

# The Effect of Applying Problem-Based Learning Model on Students' Critical Thinking Ability Science Subjects in Grade V Elementary School

Tutik Hidayati<sup>1\*</sup>, Dyah Purwaningsih<sup>2</sup> 

<sup>1</sup> Pendidikan Dasar, Universitas Negeri Yogyakarta

<sup>2</sup> SD Negeri 1 Sumberejo, Klaten Selatan

## ARTICLE INFO

### Article history:

Received December 16, 2022

Revised December 20, 2022

Accepted June 13, 2023

Available online September 25, 2023

### Kata Kunci:

Problem Based Learning,  
Kemampuan Berpikir Kritis, IPA

### Keywords:

Problem Based Learning, Critical  
Thinking Ability, Science



This is an open access article under the [CC BY-SA](https://creativecommons.org/licenses/by-sa/4.0/) license.

Copyright ©2023 by Author. Published by  
Universitas Pendidikan Ganesha.

## ABSTRAK

Salah satu permasalahan yang dihadapi siswa sekolah dasar adalah sulitnya menguasai materi pelajaran yang diajarkan. Upaya peningkatan penguasaan materi yang dilakukan guru antara lain dengan menerapkan berbagai model pembelajaran yang bervariasi. Model Problem Based Learning merupakan model pembelajaran yang mampu mengasah berpikir kritis siswa. Tujuan penelitian ini adalah untuk menganalisis pengaruh model Problem Based Learning pada muatan pembelajaran IPA terhadap kemampuan berpikir kritis. Penelitian ini menggunakan pendekatan kuantitatif dengan metode eksperimen. Penelitian ini dilakukan pada siswa SD yang menggunakan kelas V sebagai sasaran penelitian yang diberi perlakuan dengan model pembelajaran Problem Based Learning. Analisis data yang digunakan adalah uji t untuk data rasio korelasi sampel dengan analisis uji Wilcoxon Matched Pairs. Model pembelajaran berbasis masalah untuk meningkatkan kemampuan berpikir kritis IPA siswa kelas V SD berpengaruh positif dan signifikan. Hasil penelitian ini menyimpulkan bahwa hipotesis 1 (h1) diterima. Hal ini menunjukkan bahwa model Problem Based Learning berpengaruh terhadap kemampuan berpikir kritis siswa, dimana kemampuan berpikir kritis siswa meningkat setelah diterapkan pada suatu mata pelajaran tertentu.

## ABSTRACT

One of the problems faced by elementary school students is the difficulty of mastering the subject matter being taught. Efforts to increase mastery of the material were carried out by teachers, among others, by applying various varied learning models. The Problem Based Learning model is a learning model that is able to hone students' critical thinking. The purpose of this study was to analyze the effect of the Problem Based Learning model on science learning content on the critical thinking abilities. This study uses a quantitative approach to the experimental method. This research was conducted at elementary students using grade V as the research target for treatment by the Problem Based Learning learning model. The data analysis used was the t-test for sample correlation ratio data with the Wilcoxon Matched Pairs test analysis. The problem-based learning model to improve the critical thinking skills of science grade V elementary school students has a positive and significant effect. The results of this study conclude that hypothesis 1 (h1) is accepted. This shows that the Problem Based Learning model influences students' critical thinking ability, where students' critical thinking ability increase after being applied to a given subject.

## 1. INTRODUCTION

Science is one of the lessons that teaches how to come into direct contact with human life. Science subjects at the elementary school level teach about how basic concepts relate to our surroundings. Science in question is not just a collection of facts, but how to proceed in obtaining these facts which is based on the ability to use basic science knowledge to predict or explain different phenomena in terms of processes and scientific attitudes (Kumullah et al., 2018; Wirayuda et al., 2022). Science learning at the elementary school level needs to be expanded in scope and linked to problems in everyday life. Science learning in elementary schools should be able to train students' skills, student activity, scientific attitudes and

\*Corresponding author

E-mail addresses: [tutik90@gmail.com](mailto:tutik90@gmail.com) (Tutik Hidayati)

students' critical thinking skills in dealing with and solving a given problem. Basically, students in the elementary school environment are always involved with nature as a place for students to learn and gain experience. Lack of innovation from teachers who only use rote learning will affect student learning outcomes (Devi & Bayu, 2020; Encheva et al., 2019). At the elementary school level, science subjects are among the most important and necessary subjects in everyday life. For example, practicing critical thinking to solve a problem makes someone accustomed to solving life's problems systematically and easily. It is reinforced by opinion which states that critical thinking can be developed through science learning, as already stated that critical thinking is needed because it plays an important role in solving problems in everyday life and science is one of the sciences that has a role in improving critical thinking skills, science can be used to train critical thinking because science plays a very important role in human life where the problems that occur in daily human life are related to nature (Firdaus et al., 2020; Suriasa, 2018). So that student are expected to have the ability to think critically to help solve problems well. But, in science learning, the ability to think critically has not been fully developed. Students' critical thinking skills, especially in science learning, is still very low (Hasna et al., 2021; Tytler & Prain, 2022).

According to previous research, if students lack critical thinking abilities, students will find it difficult to solve problems or problems in learning science (Mareti & Hadiyanti, 2021; Pebriana & Disman, 2017). Critical thinking abilities need to be instilled in student character and applied in teaching and learning processes because these skills are very important and focus on education (Dakabesi & Luoise, 2019; Williams et al., 2009). So that it can help students to develop their academic achievements and produce students who are competent and skilled in solving problems in everyday life. Moreover, this skill is an important skill for success in living in a dynamic and complex world. However, the reality on the ground shows that science learning in elementary schools is still carried out in a textbook-oriented manner with teacher-centered learning, where students listen, take notes, and then memorize. This is in accordance with the results of the author's observations at SD Negeri 1 Sumberejo, Klaten Selatan District, Klaten Regency. This observation was reinforced by interview data obtained from a grade V teacher at SD Negeri 1 Sumberejo.

The interview discussed the problems that existed during the learning process in class. The results of observations of teaching and learning activities show that the level of critical thinking skills possessed by students is still low and this can have an impact on the competence achievement of graduates in science learning, because one of the graduation standards that must be achieved is to demonstrate the ability to think logically, critically, creatively, and innovative. Based on the results of the interviews and observations it is known that students still experience difficulties in science subjects. The material presented was very difficult for students to understand. From the results of this interview and observation it was also obtained data that students were still very passive and did not have a sense of curiosity about the material presented.

Students' critical thinking abilities that are not visible in themselves make students embarrassed to ask questions and are less active in exploring the knowledge they have so that it also has an impact on their learning outcomes. Therefore, a strategy is needed with the application of innovative learning models so that students' critical thinking abilities can increase. One learning model that is believed to improve critical thinking abilities is the Problem Based Learning model. Learning so far only leads to children's ability to memorize information so that students are less encouraged to develop thinking skills. Students are less able to connect between what they learn and how this knowledge is applied in real life. Based on the facts above, science learning in elementary schools, where students only listen, record and memorize is not effectively implemented because students are less able to develop good thinking skills.

The use of learning models can help determine the capacity of students' critical thinking abilities. Increasing critical thinking abilities can be improved by using learning models. One of them is the Problem Based Learning model. Problem Based Learning is pedagogical approach that enables students to learn while engaging actively with meaningful problems. Students are given the opportunities to problem solve in a collaborative setting, create mental models for learning, and form self directed learning habits through practice and reflection (Ahdhianto et al., 2020; Yew & Goh, 2016). Problem Based Learning can facilitate the involvement of students in learning and joining in solving a fundamental problem. Educators are concerned about Generation Z's lack of experience with high-level critical thinking and a tendency to give up when faced with challenges. Recognizing that this generation brings with them the technological skills and inclusive mindset that will elevate our profession, educators are challenged to adapt teaching strategies to encourage critical thinking and foster perseverance. So there is a need for problem-based learning as a strategy to improve critical thinking (Seibert, 2021; Walfajri & Harjono, 2019). The Problem Based Learning model for critical thinking abilities has been studied before. Based on research, the results obtained were that from the meta-analysis of several journals, the use of problem-based learning models can improve the critical thinking abilities of elementary school students (Ariani, 2020; Made et al., 2022).

Furthermore, there was a positive and significant effect using the problem based learning model on students' critical thinking abilities significant (Aizikovitsh-Udi & Cheng, 2015; Risnawati et al., 2022). However, when compared to previous research, the Problem Based Learning model has several differences. The difference in question lies in the type of research, research location, research subject, level of research education, and learning materials.

The Problem Based Learning learning model students are faced with real life problems (contextual) from the environment so that they can improve students' conceptual understanding and critical thinking abilities. It is supported by other research results found the Problem Based Learning (PBL) model gives effect and can improve critical thinking skills because the implementation of science learning using learning tools oriented to the Problem Based Learning (PBL) model is in the good category and critical thinking skills of students who are treated with the Problem Based Learning (PBL) learning model are significantly better and higher than conventional classes (Ejin, 2017). This research is also based on previous research which stated that there was a significant positive effect of the Problem Based Learning model on students' cognitive abilities and critical thinking skills (Sarimuddin et al., 2021). Furthermore, other research was found that there was an influence of the Problem Based Learning (PBL) model on critical thinking skills and understanding of science concepts at SDN 30 Sumpangbita (Rahman et al., 2020). In addition, a similar study who researched the Effect of Problem Based Learning (PBL) Learning Models on Students' Critical Thinking Ability in Science Learning Grade IV SDN 1 Beleka for the 2021/2022 academic year, the results showed that there was an influence of the problem based learning (PBL) learning model on students' critical thinking abilities in learning Science class IV SDN 1 Beleka for the 2021/2022 academic year (Mariskhantari et al., 2022).

It is often assumed that problem-based learning is an effective approach to encourage the development and/or improvement of students' critical thinking. To explain the relationship between problem-based learning and critical thinking, this scoping review maps how the idea of critical thinking is conceptualized in relation to problem-based learning in the literature on problem-based learning in the context of higher education. Eight academic databases were searched and a total of 66 peer-reviewed articles were identified as eligible for review. The findings suggest that there is a plurality of positions regarding the meaning of critical thinking and the relation of concepts to problem-based learning (Anugraheni, 2018; Nugraha, 2018; Thorndahl & Stentoft, 2020). To find out whether or not there is an influence of the Problem Based Learning model on students' critical thinking abilities, it is important to do a research. The purpose of this study was to analyze the effect of the Problem Based Learning model on science learning content on the critical thinking abilities of fifth grade students at SD Negeri 1 Sumberejo which was limited to theme 2 on Makanan Sehat.

## 2. METHOD

This study uses a quantitative approach. The quantitative approach has several research methods, one of which is the experimental method, in which this method is used to find the effect of certain treatments on others under controlled conditions (Sugiyono, 2013). Before the treatment was given, a pre test was carried out. After the treatment was carried out a post test was carried out. This research was conducted at SD Negeri 1 Sumberejo, Klaten Selatan using grade V as the research target for treatment using the Problem Based Learning model in the odd semester of August 2022 for the 2022/2023 academic year. The sampling technique in this research is using saturated sampling technique. The population and sample in this study were all fifth grade students at SD Negeri 1 Sumberejo, Klaten Selatan with a total of 24 students where there were 13 male students and 11 female students. The average age is 11 years.

The research instrument used observation for class teachers in the form of the implementation of the Problem Based Learning model, questionnaires to determine student responses to learning using the Problem Based Learning model, and tests in the form of multiple choice questions to determine students' critical thinking abilities. The data analysis used was the t-test for sample correlation ratio data with the Wilcoxon Matched Pairs test analysis. Data analysis used is quantitative data analysis and qualitative data analysis.

Quantitative data in the form of student test results were processed and statistically analyzed using the Statistical Package for Social Science (SPSS) Software for windows version 16.0. The qualitative data that is processed and analyzed is questionnaire data and observational data during the learning process. The data from filling out the questionnaire which is the student's response to the implementation of the learning model is calculated by score then tabulated and calculated as a percentage. Processing and analysis of data from observation of learning is by translating observations of learning outcomes.

### 3. RESULT AND DISCUSSION

#### Result

The results of research that has been carried out on the 6<sup>th</sup> s.d. 10<sup>th</sup> of August 2022 at SD Negeri 1 Sumberejo with a sample of grade V with a total of 24 students using the Problem Based Learning model in the Natural Science subject matter theme 2 Makanan Sehat can be seen in [Table 1](#).

**Table 1. Results of Students' Critical Thinking Ability**

	N	Minimum	Maximum	Mean	Std. Deviation
PRETEST	24	40.00	100.00	55.4167	18.87699
POSTTEST	24	60.00	100.00	80.4167	12.32853
Valid N (listwise)	24				

Based on [Table 1](#), it can be concluded that students' critical thinking abilities obtained from the results of the pre-test and post-test have increased although both in the pre-test and post-test there are students who are categorized as complete and incomplete. Students categorized as having complete critical thinking abilities are students who get pre-test and post-test scores  $\geq 70$ , according to the KKM score determined by the school. Conversely, students who are categorized as having incomplete critical thinking abilities are students who get pre-test and post-test scores  $\leq 70$ . So from these results the pre-test scores show an average of 55.4167 in the low category and the post-test scores show an average of 80.4167 with high category. The results of the average categories above have been interpreted based on the criteria, namely  $81.25 < - \leq 100$  very high,  $71.50 < - \leq 81.25$  high,  $62.50 < - \leq 71.50$  moderate,  $43.75 < - \leq 62.50$  is low, and  $0 < - \leq 43.75$  is very low.

Before knowing whether or not the Problem Based Learning model has an effect, a requirements test is carried out to find out whether the data is normal or abnormal and homogeneous or non-homogeneous. So that it can be proven in the table below based on the calculation of the Software Statistical Package for Social Science (SPSS) for windows version 16.0. The data obtained shows that it is not normal, as evidenced in [Table 2](#).

**Table 2. Data Normality Test Results**

Test	Statistic	Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
		Df	Sig.	Statistic	df	Sig.	
Critical Thinking	Pre Test	0.280	24	0.000	0.786	24	0.000
	Post Test	0.222	24	0.004	0.903	24	0.025

If seen in [Table 2](#), the normality test on the Kolmogorov-Smirnov resulted in a significant pre-test value of  $0.000 < 0.05$  and a post-test of  $0.004 < 0.05$  so it can be concluded that the test variable has data that is not normally distributed. If the data normality requirement test is known, the next requirement test is to find out whether the data is homogeneous or non-homogeneous. The data obtained shows that it is not homogeneous as evidenced by [Table 3](#).

**Table 3. Data Homogeneity Test Results**

Test of Homogeneity of Variances			
Critical Thinking			
Levene Statistic	df1	df2	Sig.
6.111	1	46	0.017

It can be seen in [Table 3](#) that the homogeneity test above produces two tables, namely the Test of Homogeneity of Variances table and the ANOVA table. With these two tables, the focus is only on the Test of Homogeneity of Variances table. Based on the above results, a significance value of  $0.017 < 0.05$  is obtained, so it can be concluded that the testing of the Problem Based Learning variable on students' critical thinking abilities is not homogeneous. So that if the data is not normally distributed and not homogeneous then to find out the effect of the Problem Based Learning model on students' critical thinking abilities can be tested using the Wilcoxon matched pairs test in [Table 4](#).

**Table 4.** SPSS Calculation Results for the Wilcoxon Matched Pairs Test

		N	Mean Rank	Sum of Ranks
Post_Test - Pre_Test	Negative Ranks	0 <sup>a</sup>	0.00	0.00
	Positive Ranks	21 <sup>b</sup>	11.00	231.00
	Ties	3 <sup>c</sup>		
	Total	24		

- a. Post\_Test < Pre\_Test
- b. Post\_Test > Pre\_Test
- c. Post\_Test = Pre\_Test

The Ranks [Table 4](#) shows that the Negative Ranks or the difference between the pre-test and post-test results is 0, whether it's the value of N, Mean Rank or Sum Rank. This value of 0 indicates no decrease (decrease from the pre-test and post-test scores). And in Positive Ranks or the difference between the pre-test and post-test results, there are 21 positive data, which means that the 21 students experienced an increase in post-test results. The Mean Rank or average increase is 11.00, while the total positive rankings or Sum Ranks are 231.00. Ties are the similarities in the pre-test and post-test scores, in the pre-test and post-test scores there are 3 the same values. In the Test Statistics table, if the value of *Asymp.Sig.(2-tailed)* < 0.05 then hypothesis 1 ( $H_1$ ) is accepted and if the value of *Asymp.Sig.(2-tailed)* > 0.05 then hypothesis 0 ( $H_0$ ) is rejected. Based on the output of "Test Statistics", it is known that *Asymp.Sig.(2-tailed)* has a value of 0.000 < 0.05, so it can be concluded that hypothesis 1 ( $H_1$ ) is accepted. This means that there is a difference in the pre-test and post-test scores and there is an influence of the Problem Based Learning model on students' critical thinking abilities.

**Discussion**

Prior to the application of the Problem Based Learning model, the results of students' critical thinking abilities in the form of a pre-test obtained an average of 55.4167, which means that students' critical thinking abilities are low and they do not understand Makanan Sehat material, so the researcher provides treatment in the form of learning using the Problem Based Learning model. The learning device used by researchers to develop is the Learning Implementation Plan (RPP) which in the learning process uses the Problem Based Learning model. The Problem Based Learning model is a learning model that actively involves students in each learning process that has been divided into study groups with the number of each group having 4 students. In this lesson according to Piaget's theory, students are given the opportunity to experiment with physical objects supported by interactions with peers and assisted by teachers. Learning tools developed include syllabus, lesson plans and worksheets. With the Problem Based Learning model students are very enthusiastic in receiving the material that has been given by the teacher, so that new ideas emerge in a lesson. This is evidenced by the results of the post test scores given by the teacher after the application of the Problem Based Learning model. The average post-test result obtained by students was 80.4167, although there were still 3 students who scored below the KKM set by the school, which was 70. Efforts to improve students' critical thinking abilities were one of them by applying various learning models to each meeting of learning activities in accordance with the material provided. In this study, researchers used or applied the Problem Based Learning model which involved fifth grade students at SD Negeri 1 Sumberejo, Klaten Selatan. In the learning process students are treated with the Problem Based Learning model on Makanan Sehat material. The results of the hypothesis test are in accordance with the initial hypothesis which states that there is an influence on students' critical thinking abilities by applying the Problem Based Learning model to grade V SD Negeri 1 Sumberejo, Klaten Selatan.

The increase in students' critical thinking abilities can be seen from the average on the pre-test which is equal to 55.4167 and the average score on the post test which is equal to 80.4167 so that it can be seen that there is an influence on students' critical thinking abilities with the difference being the average the increase obtained in each student between before and after the implementation of learning using the Problem Based Learning model. This is proven by the results of the SPSS test with the *Asymp.Sig.(2-tailed)* value < 0.05 then hypothesis 1 ( $H_1$ ) is accepted and if the *Asymp.Sig.(2-tailed)* value is > 0.05 then hypothesis 0 ( $H_0$ ) is rejected. Based on the output of "Test Statistics", it is known that *Asymp.Sig.(2-tailed)* has a value of 0.000 < 0.05, so it can be concluded that hypothesis 1 ( $H_1$ ) is accepted. The results of this study indicate that the Problem Based Learning model influences students' critical thinking abilities, where students' critical thinking abilities increase after being given an application to a given subject. This is supported by constructivist theory which is an approach to creating a learning environment that can encourage students to construct knowledge and skills personally, and be able to apply knowledge and be

able to solve problems so they can find ideas. Similar results were research conducted by Risnawati et al. which stated that based on the results of data analysis results and discussion of research on problem-based learning learning models on students' critical thinking abilities, there was a positive and significant effect as shown by the results of data analysis using the t test and effect size test (Risnawati et al., 2022). This is also in line with the results of research conducted by other researcher, the results show that there is an increase in each cycle that has been adjusted with indicators of critical thinking. Thus the application of the model problem based learning in general can improve students' critical thinking skills in science learning at school (Maqbullah et al., 2018). Based on the results of the analysis regarding the use of the Problem Based Learning (PBL) model, it can be obtained that this model can improve the critical thinking of fifth grade elementary school students starting from the lowest increase of 0.61% to the highest of 18.15% (Saputri, 2020). Furthermore, there is the aim of this study to analyze previously published studies and obtain a summary regarding the success of problem-based learning research on critical thinking skills in learning mathematics. The results of this study indicate that the problem-based learning model can improve students' critical thinking processes in learning mathematics. These results can be seen from the results of the pretest and posttest with an average of 0.15% included in the Week Effect category (Phasa, 2020).

The same thing was also stated by Sani that the critical thinking abilities of students who were taught with the Problem Based Learning model were better than those who were taught with the Direct Instructional model. In addition, the results of Ulger's research concluded that PBL has a significant influence on creative thinking, but critical thinking dispositions are affected to a lesser extent (Sani, 2022; Ulger, 2018). Other similar research found that the problem-based learning model was effective in developing the critical thinking abilities of accounting majors in vocational high school students (Saputra et al., 2019). In the same year a similar study was who concluded that the problem-based learning model can improve the critical thinking abilities of elementary school students (Zuryanty et al., 2019). This model can be an effort to enhance the thinking skills of elementary school students in science learning. In addition, previous study obtained the result that students' critical thinking abilities were taught using a collaborative problem-based learning model better than students who were taught with a direct learning model (Khairani et al., 2020). In addition, there is research used Classroom Action Research (CAR) which was intended to contribute to the improvement of knowledge, style, techniques and methods of teachers in the classroom, and to provide insight into the behavior of teachers and students in applying learnin by previous study with based on the results of the study it can be concluded that through the PBL Model can improve critical thinking skills of fourth grade students in learning of elementary school 11 Air Camar, Padang City (Monalisa et al., 2019). From the results of the meta-analysis in this study it was concluded that the use of the Problem Based Learning (PBL) learning model was effective in increasing the critical thinking of elementary school students. Another research model conducted through meta-analysis concluded that the use of the Problem Based Learning (PBL) learning model is effective in increasing students' critical thinking (Ariani, 2020). In the same year, previous study conducted a meta-analysis study, with the result that the problem based learning (PBL) learning model can improve critical thinking abilities in science learning content in elementary schools (Utama & Kristin, 2020). Based on the findings conducted, it shows that the research variable, namely the Problem Based Learning model assisted by visual media, makes a positive contribution to the critical thinking abilities and science learning outcomes of elementary students (Devi & Bayu, 2020).

There are others study who conduct research with the results of observations and reflections carried out by the teacher, in the implementation of learning themes 8, sub-themes 1 and sub-themes 2 using the problem-based learning model, have been as expected. Most students have shown their critical thinking skills in learning (Islam et al., 2018). The results of this study also show that students can take part in learning using the problem-based learning model so that critical thinking skills and science learning outcomes gradually increase. A similar study was conducted study Problem-Based Learning Model Assisted by Mentimeter Media in Science Learning on Students' Critical Thinking and Collaboration Skills (Dwi Anggriani & Eko Atmojo, 2022). The results show significant differences in critical thinking and collaboration skills between students who study using problem-based learning with the aid of a meter and students who learn without using problem-based learning with the aid of a meter. So, it can be concluded that the problem-based learning model assisted by a meter influence elementary school teacher education students' critical thinking and collaboration skills. Other study conducted research that aimed to determine the effect of applying a scientific approach based on STEM-oriented Problem Based Learning (PBL) on critical thinking skills and scientific literacy in fifth grade elementary school students in Cluster I Gusti Ketut Pudja and the results showed that there was an influence of the Problem Based Learning Model (PBL) is STEM oriented towards students' critical thinking skills and scientific literacy (Adiwiguna et al., 2019). Another study that described the application of the Problem Based Learning model in

improving students' critical thinking skills in the Social Psychology course at the Psychology Department of the Faculty of Education at UNESA. Through the application of Problem Based Learning, students are expected to explore and find their own problem solving discussed in the teaching and learning process in the classroom. The method used is Classroom Action Research. The conclusion was that the problem-based learning model is able to improve students' critical thinking skills in the Social Psychology course at the Psychology Department of the Faculty of Education at UNESA (Nyet Moi Siew, 2016; Satwika et al., 2018). There is another research which is classroom action research (PTK) where the implementation uses two cycles. The purpose of this study is to describe the application of PBL to improve critical thinking skills and learning outcomes, knowing the increase in students' critical thinking skills, the results showed that the use of the problem learning model can improve critical thinking skills and learning outcomes in solving problems in mathematics in grade 4 SD Negeri Suruh 01 and know the increase in student learning outcomes (Asriningtyas, A.N., Kristin, F., Anugraheni, 2018). In the same year, there was research was aimed to determine the improvement of the result of critical thinking skills and student learning outcomes when applied Problem Based Learning model on Theme 7 Energy and Its Changes. Based on the results of the research and discussion it can be concluded that the application of Problem Based Learning on the theme of Energy and Change can improve the critical thinking skills of class III students at SDI Klojen Kidul, especially in the ability to ask questions (Ningsih et al., 2018).

From the various studies that have been conducted by researchers, most of them show significant results that the application of the Problem Based Learning learning model can improve students' critical thinking skills. Based on the results of the research above, it can be seen that each research conducted obtains different results of increasing critical thinking (Kusuma Dewi & Rahayu Utami, 2016; Sumarno, 2019). The author analyzes that the differences in the results of the research conducted by these researchers are caused by internal factors and external factors. Internal factors are factors that exist within the student himself (such as: health, interests, talents, intelligence, body condition), while external factors are factors that come from outside the student's self, namely family factors, school environment, and community environment (relationships). The application of a different curriculum can also have an impact on learning outcomes. In addition, the learning process carried out by the teacher, although using the same type of model, there is a possibility that the application will experience differences. The novelty findings from this study compared to existing studies is that the lesson plan used is an integrated lesson plan where when learning the discussion of the material includes several lesson content so that it is more complex. The research results are of course also getting better because the increase in students' critical thinking ability is also wider in scope, not only in one lesson content. Suggestions that can be submitted based on the results of the research that has been done are as follows: For teachers, with the results of this study, the problem-based learning model can be used as a reference for the learning model used by teachers in teaching. In problem-based learning model activities, it is better to appoint students who are less active when in class, prepare questions before carrying out learning activities. For other researchers who are interested in conducting research, it can be used as information or reference material when conducting similar research. It is hoped that the results of this study will be used as an evaluation and can be developed with further research to meet deficiencies that can be seen objectively. Researchers are to be able to conduct deeper research on students' critical thinking abilities, because there are still many methods or models, strategies or other approaches that might be able to improve students' critical thinking abilities.

#### 4. CONCLUSION

Based on the results of the studies described above, that the Problem Based Learning model has a very large contribution in developing students' critical thinking skills. Students' critical thinking skills can be developed in the learning process through the learning steps of the Problem Based Learning model. One of the characteristics of this model is in presenting the problem as the focus of learning. The problems used are contextual and authentic for students. This is in accordance with the level of cognitive development of students and the characteristics of elementary students. Through presenting the problem students are required to think at a high level in solving the problem. After being treated with the problem based learning model, there was an increase in students' critical thinking skills, including students being able to provide reflective, productive, and evaluative answers to a problem or event. Thus, the application of the Problem Based Learning model is very important to be applied in the learning process because it is in accordance with education in the context of the 21<sup>st</sup> century. Where in education today students must be more responsive to changing times.

## 5. REFERENCES

- Adiwiguna, P. S., Dantes, N., & Gunamantha, I. M. (2019). Pengaruh Model Problem Based Learning (PBL) Berorientasi STEM terhadap Kemampuan Berpikir Kritis dan Literasi Sains Siswa Kelas V SD di Gugus I Gusti Ketut Pudja. *Jurnal Pendidikan Dasar Indonesia*, 3(2), 94–103. <https://doi.org/https://doi.org/10.23887/jpdi.v3i2.2871>.
- Ahdhianto, E., Marsigit, Haryanto, & Nurfauzi, Y. (2020). Improving Fifth-Grade Students' Mathematical Problem-solving and Critical Thinking Skills Using Problem-Based Learning. *Universal Journal of Educational Research*, 8(5), 2012–2021. <https://doi.org/10.13189/ujer.2020.080539>.
- Aizikovitsh-Udi, E., & Cheng, D. (2015). Developing critical thinking skills from dispositions to abilities: mathematics education from early childhood to high school. *Creative Education*, 6(4), 455. <https://doi.org/10.4236/ce.2015.64045>.
- Anugraheni, I. (2018). Meta Analisis Model Pembelajaran Problem Based Learning dalam Meningkatkan Keterampilan Berpikir Kritis di Sekolah Dasar. *A Journal of Language, Literature, Culture, and Education POLYGLOT*, 14(1), 9–18. <https://doi.org/http://dx.doi.org/10.19166/pji.v14i1>.
- Ariani, R. F. (2020). Pengaruh Model Pembelajaran Problem Based Learning Terhadap Kemampuan Berpikir Kritis Siswa Sd Pada Muatan IPA. *Jurnal Ilmiah Pendidikan Dan Pembelajaran*, 4(3), 422–432. <https://doi.org/10.23887/jipp.v4i3.28165>.
- Asriningtyas, A.N., Kristin, F., Anugraheni, I. et al. (2018). Penerapan Model Pembelajaran Discovery Learning Untuk Meningkatkan Kemampuan Berpikir Kritis Dan Hasil Belajar Matematika Siswa Kelas 5 Sd. *Jurnal Basicedu*, 2(2), 5–10. <https://doi.org/https://doi.org/10.26714/jkpm.5.1.2018.23-32>.
- Dakabesi, D., & Luoise, I. S. Y. (2019). The Effect of Problem Based Learning Model on Critical Thinking Skills in The Context of Chemical Reaction Rate. *Journal of Education and Learning (EduLearn)*, 13(3), 395–401. <https://doi.org/10.11591/edulearn.v13i3.13887>.
- Devi, P. S., & Bayu, G. W. (2020). Berpikir Kritis dan Hasil Belajar IPA Melalui Pembelajaran Problem Based Learning Berbantuan Media Visual. *Mimbar PGSD Undiksha*, 8(2), 238–252. <https://doi.org/10.23887/jjgsd.v8i2.26525>.
- Dwi Anggriani, M., & Eko Atmojo, S. (2022). The Impact of Problem-Based Learning Model Assisted by Mentimeter Media in Science Learning on Students' Critical Thinking and Collaboration Skills. *International Journal of Elementary Education*, 6(2), 350–359. <https://doi.org/10.23887/ijee.v6i2.46837>.
- Ejin, S. (2017). Pengaruh Model Problem Based Learning (PBL) Terhadap Pemahaman Konsep dan Keterampilan Berpikir Kritis Siswa Kelas IV SDN Jambu Hilir Baluti 2 Pada Mata Pelajaran Ilmu Pengetahuan Alam. *Jurnal Pendidikan (Teori Dan Praktik)*, 1(1), 66. <https://doi.org/10.26740/jp.v1n1.p66-72>.
- Encheva, M., Zlatkova, P., Tamaro, A. M., & Brenner, M. (2019). Information Behavior of Humanities Students in Bulgaria, Italy and Sweden: Planning a Game-Based Learning Approach for Avoiding Fake Content. In *Communications in Computer and Information Science* (Vol. 989). [https://doi.org/10.1007/978-3-030-13472-3\\_28](https://doi.org/10.1007/978-3-030-13472-3_28).
- Firdaus, F. Z., Suryanti, S., & Azizah, U. (2020). Pengembangan Multimedia Interaktif Berbasis Pendekatan SETS Untuk Meningkatkan Kemampuan Berpikir Kritis Siswa Sekolah Dasar. *Jurnal Basicedu*, 4(3), 681–689. <https://doi.org/10.31004/basicedu.v4i3.417>.
- Hasna, H. R., Fajriyah, K., & Saputra, H. J. (2021). The Effect of Blended Learning Based on The Problem-Based Learning Model Assisted by Puzzle Media on The Critical Thinking Skills of Fifth Grade Students on Ecosystem Themes. *Journal of Education Technology*, 5(1), 14. <https://doi.org/10.23887/jet.v5i1.29770>.
- Islam, F. M., Harjono, N., & Airlanda, G. S. (2018). Penerapan Model Problem Based Learning untuk Meningkatkan Berpikir Kritis Dan Hasil Belajar IPA Dalam Tema 8 Kelas 4 SD. *Jurnal Mitra Pendidikan*, 1(7), 613–628. <http://e-jurnalmitrapendidikan.com/index.php/e-jmp/article/view/351>.
- Khairani, S., Suyanti, R. D., & Saragi, D. (2020). The Influence of Problem Based Learning (PBL) Model Collaborative and Learning Motivation Based on Students' Critical Thinking Ability Science Subjects in Class V State Elementary School 105390 Island Image. *Budapest International Research and Critics in Linguistics and Education (BirLE) Journal*, 3(3), 1581–1590. <https://doi.org/10.33258/birle.v3i3.1247>.
- Kumullah, R., Djatmika, E. T., & Yuliati, L. (2018). Kemampuan Berpikir Kritis dan Penguasaan Konsep Siswa dengan Problem Based Learning pada Materi Sifat Cahaya. *Jurnal Pendidikan: Teori, Penelitian, Dan Pengembangan*, 3 (12)(2018), 1583–1586. <https://doi.org/http://dx.doi.org/10.17977/jptpp.v3i12.11798>.



- Kusuma Dewi, N., & Rahayu Utami, N. (2016). Pengaruh Model Problem Based Learning Terhadap Kemampuan Berpikir Kritis Siswa Materi Sistem Ekskresi. *Journal of Biology Education*, 5(3), 50229. <https://doi.org/10.15294/jbe.v5i3.14865>.
- Made, I., Dharma, A., Ayu, N., & Lestari, P. (2022). The Impact of Problem-based Learning Models on Social Studies Learning Outcomes and Critical Thinking Skills for Fifth Grade Elementary School Students. *Jurnal Ilmiah Sekolah Dasar*, 6(2), 263–269. <https://doi.org/10.23887/JISD.V6I2.46140>.
- Maqbullah, S., Sumiati, T., & Muqodas, I. (2018). Penerapan Model Problem Based Learning (PBL) Untuk Meningkatkan Kemampuan Berpikir Kritis Siswa Pada Pembelajaran IPA Di Sekolah Dasar. *Metodik Didaktik*, 13(2), 106–112. <https://doi.org/10.17509/md.v13i2.9500>.
- Mareti, J. W., & Hadiyanti, A. H. D. (2021). Model Problem Based Learning Untuk Meningkatkan Kemampuan Berpikir Kritis dan Hasil Belajar IPA Siswa. *Jurnal Elementaria Edukasia*, 4(1), 31–41. <https://doi.org/10.31949/jee.v4i1.3047>.
- Mariskhantari, M., Karma, I. N., & Nisa, K. (2022). Pengaruh Model Pembelajaran Problem Based Learning (PBL) terhadap Kemampuan Berpikir Kritis Siswa Pada Pembelajaran IPA Kelas IV SDN 1 Beleka Tahun 2021/2022. *Jurnal Ilmiah Profesi Pendidikan*, 7(2b), 710–716. <https://doi.org/10.29303/jipp.v7i2b.613>.
- Monalisa, C., Ahda, Y., & Fitriya, Y. (2019). Critical Thinking Skill Improvement Using Problem Based Learning (PBL) Model of 4th Grade Students of Elementary School. *International Journal of Science and Research (IJSR)*, 8(2), 429–432. <http://repository.unp.ac.id/21930/>.
- Ningsih, P. R., Hidayat, A., Kusairi, S., & Dasar, P. (2018). Penerapan Problem Based Learning untuk Meningkatkan Kemampuan Berpikir Kritis dan Hasil Belajar Siswa Kelas III. *Jurnal Pendidikan: Teori, Penelitian, Dan Pengembangan*, 3(12), 1587–1593. <https://doi.org/10.17977/jptpp.v3i12.11799>.
- Nugraha, W. S. (2018). Peningkatan Kemampuan Berpikir Kritis Dan Penguasaan Konsep Ipa Siswa Sd Dengan Menggunakan Model Problem Based Learning. *EduHumaniora | Jurnal Pendidikan Dasar Kampus Cibiru*, 10(2), 115. <https://doi.org/10.17509/eh.v10i2.11907>.
- Nyet Moi Siew, R. M. (2016). the Effects of Problem- Based Learning With Thinking Maps on Fifth Graders ' Science Critical. *Journal of Baltik Science Education*, 15 (5)(1986), 602–617. <https://doi.org/Corpus ID: 56121381>.
- Pebriana, R., & Disman, D. (2017). Effect of Problem Based Learning To Critical Thinking Skills Elementary School Students In Social Studies. *PrimaryEdu - Journal of Primary Education*, 1(1), 109. <https://doi.org/10.22460/pej.v1i1.487>.
- Phasa, K. C. (2020). Meta Analisis Pengaruh Model Pembelajaran Problem Based Learning Terhadap Kemampuan Berpikir Kritis Dalam Pembelajaran Matematika. *Jurnal Cendekia : Jurnal Pendidikan Matematika*, 4(2), 711–723. <https://doi.org/10.31004/cendekia.v4i2.296>.
- Rahman, A., Khaeruddin, K., & Ristiana, E. (2020). Pengaruh Model PBL Terhadap Kemampuan Berpikir Kritis dan Pemahaman Konsep IPA Siswa Kelas V SDN 30 Sumpangbita. *Edumaspul: Jurnal Pendidikan*, 4(1), 29–41. <https://doi.org/10.33487/edumaspul.v4i1.201>.
- Risnawati, A., Nisa, K., & Oktaviyanti, I. (2022). Pengaruh Model Pembelajaran Problem Based Learning terhadap Kemampuan Berpikir Kritis Siswa Kelas V Pada Tema Kerukunan dalam Bermasyarakat SDN Wora. *Jurnal Ilmiah Profesi Pendidikan*, 7(1), 109–115. <https://doi.org/10.29303/jipp.v7i1.426>.
- Sani, R. (2022). The Effect of Problem Based Learning Model on Critical Thinking Ability of Students in Dynamic Fluid Class XI MIA SMA Negeri 2 Balige Academic Year 2014 / 2015. *Artikel in INPAFI, August 2016*. <https://doi.org/10.24114/inpafi.v4i3.5553>.
- Saputra, M. D., Joyoatmojo, S., Wardani, D. K., & Sangka, K. B. (2019). Developing Critical-Thinking Skills through the Collaboration of Jigsaw Model with Problem-Based Learning Model. *International Journal of Instruction*, 12(1), 1077–1094. <https://doi.org/10.29333/iji.2019.12i169a>.
- Saputri, M. A. (2020). Penerapan Model Pembelajaran Problem Based Learning Untuk Meningkatkan Kemampuan Berfikir Kritis Siswa Kelas V Sekolah Dasar. *Jurnal Pendidikan Dan Konseling (JPDK)*, 2(1), 92–98. <https://doi.org/10.31004/jpdk.v1i2.602>.
- Sarimuddin, S., Muhiddin, M., & Ristiana, E. (2021). Pengaruh Model Problem Based Learning Terhadap Kemampuan Kognitif Dan Keterampilan Berpikir Kritis Materi IPA Siswa Kelas V SD Di Kecamatan Herlang Kabupaten Bulukumba. *Jurnal Pendidikan Dan Pengajaran Guru Sekolah Dasar (JPPGuseda)*, 4(3), 281–288. <https://doi.org/10.55215/jppguseda.v4i3.4864>.
- Satwika, Y. W., Laksmiwati, H., & Khoirunnisa, R. N. (2018). Penerapan Model Problem Based Learning untuk Meningkatkan Kemampuan Berfikir Kritis Mahasiswa. *Jurnal Pendidikan (Teori Dan Praktik)*, 3(1), 7. <https://doi.org/10.26740/jp.v3n1.p7-12>.
- Seibert, S. A. (2021). Problem-based learning: A strategy to foster generation Z's critical thinking and

- perseverance. *Teaching and Learning in Nursing*, 16(1), 85–88. <https://doi.org/10.1016/j.teln.2020.09.002>.
- Sugiyono, D. (2013). *Metode Penelitian Kuantitatif, Kualitatif, dan Tindakan*.
- Sumarno. (2019). Pembelajaran kompetensi abad 21 menghadapi era Society 5.0. *Prosiding SEMDIKJAR (Seminar Nasional Pendidikan Dan Pembelajaran)*, 3, 272–287. <http://ojs.semdikjar.fkip.unpkediri.ac.id/index.php/SEMDIKJAR/article/view/28>.
- Suriasa, S. (2018). Penerapan Model Pembelajaran Problem Posing Menggunakan LKS Berbasis Scientific Approach Untuk Meningkatkan Keterampilan Berpikir Kritis Siswa. *Berkala Ilmiah Pendidikan Fisika*, 6(2), 190. <https://doi.org/10.20527/bipf.v6i2.4853>.
- Thorndahl, K. L., & Stentoft, D. (2020). Thinking critically about critical thinking and problem-based learning in higher education: A scoping review. *Interdisciplinary Journal of Problem-Based Learning*, 14(1), 1–21. <https://doi.org/10.14434/ijpbl.v14i1.28773>.
- Tytler, R., & Prain, V. (2022). Interdisciplinary mathematics and science - a guided inquiry approach to enhance student learning. *Teaching Science*, 68(1), 31–43. <https://doi.org/10.3316/informit.362070229925660>.
- Ulger, K. (2018). The effect of problem-based learning on the creative thinking and critical thinking disposition of students in visual arts education. *Interdisciplinary Journal of Problem-Based Learning*, 12(1), 3–6. <https://doi.org/10.7771/1541-5015.1649>.
- Utama, K. H., & Kristin, F. (2020). Meta-Analysis Pengaruh Model Pembelajaran Problem Based Learning (PBL) Terhadap Kemampuan Berpikir Kritis IPA Di Sekolah Dasar. *Jurnal Basicedu*, 4(4), 889–898. <https://doi.org/10.31004/basicedu.v4i4.482>.
- Walfajri, R. U., & Harjono, N. (2019). Peningkatan Kemampuan Berpikir Kritis Dan Hasil Belajar Tematik Muatan IPA Melalui Model Problem Based Learning Kelas 5 SD. *Jurnal Basicedu*, 3(1), 16–20. <https://doi.org/10.31004/basicedu.v3i1.54>.
- Williams, M. K., Foulger, T. S., & Wetzal, K. (2009). Preparing Preservice Teachers for 21st Century Classrooms: Transforming Attitudes and Behaviors About Innovative Technology. *Journal of Technology and Teacher Education*, 17(3), 393–418. <https://www.learntechlib.org/primary/p/28216/>.
- Wirayuda, R. P., Darmaji, D., & Kurniawan, D. A. (2022). Identification of Science Process Skills and Students' Creative Thinking Ability In Science Lessons. *Attractive: Innovative Education Journal*, 4(1), 129–137. <https://doi.org/10.51278/aj.v4i1.335>.
- Yew, E. H. J., & Goh, K. (2016). Problem-Based Learning: An Overview of its Process and Impact on Learning. *Health Professions Education*, 2(2), 75–79. <https://doi.org/10.1016/j.HPE.2016.01.004>.
- Zuryanty, Kenedi, A. K., Chandra, R., Hamimah, & Fitria, Y. (2019). Problem based learning: A way to improve critical thinking ability of elementary school students on science learning. *Journal of Physics: Conference Series*, 1424(1). <https://doi.org/10.1088/1742-6596/1424/1/012037>.