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The Effectiveness of Guided Inquiry Model and Problem-Based Learning on Critical Thinking Skills of Elementary School Students

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Abstract

Proses belajar mengajar masih terfokus pada tenaga pendidik. Siswa kurang mau menerima materi pembelajaran dan IPS. Oleh karena itu, siswa hanya memiliki pemahaman yang benar tentang materi tersebut. Penelitian ini merupakan penelitian eksperimen yang menggunakan desain pre-test-post-test dengan kelas eksperimen dan kontrol. Penelitian ini bertujuan untuk menganalisis perbedaan kemampuan berpikir kritis siswa sekolah dasar pada kelas eksperimen dengan model pembelajaran berbasis masalah dan kelas kontrol dengan model pembelajaran inkuiri terbimbing. Populasi dalam penelitian ini adalah siswa kelas IV. Teknik pengambilan sampel menggunakan stratified cluster random sampling dipilih sebagai teknik pengambilan sampel. Pengolahan data dilakukan dengan analisis Paired Sampling dan Independent Sampling. Hasil penelitian menunjukkan (1) analisis uji-t diperoleh Sig dua sisi sebesar 0,00 < 0,05, hipotesis Ho ditolak, terdapat perbedaan keefektifan penggunaan model PBL dan pedoman pembelajaran terhadap kekritisan siswa. keterampilan berpikir IPS, (2) Perhitungan effect size menunjukkan bahwa model pembelajaran berbasis masalah (PBL) lebih efektif dibandingkan model inkuiri terbimbing terhadap keterampilan berpikir kritis siswa pada pembelajaran IPS. Keterampilan berpikir kritis siswa yang menggunakan model pembelajaran berbasis masalah jauh lebih tinggi daripada keterampilan berpikir kritis siswa yang menggunakan model inkuiri terbimbing. Model pembelajaran berbasis masalah (PBL) lebih efektif daripada model inkuiri terbimbing untuk pembelajaran IPS tentang kemampuan berpikir kritis siswa yang mampu menganalisis dan memecahkan masalah mereka.

Keywords: *Inkuiri terbimbing, model instruksional, IPS, berpikir kritis*

Abstract

The teaching and learning process is still focused on educators. Students are less willing to accept learning materials and social studies. Therefore, students only have a correct understanding of the material. This research is an experimental study that uses a pre-test-post-test design with experimental and control classes. This study aims to analyze the differences in critical thinking abilities of elementary school students in the experimental class with the problem-based learning model and the control class using the guided inquiry learning model. The population in this study was fourth-grade students. The sampling technique using stratified cluster random sampling was chosen as the sampling technique. Data processing is done by analyzing Paired Sampling and Independent Sampling. The results showed (1) the t-test analysis obtained two-sided Sig of 0.00 <0.05, the hypothesis Ho was rejected, and there were differences in the effectiveness of using the PBL model and learning guidelines on student criticality. social studies thinking skills, (2) The calculation of effect size shows that the problem-based learning model (PBL) is more effective than the guided inquiry model on students' critical thinking skills in social studies learning. The critical thinking skills of students who use the problem-based learning model are much higher than the critical thinking skills of students who use the guided inquiry model. The problem-based learning (PBL) model is more effective than the guided inquiry model for social studies learning about students' critical thinking skills that can analyze and solve their problems.

Keywords: Guided inquiry, instructional model, social studies, critical thinking.

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1. INTRODUCTION

Social Studies as an education and knowledge program does not only present social studies material theoretically but directs students to become individuals who are responsible for all matters relating to social life (Amrullah et al., 2020; Yati & Amini, 2020). In addition,

through social studies education is expected to be able to develop attitudes, moral values, and a set of social life skills (Qomariyah, 2019; Rosnihayati, 2017). This is in line with the goal of social studies education at the elementary school level, namely to develop basic knowledge and skills that are useful for everyday life and as a provision for continuing education to a higher level (Sapriya, 2015). Broadly speaking, it is expected that (1) knowing the concept of human life and the environment, (2) having basic logic, critical thinking, inquiry, problem-solving skills, and skills in social life, (3) having commitment and awareness of social and human values, (4) have communication skills, cooperation, and competence (Asmahasanah et al., 2018; Fitchett et al., 2014). This means that social studies education in elementary schools is important to foster students in improving ways of thinking, thinking, and being responsible. Expecting the ability to face the realities of social life can be done through social studies learning activities. Social Studies also prepare students to become active, creative, and responsible people in the 21st century (Brophy et al., 2016; Farris, 2015). Success in the 21st century requires the ability to make rational decisions independently and collectively (Duke et al., 2021; Lee et al., 2018).

For a meaningful social studies education, teachers need to understand and meet the needs of their students. Teachers need to take advantage of the diversity of students and their natural interest in the world around them. skills and experiences of students, teachers can design learning activities that encourage students to make meaningful connections and their knowledge and perspectives. wanting students to think in social studies is one of the main goals of many primary school educators for students to become good citizens. One of the skills that play an important role in human success in life is critical thinking. Critical thinking is a human way of thinking that reacts to something by analyzing facts and making decisions. Critical thinking is a spiritual organizational process and strategy used to solve problems, make decisions, and learn new concepts (Kumullah et al., 2018; Lai, 2011). Sternberg defines critical thinking as a spiritual organizational process and strategy for problem-solving, decision-making, and new concept acquisition. Therefore, critical thinking is the process of evaluating evidence or a discussion to arrive at an accurate conclusion. Critical thinking is thinking that is adopted to deal with life's difficulties and facilitate access to information (Elder & Paul, 2006; Wechsler et al., 2018). On the other hand, groups with critical thinking skills tend to use quality assurance, counterarguments, counterarguments, and evidence. The results of the study show that thinking ability as a level has a significant effect on reasoning ability (Kurniati et al., 2016; Parmiti et al., 2022).

Modern society needs people with diverse skills to understand and utilize a wide range of thinking, research, problems, critical thinking, and creativity. Critical thinking is thinking adopted to overcome difficulties and facilitate access to life information. Therefore, understanding the information used to advance an idea requires critical thinking skills (Afdareza et al., 2020; Firdaus et al., 2015). Critical thinking is defined as proficient and positive in interpretation, evaluation, observation, communication, and reasoning (Adeyemi, 2012; Naparin et al., 2020). The importance of critical thinking and the broad barriers to classroom education, transfer, and evaluation in the 21st century (Costa, 2014). Based on his research, shows that critical thinking is a spiritual process. Critical thinking consists of several components: focus on problems, analyze discussions, make suggestions, challenges, and answer questions (Gedik, 2014). Critical thinking skills are classified into 5 aspects, namely basic clarification, basic support, interference, further clarification, strategy, and tactics (Enciso et al., 2015; Mabruroh & Suhandi, 2017). The implications of aspects of critical thinking skills to assist students in solving and solving social problems as the embodiment of critical thinking skills are the responsibility of social studies learning in elementary school. They also believe in critical thinking skills such as perception, reasoning, assumption recognition, logical reasoning interpretation, and judgment. They argue that the

ability to think critically, and process and evaluate old information with new information is the result of inductive and deductive thinking in problem-solving. Watson and Glaser's definition of critical thinking forms the basis of critical thinking tests that are widely used today to measure critical thinking (Arsy et al., 2019; Halimah et al., 2020; Hwang et al., 2015; Riwanto et al., 2019; Tapung et al., 2018).

Observations at SDN Kleco 2 show that the teaching and learning process is still focused on educators. Students are less willing to accept learning materials and social studies. Therefore, students only have a correct understanding of the material. Students are not used to thinking critically about problems related to social interactions in everyday life. Despite this fact, social studies learning outcomes are still low, because students cannot correctly answer questions that require justification to solve social problems. This can be seen from the average score of students' critical thinking skills that do not meet the criteria. The following is data on critical thinking aspects resulting from the ability to answer social studies topics on environmental issues. (1) Students' reasoning analysis ability is only 50%, (2) evaluation is based on 60% evidence, (3) inductive or deductive reasoning 67% concludes, (4) reasoning 69% Solving problems. It's also not good to create character stats while learning. This is because students have not mastered the material, easily give up when faced with problems, cheat on exams, are slow to learn, easily emotional, and confident in dealing with problems., have laziness to complete tasks, and inability to do them.

The advantages of existing sources, the lack of problem-based learning approaches, and guided research are alternative social learning models that can be used to improve students' critical thinking skills. By using this method, it is expected that students will improve their critical thinking skills. Critical thinking skills are important in the learning process because they can motivate students to think critically through the stages of problem-based learning. Problem-based learning (PBL) is a learning approach that is the beginning of student learning through the need to solve problems. Students are also trained to build domain knowledge, develop problem-solving skills, and develop independent learning skills to find solutions in the problem-solving process. Willing to participate, students are only positioned as recipients. Each student presents their problem and asks them to investigate and determine a solution. In this way, students are encouraged to work more actively on the topic and develop critical thinking skills (Hung et al., 2014). PBL is also defined as an investigative process to solve the doubts, oddities, and uncertainties of complex real-life phenomena. The teaching and learning process with problem-based learning allows students to learn to work in groups and find solutions to problems in context. This process is designed for students to develop their skills to find systematic solutions. The advantage of problem-based learning is that it can improve critical thinking skills (Masek & Yamin, 2011). Problem-based learning models have been shown to play an important role in improving students' social skills, including critical thinking skills in elementary school. School students (Al-Najar, H. et al., 2019; Marnita et al., 2020; Simamora et al., 2017; Ulger, 2018). The application of problem-based learning also encourages students to think critically by asking questions, discussing social problems such as the environment and the economy, and finding solutions to these problems. This study aims to confirm the effectiveness of the learning model that addresses students' critical thinking skills in social studies subjects through problem-solving-based learning models and guided research models (Baloche & Brody, 2017; Ghaith, 2018; Saputra et al., 2019; Zubaidah et al., 2018). The study on the effectiveness of the GIL model is based only on scientific trends (Cairns & Areepattamannil, 2019), the development of a concept design, but in 1980. Conducted from. Acquisition of scientific knowledge and attitudes (Dorfman et al., 2017; Sokołowska, 2018). The GIL model is believed to be more effective than in the PBL era for developing elementary school writing skills (Palupi et al., 2020). The steps in the guided query model are as follows: (1) Asking

questions or questions and (2) making hypotheses. (3) Experimental design, (4) Conduct experiments to obtain information, (5) Collect and analyze data, (6) Draw conclusions from guided research methods in scientific learning (Al-Tabany & Badar, 2014). This method has been identified as going far beyond other methods to provide students with meaningful learning by teaching heuristics, assignments, and problem-solving, which are key elements of modern science.

2. METHODS

This research is an experimental study that uses the pre and post-test control group design method because not all external variables can affect the dependent variable controlled by the researcher. Based on this, we recommend using this experiment to improve the quality of learning (Creswell 2017). The variables in the survey consisted of the learning model as the independent variable, the problem-based learning model, and the guided inquiry model. The dependent variable in this study is critical thinking as a result of social studies learning. This study applies a problem-based learning model in experiential education. It is taught through a step-by-step problem-based learning model. (1) Organize students into problems, (2) Organize students into learning, and (3) Support independent groups. Research, (4) Development, and presentation of works and exhibitions, 5) Analysis and evaluation of the problem-solving processes. Learning in the control group was carried out with the following steps using a guided survey model: (1) orientation, (2) problem formulation, (3) hypothesis formulation, (4) data collection, (5) hypothesis testing, and (6) conclusion prescription. The research was conducted in public schools in the Surakarta area, Central Java, Indonesia, with the research subjects being fourth graders of State Elementary Schools in Laweyan District, Surakarta Regency, which consisted of 40 schools. Fourth-grade elementary school students in Surakarta Regency for the 2019/2020 academic year are the population in this survey.

The research sample was 108 fourth-grade elementary school students from six elementary schools in Surakarta Regency. These students were randomly selected using a stratified cluster random sampling technique. Stratified cluster random sampling is a combination of cluster random sampling and cluster random sampling methods. This is because the target population is quite large, and wide, and has the same characteristics (Sukmadinata, 2013). Data collection is done through the test method. The instrument used to explore and collect information is a test. The test is used as a tool to measure students' critical thinking skills. Their test results were collected and analyzed to see if the problem-based learning (PBL) model had a positive effect on learning Social Studies (IPS). Critical thinking in the social studies learning test consists of 10 subjective questions and 20 multiple-choice questions. This test is subjective because the items contain a collection of free-form responses. This is because students need to remember and organize their thoughts and personal lessons (Lebagi, 2014). In addition, the SPSS application is used to test the level of difficulty, selectivity, and reliability of the test equipment. Device validation was carried out using the Pearson product factor correlation test with SPSS 25. Analysis of 23 students showed that the overall Pearson correlation was 0.55 and the Pearson correlation was positive, so all questions were declared valid and provided data about students' critical thinking skills. Cronbach's alpha-based reliability test scored 0.75 or 0.70. This means that the device is fully usable. The data collection method in this research is hypothesis testing using paired sample test and independent-sample t-test, previously tested for data normality using the Chi-Square test and data homogeneity using the F test and processed with SPSS version 25.0 test

3. RESULTS AND DISCUSSION

Result

Students' basic skills were tested in the first phase of the study to ensure that students in the experimental and control groups had the same academic ability. Table 1 shows hypothesis testing using SPSS version 25.0 and pair sampling method achieving Sig values using a problem-based learning model for the pretest of critical thinking skills of the experimental class is 0.000 less than 0.05, namely Ha is accepted and H0 is rejected. This shows that there are differences in students' critical thinking skills before and after learning in class using a problem-based learning model.

Table 1. Paired Samples Test Pretest-Posttest Experimental Group

	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
				Lower	Upper			
Pretest - Posttest	-19.4905	5.44420	0.74782	-20.99117	-17.9899	-26.063	52	0.000

Table 2 shows hypothesis testing using SPSS version 25.0 and pair sampling method achieving Sig values for the pretest of critical thinking skills of the control class is 0.000 less than 0.05, namely Ha is accepted and H0 is rejected.

Table 2. Paired Samples Test Pretest-Posttest Control Group

	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
				Lower	Upper			
Pretest - Posttest	-9.87273	7.49087	1.01007	-11.89779	-7.84766	-9.774	54	0.000

Table 3. Differences Means of Pretest and Posttest Experimental Group

	Model	Mean	N	Std. Deviation	Std. Error Mean
Pair 1	**Pretest**	65.8113	53	3.47550	0.47740
	Posttest	85.1019	53	5.85263	0.80392

Table 3 shows the results of the pre-test and post-test average scores for the critical thinking skills of the students in the experimental group. The results show that there is a difference in the average score before and after the experimental group test that uses questions. The student's critical thinking ability was higher than before after the PBL model was applied. When the PBL model was applied, the average critical thinking ability of social studies students increased to 85.1019 which was originally 65.8113. The results of this study are in line with the findings which state that PBL is an effective learning tool to improve the critical thinking and problem-solving skills of medical students (Tayyeb, 2013). The same research stated that higher-order reasoning skills can be improved by problem-based learning (Ganiron, 2014).

Table 4. Differences Means of Pretest and Posttest Control Group

	Model	Mean	N	Std. Deviation	Std. Error Mean
Pair 1	**Pretest**	61,6000	55	4,64120	0,62582
	Posttest	71,4727	55	6,04567	0,81520

Table 4 shows the results of the average critical thinking skill scores of contrast students before and after the test. Based on these results, there is a difference in the mean results of the pre-test and post-test of the control group using the guided question model method. Students' critical thinking ability after applying the inquiry model was higher than before. The average critical thinking ability of social science students was originally 61,000 but increased to 71,4727 when the guided query model was applied. The results of this study are consistent with the findings who state that the use of guided question models has a significant impact on elementary school students' problem-solving and reasoning skills (Hilman, 2013).

The normality test is used to prove whether a sample is from a normally distributed population, and the homogeneity test is used to prove whether a sample is from a homogeneous population. In this study, the Kolmogorov-Smirnov test was used to perform a normality data test. If a value greater than (sig) is greater than 0.05, the data is normally distributed. Anomalous distribution data if the significant value (sig) is less than 0.05. Based on data analysis, the data for this study were normal and homogeneous. Therefore, the t-test can be continued as a hypothesis test. The homogeneity test is performed so that the data being analyzed is taken from a population that does not make a significant difference in diversity/homogeneity. The study variance uniformity test used the Levene test with a significance level of 0.05. That is, if the significance (sig) is greater than 0.05, the study data is uniform, and if the significance (sig) is less than 0.05, the study data is not uniform. The significance of the analytical skills in the experimental and control classes is 0.587> 0.05 sig. This shows that the data from the two groups, the experimental class, and the control class, show the same type of variant.

Based on the results of the hypothesis analysis using the t-test, both parties have Sig 0.00, then Hypothesis Ho is rejected and Hypothesis H1 is accepted. This means that students who use problem-based learning models have higher critical thinking skills than students who use guided inquiry models. It can also be interpreted that there are differences in students' critical thinking skills between the experimental group and the control group. The critical thinking ability of the experimental group students is much higher than the control group students, so it can be seen that the problem-based learning model affects students' critical thinking skills. This study was continued with an impact test to confirm the effect of using the model on students' critical thinking skills. The effect size results were calculated using SPSS version 25 and are based on Cohe's interpretation. Calculating the effectiveness of the two learning models using SPSS version 25, the experimental class wins score is 56.7657 or 56.8%, and the control class wins score is 24.6932 or 24.7%. This means that the PBL model is very effective in learning social studies about students' critical thinking skills compared to the guided query model. (PBL) has a significant impact on improving critical thinking skills compared to guided inquiry learning models.

Discussions

The results show that there is a significant influence between the learning model and students' critical thinking skills. Table 1 shows that using the problem-based learning model is more successful in improving critical thinking skills in social studies learning followed by various teacher methods by applying the PBL syntax that has been described in the method

point. The syntax consists of five stages of learning: (1) Organizing students into problems, (2) Organizing students for learning, (3) Supporting group and independent surveys, (4) Developing and presenting works and exhibitions, 5) Analyzing and evaluating processes in problem-solving. Students who learn using the problem-based learning model have better critical thinking skills than before using the model, it can be seen in table 3, that the pretest average before using the problem-solving model was 65.8113, and after using the problem-solving learning model the post-test score was 85.1019. Problem-based learning model in social studies learning, students are required to actively look for sources as data to solve social problems that are used as discussion topics. Previous research results found that students' collaborative and critical thinking skills in problem-solving improved significantly after being taught in a problem-based learning model (Anantasuk, 2019; Waite et al., 2020). Students' problem-solving skills have improved significantly by 86.11%. Through the PBL step, students are accountable for the sources they receive in the form of critical discussion and reasoning as answers to their problem-solving. By using this PBL model, the originally teacher-centric learning process shifts to active learning as students use the PBL model to better practice critical thinking. Of course, learning in elementary school still requires teacher guidance and guidance. The problem-based learning process using PBL assists students in learning efforts, subgroup work, and group analysis processes. It also develops social skills and employability to promote effective learning.

Previous studies on the influence of PBL on critical thinking found a positive impact of PBL interventions on skills development Compared to traditional learning models, the PBL model has more advantages, can fully mobilize the enthusiasm of students in practicing knowledge, and affect increasing students' critical thinking skills, so that students can absorb new knowledge and promote themselves as they absorb new knowledge (Liu & Pásztor, 2020; Quinn et al., 2020; Salari et al., 2018; Wang, 2018). The advantages of PBL have made this approach even more popular (Zabit et al., 2021). PBL plays a major role in linking theory and practice with involve students in the process of solving problems related to children's daily lives. where knowledge and skills are developed through learning by doing. In this case, as Patrick John J said, we need a teacher who can be a role model in implementing a learning model that can motivate students' critical thinking skills. Classroom. Teachers who encourage and practice critical thinking in the classroom contribute significantly to the intellectual development of their students. In addition, they can evoke a critical or positive attitude towards the student's critical thinking. Motivation for primary school students includes paying attention to, understanding, and analyzing student social cases to stimulate critical thinking skills through problem-solving (Dunn & Kennedy, 2019; Henrie et al., 2015; Vong & Kaewurai, 2017; Wati & Suarni, 2020; Zainuddin, 2018). According to Table 2, students' critical thinking abilities associated with post-learning social studies using a guided inquiry model are higher than before, with a statistical difference of 0.05. Students who learn using the guided inquiry model have better critical thinking skills than before using the model, it can be seen in Table 3, that the pretest average before using the guided inquiry model was 61.6000, and after using the guided inquiry learning model the post-test score was 71.4727. The guided inquiry learning model requires students to be more active in every lesson (Mardianti et al., 2020; Pursitasari et al., 2020). Development of information requires students to frequently asked questions, work together, accept criticism, respect others, responsibly receive suggestions and criticism, respect others, and can control themselves, where attitude is part of social skills. The interaction with the application of the guided inquiry model will improve students' critical thinking skills. Guided inquiry emphasizes fact-finding and curiosity so that during the process, students will communicate and interact with each other. It is part of social skills in social learning studies. Guided inquiry makes students

more active, collaborate, think critically, solve problems, and have good self-control (Avsec & Slavko, 2014; Palupi et al., 2020)

Statistical analysis showed that students in the experimental class achieved significantly higher post-test averages compared to students in the control class ($p < 0.05$). Students' critical thinking skills in social studies learning were higher at the 0.05 level in the experimental group than in the control group. From the results of experimental class studies, it is clear that students critical thinking skills improve after treatment with a problem-based learning model. This result was pointed out by a previous study and when a problem-based learning model was applied, students became more and more involved, creative, disciplined, and criticized for learning (Galand et al., 2012; Marzuki & Basariah, 2017). The subject-based learning model has a significant impact on students' critical thinking skills in thinking and self-discipline in social education. The PBL model uses students' real problems to enable them to use their knowledge and critical thinking skills to solve problems, and because students can develop independence and self-confidence, they can achieve thinking skills (Arends, 2012). In addition, students taught in problem-based learning models had an average N-gain of 56.8%, while students taught in guided exploration-based learning had an average N-gain of 24, 7%. This means that the improvement of students' critical thinking ability is greater in the experimental class than in the control class. From this, we can conclude that the influence of problem-based learning models in social studies improves students' critical thinking skills.

4. CONCLUSION

The problem-based learning (PBL) model is more effective than the guided query model for social science learning about students' critical thinking skills that can analyze and solve their problems. The PBL model can be used as a more innovative, fun, and rewarding alternative to learning, as social studies students can build their knowledge by solving problems similar to those in the real world.

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