

# Problem-based learning model based on student's ability to apply their critical thinking: A preliminary study

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## ABSTRACT

This study sought to assess the critical thinking-based problem-based learning model. A total of 22 students and one teacher from the fifth grade of SD Negeri 2 Way Huwi in the Jati Agung District of South Lampung, Indonesia, participated in the study. A descriptive qualitative technique was used in this study, and the research instruments included a needs analysis questionnaire, observation, documentation, and structured interviews. Our preliminary study's findings indicate that students required a problem-based learning model based on critical thinking ability.

## KEYWORDS

Learning model; PBL; critical thinking; elementary school; preliminary study

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## Introduction

Education has a very important role in realizing Indonesia's golden generation. Quality education can help the golden generation grow and develop dynamically and actively to become Indonesian people who are characterized, intelligent, competitive, and productive. Efforts to realize these expectations require skills in 21st century learning. 21st century learning balances the demands of the millennial era with the aim that later students will be familiar with 21st century life skills. Critical thinking ability is one of the assets that students must have as a provision in facing the development of science and technology at this time. This is in accordance with the opinion of Widarto, Parjono and Widodo (2012), which states that students are required to have eight main competencies in 21st century education, namely; (1) communication skills, (2) critical and creative thinking skills, (3) inquiry/reasoning skills, (4) interpersonal skills, (5) multicultural/multilingual literacy, (6) problem solving, (7) information/digital literacy and (8) technological skills.

One of the skills needed in the 21st century is the ability to think critically (Critical Thinking) and problem solving. In terms of this ability, students are required not only to think intelligently from memorizing activities, but also to think intelligently which is formed from the habituation process to solve problems in the learning process. According to Ennis (in Supriya, 2012), critical thinking is reasonable and reflective thinking that focuses on deciding what to do. In addition, the results of research by Samritin and Suryanto (2016: 93) also explain that critical thinking is very important because it can train students' abilities to process complex tasks or problems by involving connections, problem solving, and mathematical reasoning. Therefore, the task of educators is to create opportunities for students to develop and improve critical thinking skills by solving a problem in the learning process.

In practice during the learning process, there are still some educators who only prioritize the completeness of the material and do not optimize the learning activities of students. Students only receive information provided by educators which results in students' active participation in learning to be less visible. This is what causes learning to only focus on memorizing concepts, thus students' mastery of concepts is low, especially the ability to solve a problem and think critically. Lack of trained problem solving skills will make students feel difficult in dealing with problems. Consequently, the effectiveness of students' learning is generally limited, it only occurs in final moments nearing the test. Therefore, the current learning model has not been able to hone students' analytical skills, sensitivity to problems, practice problem solving and the ability to evaluate problems holistically.

The learning process should be able to improve critical thinking skills by applying innovative learning models, one of which is using the Problem Based Learning (PBL) Model. According to Graff & Kolmos (2013), the Problem Based Learning (PBL) model is a learning model that will guide students to study in groups to solve problems given by

educators. Then, according to Utomo, Wahyuni, & Hariyadi, (2014) the problems used in this learning model are problems based on the problems of students' daily lives. PBL is applied to stimulate higher order thinking in problem-oriented situations. The use of PBL will involve all students in solving a problem therefore it can improve students' thinking skills, practice problem solving skills and improve mastery of learning materials.

Margetson (in Rusman, 2011) states that Problem Based Learning is a learning model that can help students to improve the development of lifelong learning skills in an open, reflective, critical, and active learning mindset. In addition, it facilitates successful problem solving, communication, group work, and better interpersonal skills than other models. There is a relationship between problem solving and critical thinking skills because critical thinking is a process used when generating a new idea by combining ideas that were previously done.

In PBL model learning, students are required to work on solving problems by conducting investigations from various sources to find concepts. With a good mastery of concepts, learning will be more meaningful. It should be emphasized that in the implementation of the PBL model, students are not only required to solve problems correctly, but they are more expected to understand the given problem, decide which information is important from the problem that can be used as a guide to solve it, and what abilities must they have to solve those problems effectively. According to research conducted by Farhan (2014), the Problem Based Learning (PBL) learning model is effective in terms of student achievement.

One way to improve the quality of education in Indonesia can be done by educators by conducting research in an elementary school, for example by developing existing learning models. This is in accordance with the opinion of Soenarto (2013), which states that one way to improve the quality of education is that education experts conduct research that leads to the development of learning models. The development of learning models is a process of activities to produce a new learning model or modification of an existing learning model to become better at helping students to think critically. This is also in line with the opinion of Rustaman (2017) who argues that educators must be able to recognize and use learning models that have been developed by experts.

In accordance with Article 10 Chapter IV of Law Number 14 of 2005 concerning Educators and Lecturers, it is stated that educators must have four competencies, namely professional competence, pedagogic competence, social competence, and personality competence. Competencies that require educators to be able to have the ability to master learning, the ability to evaluate and the ability to develop their profession are pedagogic competencies that educators must possess. One way for educators to develop pedagogic competence is to develop existing learning models, or create a learning model.

The success of the learning process in schools cannot be separated from the ability of educators to apply learning models that are oriented towards increasing student involvement effectively in the learning process. The development of the appropriate learning model basically aims to create learning conditions that allow students to learn actively and fun therefore students can achieve maximum learning outcomes and achievements.

## Methods

This study used a qualitative descriptive method to determine the needs of students on the Problem Based Learning model based on critical thinking ability. The subjects in this study were 22 students of class VA and 1 teacher of class VA at SD Negeri 2 Way Huwi, Jati Agung District, South Lampung, in 2022/2023 academic year.

Data collection was carried out using questionnaires, observations, documentation, and interviews with students and a teacher. Data collection was carried out after the implementation of the Odd Semester MID examination for the 2021/2022 academic year. Several aspects were used as a reference in making the questionnaire, namely the learning that had been carried out so far and the use of learning models that were applied during learning. The results of the data were analyzed by calculating the percentage. In addition to the results of data analysis presented in the form of percentages, descriptive analysis was also carried out.

## Results

Based on the results of a preliminary study that the researchers conducted in the VA class of SDN 2 Way Huwi in the 2021/2022 Academic Year, it was found out that the achievement of the students' learning outcomes in the MID Semester had not yet reached the specified minimum passing grade (KKM). The results of the Odd Semester MID test results for Class VA students at SDN 2 Way Huwi in the 2021/2022 academic year had not yet reached the indicator of success because the percentage of scores above the KKM is still low. Likewise, the level of problem solving skills and critical thinking skills is still low. This is in accordance with the results of the distribution of student questionnaires. It was analyzed that of the 10 students of class VA at SD Negeri 2 Way Huwi, 50% of them are able to solve and formulate problems in learning materials. In addition, 100% of students have done experiments and analyzed problems, then 100% of students have practiced working on critical thinking questions. However, the results show that only 20% of students can work on critical thinking questions. Moreover, 100% of students agree that the learning process should be carried out using the PBL model that has been developed.

Based on the results of the questionnaires that have been distributed to educators, it is analyzed that of 2 fifth grade educators at SD Negeri 2 Way Huwi, 100% of educators have implemented learning models that are in accordance with the demands of the 2013 curriculum. There are 100% of educators who have implemented the PBL model in the learning process and 100 % have not made a lesson plan that is in accordance with the syntax of the PBL model, one

of the reasons is because educators have difficulty in the learning process when using the PBL model. Besides, educators do not understand the syntax/steps of the PBL model, thus in its application educators have not mastered it and have difficulty during the learning process. Furthermore, 100% of educators have not been able to improve students' critical thinking when using the PBL model. In addition, in terms of the process of making critical thinking questions, 50% of educators do not make a grid of questions first, therefore the critical thinking ability of students is said to be low. There are 100% of educators who have not developed a PBL model based on critical thinking and agree to the development of a PBL model based on critical thinking skills.

Based on interviews validation with educators at SD Negeri 2 Way Huwi, information was obtained that most of the questions made by educators only covered the ability to remember, understand, and apply (C1-C3). Educators pay less attention to the demands of C1-C6 in making questions. This causes students to be less stimulated to improve their critical thinking skills, thus when students are faced with a problem that is quite difficult they will find it difficult for them. Educators have applied the PBL model to the learning process and have made lesson plans that are in accordance with the PBL model, but educators have difficulty in the learning process when using the PBL model because they do not understand the syntax/steps of the PBL model. As a result, students still have low problem solving skills. In addition, educators have not been able to improve students' critical thinking skills when using the PBL model. Consequently, students' critical thinking skills are still low. In order for students' critical thinking skills to increase, educators can apply one of the learning models by using the PBL learning model appropriately so that students can solve a problem both in the learning process and in the questions of test that educators have made.

Based on the results of interview analysis, the learning that has been carried out by educators is more applying a teacher centered approach where the teacher becomes the center of information for students. This learning pattern is more about the activeness of educators than students. When educators provide opportunities to ask questions, students seems to keep silent without anyone asking questions, it is resulting in low critical thinking skills of students in solving problems. The principal supports educators to innovate or renew the Problem Based Learning (PBL) model based on students' critical thinking skills. In addition, the principal will also provide separate assessments for educators who innovate or renew the development of learning models. Educators are expected to develop PBL based on critical thinking skills because so far educators, during the learning process, only require students to memorize all the information conveyed by educators thus the current learning process is still not optimal.

To overcome or improve learning outcomes, one way is to change the conventional learning method with the approach required by the 2013 curriculum. Referring to these problems, a solution is needed by implementing a learning that can actively involve students and can formulate problems both in terms of activities and finding learning concepts. Therefore, it can form/lead to higher-order thinking skills.

## Discussions

Several research results with a focus on the implementation of PBL model problems to improve students' critical thinking skills include a research conducted by Ragilia et al (2018) entitled "**Development of Problem Based Learning Model Learner Worksheet to Improve Critical Thinking Ability**". The results of their research revealed that the PBL student worksheet model was prepared and developed based on students' needs analysis and refers to the basic competencies that have been determined. This student worksheet is feasible to use based on the validation of material experts and media experts which are indicated by the "very good" category from the results of field trials. The PBL student worksheet model developed is effective in improving students' critical thinking skills.

The next research is a study conducted by Emiliasari et al (2019) entitled "**Problem-based Learning: Developing Students' Critical Thinking**". The results of the study revealed that the PBL learning process in the English class in developing students' critical thinking was started from problem formulation, problem analysis, discovery and reporting, presentation and reflection, integration and evaluation by educators. The role of the educators in the PBL class is not actively involved, yet the educators act only to stimulate students and guide them more like facilitators in the classroom. The only obstacle for educators is time management.

Another research is a study conducted by Haryulinda et al (2020) entitled "**Development of Brain-Based Learning Model Based on Problem-Based Learning (BBL-PBL) to Improve Critical Thinking and Learning Outcomes**". The results of the study showed that the product validity was 91.4% with a very valid category. In addition, the results of the effectiveness of the cognitive model were 0.81 in the high category, the psychomotor aspect was 82 in the moderate category, and critical thinking skills were 85 in the very good category. The practical results obtained from the teacher and student questionnaire responses were 91.2% and 86%, respectively. Both were classified in the very good category.

After studying previous studies, the researchers conclude that the PBL learning model can be carried out at every level of students and in various subjects thus it can improve students' critical thinking skills. Meanwhile, previous researchers did not discuss the obstacles/difficulties of implementing PBL syntax from the point of view of educators. Therefore, the researchers want to describe the development of a PBL learning model based on students' critical thinking skills.

## Conclusion

. Based on the results of the research needs analysis above, it can be concluded that the fifth grade students of SDN 2 Way Huwi, Jatiagung District need a Problem Based Learning model to improve students' critical thinking. It is hoped that the PBL model selected by the researchers can be a solution for the thematic learning support model to improve the critical thinking skills of elementary school students.

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