyek penelitian adalah siswa kelas V sekolah dasar yang berjumlah 60 orang. Teknik pengumpulan data menggunakan tes dan observasi. Instrumen penilaian yang digunakan adalah soal tes dan lembar observasi yang dilengkapi dengan rubrik penilaian. Teknik analisis data yang digunakan adalah uji T. Hasil penelitian menunjukkan bahwa nilai signifikansi (2-tailed) adalah 0,000 (kurang dari 0,05), artinya Ha diterima dan H0 ditolak. Rata-rata problem based learning dan pembelajaran konvensional pada keterampilan berpikir kritis pembelajaran tematik dari hasil uji T adalah 74,333. Jadi, dapat disimpulkan bahwa terdapat perbedaan keefektifan antara pendekatan pembelajaran berbasis masalah dan pembelajaran konvensional terhadap keterampilan berpikir kritis pembelajaran tematik siswa kelas V Sekolah Dasar.

ABSTRACT

Critical thinking is one of the competencies that must be possessed by students. Therefore, the process of implementing learning must be able to improve students' critical thinking skills. This study aims to analyze the difference in effectiveness between the problem-based learning approach and conventional learning on the critical thinking skills of thematic learning of fifth grade elementary school students. This type of research is a quasi-experimental study with a nonequivalent control group design model. The research subjects were 60 grade V elementary school students. Data collection techniques using tests and observations. The assessment instruments used are test items and observation sheets equipped with an assessment rubric. The data analysis technique used was the T test. The results showed that the significance value (2-tailed) was 0.000 (less than 0.05), meaning that Ha was accepted and H0 was rejected. The average problem based learning and conventional learning on the critical thinking skills of thematic learning from the results of the T test is 74,333. So, it can be concluded that there is a difference in effectiveness between the problem-based learning approach and conventional learning on the critical thinking skills of thematic learning of fifth grade elementary school students.

1. INTRODUCTION

Education is a process of humanizing human beings, through education a person can maintain self-quality and improve self-existence against the surrounding environment (Servant-Miklos, 2019; Surya, 2017). So education is eternal and absolutely must be owned by all humans. Education requires an increase. One way to improve quality is to improve the quality of learning (Ariani, 2020; Sudana et al., 2019). Improving the quality of learning can be achieved if the teacher has carried out innovative learning by placing students as learning centers and students are able to interpret the meaning of learning. This is in accordance with 21st century learning.21st century learning is learning designed for the 21st century generation to be able to keep up with the latest technological developments (Rahmawati & Atmojo, 2021; Rosnaeni, 2021). Especially in the realm of communication which has entered into the joints of life,

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therefore students are required to be able to master the four learning skills (4C), namely: creativity and innovation, critical thinking and problem solving, communication and collaboration. Critical thinking and problem solving is one of the skills that students need to achieve in learning (Hussin et al., 2018; Ögren et al., 2017).Students' critical thinking skills do not come by themselves, but need to be accustomed to since elementary educators (Astari & Sumarni, 2020; Diani et al., 2016).

However, in reality students' critical thinking skills are still very low. This is due to the insidethe learning process that teachers carry out is still mostly teacher-centered so that it makes students less active in participating in learning (Arifin et al., 2021; A. Hartini, 2017). The teacher's learning activities are still only based on the handbook and are explained directly by the teacher (TI Hartini et al., 2014; Perdana et al., 2020). This causes students to be less active in participating in learning and can reduce students' critical thinking skills (Efendi & Wardani, 2021; Nuzulaeni & Susanto, 2022). In addition to these problems, teachers experience difficulties in designing learning that can make students active in learning and enable students to improve students' thinking skills (A. Hartini, 2017; Primayanti et al., 2019). In addition, teachers have difficulties in choosing the right models, methods, techniques and learning media or learning resources. Some teachers do not use learning media in teaching because teachers find it difficult to determine and design appropriate learning media (Arifin et al., 2021; Effendi et al., 2021). These problems will have an impact on students who are less motivated in participating in learning so that students tend to be passive in participating in learning.

The right solution to encourage students' critical thinking skills with problem based learning. Because in everyday life requires the ability to think critically. Critical thinking skills require a person's higher order thinking skills to solve problems logically and precisely (Ariani, 2020; Pramana & Pudjawan, 2020). Problem based learning is learning that involves students to learn (Husein et al., 2019). This activity requires students to think critically, so that the problem can be solved properly. Problem based learning students are required to be active and solve their own problems with the knowledge and experience that students have (Amris & Desyandri, 2021; Ningsih et al., 2018). The teacher is only a facilitator and learning focuses on students. This encourages students' critical thinking skills, because critical thinking skills are needed for real world life (Arifin et al., 2021; Balan et al., 2019). Therefore, PBL can encourage students' critical thinking skills to be active and solve problems. Problem based learning learning approach through the process of critical thinking and high-level thinking to be skilled at solving problems that are oriented to authentic problems from the actual lives of students (Li et al., 2020; Rahayuningsih, 2017). Students must solve problems in the right way. So, there needs to be encouragement so that the problems experienced can be solved. Encouragement needs to be done by the teacher to help students solve the problems they are experiencing. Therefore, teachers can use learning designs. Learning designs that can encourage students' critical thinking skills are problem based learning. That way, the problems experienced by students can be resolved.

Several previous research findings state that the problem-based learning model can improve critical thinking skills (Efendi & Wardani, 2021). The problem based learning model is effectively used for learning that requires solving problems (Choi et al., 2014). The problem based learning model is the right strategy to develop critical thinking skills (Seibert, 2020). Learning activities in order to encourage students' critical thinking skills can use problem based learning (Ariani, 2020; Jannah et al., 2019).The problem based learning model can be used in thematic learning (Amris & Desyandri, 2021). Many studies related to the application of the PBL model have been carried out. However, it is necessary to conduct this research because not all schools implement learning by focusing on problem solving that encourages critical thinking skills in thematic learning, so by conducting this research at least schools (research subjects) can implement learning by focusing on problem solving that encourages critical thinking skills. on thematic learning. The aim of the study was to analyze the effectiveness of the problem based learning approach on the critical thinking skills of thematic learning of fifth grade elementary school students.

2. METHOD

The type of research used is experimental research. This type of research includes quasi-experiments with models*nonequivalent control group design*. The research design consisted of 2 groups, namely the experimental group and the control group. This research was conducted on fifth grade students at SD Negeri 2 Mlipak and SD Kristen 03 Wonosobo in semester 1 of the 2022-2023 school year, with the research unit being class V students at SD Negeri 2 Mlipak as the control group and SD Kristen 03 Wonosobo as the experimental group. The number of students for the control group consisted of 30 students and the number of students for the experimental group consisted of 30 students.For the experimental group with problem based learning and the control group without problem based learning.

The population used in this study were all elementary school students in Wonosobo City.The sample used in this research islearnersclass V Elementary School in the city of Wonosobo namelySD Country 2 Mlipak and SD Kristen 03 Wonosobo. The sampling technique is by means of purpose stratified quota random sampling. From the existing population, the research objective (purpose) is to improve students' critical thinking skills, then determine the class used, namely class V, then determine the number of each group, namely 30 students and take them randomly.Data collection techniques using observation and tests. The assessment instruments used are test items and observation sheets equipped with an assessment rubric. The data analysis technique used is the T test. The requirements for the T test are that the experimental group and the control group are normally distributed and homogeneous. Before the instrument is used to find out that the two groups are normally distributed and homogeneous, the research instrument is tested for validity and reliability first. Testing the validity and reliability using SPSS 20.00 for windows.

Testing the validity of 30 questions. The results of the calculation of the validity test of valid questions with rcount (0.35 - 0.79) are declared valid. Valid item number numbers 1-16, 18-20, 22-30. Invalid item numbers 17 and 21, because rcount (0.32 and 0.33). Valid items were tested for reliability. The results of the validity test of the items showed that out of the 30 items that had been tested, 28 items were valid and 2 items were invalid. Items that are not valid are not used in research. Items that are valid are tested for reliability, while questions that are invalid are discarded. Items used for research as many as 20 questions.The results of the reliability test on 28 items with Cronbach's Alpha were 0.905. The results of the reliability test of the items with the help of SPSS 20 showed that the Cronbhach's alpha value produced was located in the interval 0.800 – 1.00 so that it can be concluded that the items on critical thinking ability were declared to be in the very reliable category. The research instrument was declared valid and reliable, so the normality test was carried out in the two study groups. The normality test results are presented in Table 1.

Table 1. Normality Test Results for the Experimental Group and the Control Group

2nd Test	Shapiro-Wilk			Category
	Statistics	df	Sig.	
Experiment	0.936	30	0.070	Normal Distribution
Control	0.948	30	0.149	Normal Distribution

Source: Processed Results of SPSS 20

The results of the normality test in the experimental group and control group showed normal distribution, because both groups obtained a significance value of more than 0.05. Data that is normally distributed, then the next step is the homogeneity test.The results of the homogeneity test for the experimental group and the control group are presented in Table 2. The homogeneity test results for the experimental group and the control group showed a significance value of 0.557 greater than 0.05 (0.557 > 0.05), so it can be concluded that the experimental group and the control group have the same or homogeneous variance. The next step will be to test the hypothesis using the T-test analysis technique.

Table 2. Homogeneity Test Results of the Experiment Group and the Control Group

Levene Statistics	df1	df2	Sig.
0.349	1	58	0.557

3. RESULT AND DISCUSSION

Result

This type of research includes a quasi-experimental model with nonequivalent control group design. Implementation of learning using the materialtheme 1 Animal and Human Movement Organs, sub-theme 2 Humans and their Learning Environment 5 Human Movement in the Surrounding Environment. Implementation of learningthe experimental group with a problem based learning approach and the control group with conventional learning. Experimental group learning with a problem based learning approach through listening to problems, dividing tasks to solve problems, collecting data, analyzing data, making reports, presenting, and doing tests. Control group learning with conventional learning through stepsmlisten to material explanations, take notes on material, ask questions, do assignments, and take tests. Learning steps in the control group are learning steps carried out at school. The average results of the second test score for each group are presented in detail in Table 3.

Table 3. Average Test Scores in the Experiment Group and the Control Group

Group	N	Min	Max	Means	std. Deviation	std. Error Means
Experiment	30	40	100	80.00	15.369	2.806
Control	30	35	100	71.67	13.855	2.530

The results of the test scores of students in the experimental group and the control group can be explained that the lowest score in the experimental group is 40, while the lowest score in the control group is 35. The highest score in the experimental group is 100, while in the control group is 100. The results of the average score are the average score in the experimental group was 80.00, while the average score in the control group was 71.67. The difference in the average score of the 2nd test for students' critical thinking skills between the experimental group and the control group was 8.33. Even though the distribution of critical thinking skills between the experimental group and the control group follows a normal and homogeneous curve, there are differences in the results of critical thinking abilities. The difference in results is because there are differences in the learning treatment used, so that the learning process takes place differently. The students' critical thinking skills in the experimental group and the control group in thematic learning can be classified into 4 categories, namely very critical, critical, less critical, and uncritical.Measuring the level of students' critical thinking skills is obtained based on the highest score of students' critical thinking ability instrumentsand the lowest score of students' critical thinking ability instrument. In determining the number of classes, Sturges' formula can be used, namely the class interval is obtained based on the results of the range (maximum score - minimum score) then divided by the number of classes. In determining the number of classes, Sturges' formula can be used, namely the class interval is obtained based on the results of the range (maximum score – minimum score) then divided by the number of classes. Students' critical thinking skills are classified into 4 categories. The results of the frequency distribution of students' critical thinking skills based on the categories of critical thinking abilities are presented in Table 4.

Table 4. Frequency Distribution of Critical Thinking Ability

Class Intervals	Category	SD Kristen 03 Wonosobo		SD Negeri 2 Mlipak	
		Frequency	Percentage (%)	Frequency	Percentage (%)
3.74 – 0	Not Critical	0	0	0	0
7.49 – 3.75	Less Critical	0	0	3	10
11.24 – 7.5	Critical	8	27	11	37
15 – 11.25	Very Critical	22	73	16	53
Amount		**30**	**100**	**30**	**100**

Table 4 shows that in the thematic learning of the experimental group there were 22 students in the very critical category with a percentage of 73%, 8 students in the critical category with a percentage of 27%. There were no students who were less critical in the experimental group and there were no students who were not critical in the experimental group. Whereas in the control group there were 16 students in the very critical category with a percentage of 53%, 11 students in the critical category with a percentage of 37%, and there were 3 students in the less critical category with a percentage of 10%, and there were no students who were not critical in the control group . So,

Implementation of the learning process in the experimental group with the problem based learning approach has a maximum total score of 21 on the teacher's activity sheet and student activity sheet. While the implementation of the learning process in the control group with conventional learning has a maximum total score of 13 on the teacher's activity sheet and students' activity sheet. So, it can be concluded that the percentage of implementation of the learning process in the experimental group with the problem based learning approach on teacher activity sheets and student activity sheets is 100%. While the percentage of implementation of the learning process in the control group with conventional learning on teacher activity sheets and student activity sheets is 100%, so that both learning models are implemented.learnersfifth grade elementary school. The data analysis technique uses the T test technique. If the resultsobtained a significance (2-tailed) of more than 0.05 then Ho is accepted and Ha is rejected. However, if the significance (2-tailed) is less than 0.05 then Ha is accepted and Ho is rejected. The distribution of the T test for critical thinking skills is presented in Table 5.

Table 5. Distribution of Critical Thinking Ability T Test

	Paired Differences					t	df	Sig. (2-tailed)
	Means	std. Deviation	std. Error Means	95% Confidence Interval of the Difference				
				Lower	Upper			
Pair 1 Test Score	74.333	15.251	1969	70.394	78.273	37.753	59	0.000

Based on Table 5, the Paired Samples Test obtained a significance value (2-tailed) of 0.000 <0.05, so Ha was accepted and Ho was rejected, meaningthere are differences in the effectiveness of problem based learning on critical thinking skills in thematic learninglearnersfifth grade elementary school. Differences in the effectiveness of problem based learning on critical thinking skills in thematic learninglearnersclass V SD is significant, meaning that there is a significant difference.

Discussion

This research is a quasi-experimental study with a nonequivalent control group design model. Implementation of learning using theme material 1 Organ Movement of Animals and Humans, sub-theme 2 Humans and their environment learning 5 Human Movement in the Surrounding Environment. The research results show several findings. First, the application of the problem based learning model has a higher number of students with critical thinking skills compared to the control group with conventional learning. Learning activities using problem based learning are carried out, because students are involved in solving problems so that students can understand learning. Students can feel satisfied to find new knowledge that is able to develop and account for the learning that has been done, so that learning becomes more fun. The problem-based learning model requires students to think critically by adapting new knowledge and giving students the opportunity to experience problems in the real world directly (Surya, 2017; Ting et al., 2021). Problem based learning is a learning model that makes authentic problems the center of organizing content and learning processes and emphasizes learning experiences that are carried out by investigating, analyzing, and solving problems (Ariani, 2020; Irwandani et al., 2019). So that the problem based learning model is effectively used in the learning process.

Second, the problem based learning model encourages students to think critically. The problem-based learning model requires students to be active and solve their own problems with the knowledge and experience that students have (Devirita et al., 2021; Surya, 2017). The teacher is only a facilitator, learning focuses on students. It encourages students' critical thinking skills. Therefore, PBL can encourage students' critical thinking skills to be active and solve problems. Students' critical thinking skills appear when identifying existing problems, then determining the problem so that they can determine strategies to solve the problem (Abrami et al., 2008; van Laar et al., 2017). Students collect data for proof which will later draw conclusions based on the answers. In the problem-based learning model, students find problems, then students prepare to study individually or in groups to solve problems, then present the results found, and students follow up in solving problems. These PBL activities encourage critical thinking skills which consist of analyzing the opinions obtained, being able to ask questions, being able to answer questions, being able to solve problems, and being able to make conclusions which can later be evaluated.

Third, there are differences in the effectiveness of problem based learning on critical thinking skills in thematic learning. Thematic learning with a problem based learning model becomes more meaningful.Thematic learning aims to provide meaningful experiences to students (Laksana et al., 2016; Lestari & Harjono, 2021; Sabdarini et al., 2021). Learning problem based learning is used in thematic learning. Thematic learning is an integrated learning model that involves several subjects to provide meaningful experiences to students. Thematic learning provides the breadth and depth of curriculum implementation, offering opportunities for students to emerge dynamics in education. It can be concluded that thematic learning is a learning that consists of several lessons in one theme in order to provide experience and teach several concepts to students. The involvement of students in thematic learning needs to be emphasized actively so that students practice in finding their own knowledge that is being studied (Geni et al., 2020; Yunita Anindya et al., 2019). Therefore, teachers need to package learning that fosters learning experiences so that students get meaningful learning. Thematic learning is directed at three learning domains, namely the cognitive, affective, and psychomotor domains.

Based on the findings, it shows that there is a difference in effectiveness between the problem based learning approach and conventional learning on the critical thinking skills of thematic learning of fifth grade elementary school students. This finding is reinforced by the findings of previous studies which state

that the problem-based learning model can improve learning outcomes (Anjelina Putri et al., 2018; Ariswati, 2018; Nurqomariah et al., 2017; Priani et al., 2018). The problem based learning model is effectively used for learning that requires solving problems (Choi et al., 2014). The problem based learning model is the right strategy to develop critical thinking skills (Seibert, 2020). Learning activities in order to encourage students' critical thinking skills can use problem based learning (Ariani, 2020; Jannah et al., 2019).The problem based learning model can be used in thematic learning (Amris & Desyandri, 2021). The implications of this research are that teachers are expected to be able to use learning innovations through PBL learning designs and teachers can be skilled at measuring students' critical thinking abilities. However, the implementation of the PBL model has a weakness, namely learning the problem based learning (PBL) model takes a long time.

4. CONCLUSION

The research results showthere are differences in effectiveness between the approaches*problem based learning*and conventional learning on the ability to think critically in thematic learning of fifth grade elementary school students. Gteachers can use learning innovations through PBL learning designs and teachers can be skilled at measuring students' critical thinking abilities. AThanks to this research, it is hoped that other research will be able to find out various situations and conditions in the learning process. Thus, the deficiencies contained in this research can be corrected and perfected in further research.

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