

## Strathening Critical Thinking Skills thought a Problem Based Learning Approach in Elementary Schools in Salatiga City

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### Abstract

*Purpose:* The purpose of this study is to describe in depth the learning experience and the effectiveness of using problem-based learning in fostering students' capacity for critical thinking at Sidorejo Lor 03 Primary School in Salatiga City.

*Methodology:* This research employs a qualitative methodology with a phenomenological design. Data were collected through in-depth interviews with teachers and learners, participatory observation during the learning process, and documentary analysis of related learning materials.

*Results:* The study reveals that problem-based learning provides meaningful learning experiences and significantly enhances students' critical thinking skills. Through real-world problem scenarios, learners become more active in finding information, analyzing problems, and evaluating solutions. Additionally, they demonstrate improved communication, collaboration, and creativity.

*Applications/Originality/Value:* These findings highlight the effectiveness of problem-based learning as an instructional strategy to develop 21st-century skills especially critical thinking in elementary education. The study underscores the value of engaging students with authentic problems to cultivate deeper cognitive and social skills, offering a viable alternative for educators seeking to improve classroom outcomes.

### Introduction Section

Critical thinking skills are becoming increasingly crucial for primary school learners in this fast-paced and information-packed era. In facing the difficulties facing us in the 21st century, learners are required to not only master knowledge, but also be able to analyze information, evaluate various perspectives, and make the right decisions. Critical thinking skills are defined as a cognitive process in conducting specific and systematic analysis related to problems, accuracy in distinguishing problems, and identifying information to plan problem-solving strategies [1] [2].

Primary education is a very decisive early stage in the formation of a person's character and abilities. Through effective learning, primary schools can equip learners with critical thinking skills that are useful throughout their lives, the the National Education Ministry and Culture seeks to strengthening character education in students through the Pancasila Learner Profile, one of which is the ability to reason critically [3][4].

In other words, critical thinking skills are a comprehensive educational innovations to teach 21st century abilities. Critical thinking skills are valuable for primary school learners to face the future [5]. Basic education has a strategic role in shaping the next generation who are smart, creative, and able to face global challenges. Therefore, data collection related to critical thinking skills is very important because it can provide pedagogical implications and provide one of the solution offerings to develop critical thinking [6].

One type of learning is problem-based learning models that makes students the focus of problem solving. [7] [8][9][10]. The learning process in in education that is problem-based students are invited to face problems or simulations that are relevant to real life. Learners are encouraged to find solutions through a process of investigation, analysis and evaluation. This not only equips learners with factual knowledge, but also hones Critical thinking abilities, creativity, cooperation, and communication[11][12][13].

The application of problem-based education in the classroom can effectively hone students' critical thinking skills. By being faced with authentic problems, learners are trained to analyze problems in depth, gather relevant information, evaluate various alternative solutions, and make rational decisions. The systematic problem-solving process in problem-based learning encourages learners to think logically, analytically, and evaluatively, so that their critical thinking skills continue to be honed [9][14][15].

Problem-based learning also creates an active and collaborative learning environment. In small groups, learners can exchange ideas, argue and construct understanding together. This social interaction process allows learners to see problems from various perspectives, so they can develop divergent and flexible thinking skills. Thus, critical thinking learning not only equips learners with factual knowledge, but also prepares them to be independent learners and problem solvers in the future [8][16][17][18].

The application of problem-based education in teaching is promising, but teachers often face various challenges [19][20]. One of the main challenges is time constraints. Developing authentic problem scenarios, managing group discussions, and providing constructive feedback require significant time. In addition, not all teachers have adequate training in designing and putting problem-based learning into practice. This can hinder the successful implementation of problem-based learning.

Another challenge teachers often face is the availability of resources such as books, scientific articles, teaching aids and technology. The limited availability of these resources can limit the complexity of problems that can be raised in learning. In addition, not all learners have equal access to resources, which can lead to gaps in problem-solving skills.

## METHODS

This research uses a qualitative approach with a phenomenological paradigm. This approach was chosen because it aims to understand the meaning of subjective experiences related to the ability to think critically in students through strengthening problem-based learning at Sidorejo Lor 03 Elementary School State in Salatiga City.

Data collection in this study was carried out using the triangulation technique, namely by combining several data collection methods. First, in-depth interviews were conducted with some learners who were purposively selected based on certain criteria. This interview aims to explore learners' in-depth experiences and perspectives related to their understanding of the problem-based learning process and its impact on critical thinking abilities. Participatory observation was conducted to directly observe the learning dynamics in the classroom and learners' interaction in solving problems. Documentation was conducted to collect supporting data, such as learning outcomes, teaching modules, learners' work, and related literature.

This research was conducted at Sidorejo Lor 03 State Elementary School in Salatiga City. This school was chosen because it is one of the transformative core schools that has a positive reputation, conducts active learning, and has adequate resources. This school is a relevant context to study how a method of learning based on problems can strengthen students' critical thinking.

The data obtained from the various sources were then analyzed descriptively qualitatively. Data reduction, data presentation, and conclusion drawing were the three phases of the data analysis process. To reduce the amount of data, the primary themes that surfaced from the data were identified. Furthermore, the data was presented in narrative form to describe in depth the learners' experiences. Finally, conclusions were drawn based on the findings obtained from the data analysis.

## Literature Review

### **Critical Thinking Skills**

Critical thinking skills are core competencies that need to be possessed by every individual, especially from an early age. In today's information age, learners are required to not only master knowledge, but also be able to analyze, evaluate, and apply the information in daily life. In the context of education, especially in elementary schools, critical thinking is an important foundation for building the ability to learn independently, solve problems, and innovate. By developing critical thinking skills early on, learners will be better prepared to face future challenges that are increasingly complex.

The critical thinking theoretical framework model commonly used in education is the Ennis model. The Ennis model is one of the most frequently used models to measure and develop critical thinking abilities [21][22]. This model outlines the stages of critical thinking systematically, making it easier for us to understand and practice these skills. Ennis' model provides a comprehensive framework for developing learners' critical thinking skills. By applying this model in learning, learners can be trained to think more rationally, systematically, and objectively.

**Table 1.** Stages of Critical Thinking Ennis Model

Stage	Description
Elementary Clarification	Clearly understand the problem or issue.

Basic Support	Assess relevant evidence, arguments and assumptions.
Inference	Draw conclusions based on available evidence.
Advanced Clarification	Explain the thinking process and decisions made.
Organizing Strategy and Tactics	Monitor and evaluate own thinking process.

Each stage in this model has significant implications for the learning process. In the early stages, learners are trained to explain simply a problem or concept. This helps them to clearly understand what they are learning and avoid misunderstandings. Next, students are encouraged to build basic skills such as evaluating sources of information and making careful observations. These skills are essential to ensure that the information used in the critical thinking process is accurate and relevant.

The next stage is drawing conclusions. Learners are trained to conduct deductive and inductive reasoning, and make rational decisions based on evidence. This ability allows learners to connect the different information they have learned and form a more thorough understanding. At the advanced explanation stage, learners are encouraged to identify key terms and assumptions underlying an argument. This helps them to think more critically and avoid thinking errors. Finally, learners are trained to manage strategies and tactics in solving problems. This skill enables learners to choose the most effective approach and adjust their strategy if necessary.

The application of Ennis' model in education can be done in various ways. Teachers can use open-ended questions that encourage learners to think critically, assign tasks that demand analysis and evaluation, and create a learning environment that encourages healthy discussion and debate. Furthermore, educators can also use various learning aids such as simulations, case studies, and group projects to help learners practice their critical thinking skills.

### ***Problem Based Learning***

The learning strategy known as "problem-based learning" places learners as active problem solvers [23][9]. In problem-based learning, learners are invited to face authentic or simulated problems that are relevant to real life. They are then encouraged to find solutions through a process of investigation, analysis and evaluation. The basic concept of problem-based education is to offer learners with meaningful learning experiences by connecting subject matter with real-world problems. Thus, learners not only memorize facts, but also understand the concepts and principles underlying a problem. In the 20th century, educators realized the importance of learner-centered learning. John Dewey, a famous educational figure, was one of the pioneers who emphasized the importance of experiential learning [24]. The concept of learning through problems has grown in popularity with studies showing its effectiveness in enhancing pupils' capacity for critical thinking, problem solving, and teamwork.

The implementation of problem-based education has been carried out in various educational contexts, ranging from basic education to higher education. In primary education, problem-based learning can be used to teach science, math and language concepts in a more interesting and meaningful way [25][26].

### ***Strengthening Critical Thinking with a Approach to Problem-Based Learning***

The method of learning called "problem-based learning" places learners as active problem solvers [27]. In problem-based learning, learners are invited to face real, complex problems and actively seek solutions. This process demands students to assess options, analyze data, and make evidence-based judgments. Through critical thinking learning, students are trained to think logically, systematically, and creatively [28][29][30]. These skills are the foundation of critical thinking. The long-term benefits of implementing Utilizing problem-based learning to cultivate critical thinking abilities are significant [27][31]. Learners who are accustomed to critical thinking learning tend to be more confident in facing challenges, more able to solve complex problems, and more adaptive to change [32][33]. Strong critical thinking skills will be very useful for learners in continuing their studies to a stronger level which will be very useful for learners in continuing their studies to a higher level, entering the world of work, as well as in everyday life. In addition, problem-based learning can also increase students' motivation to learn, because they feel more involved and relevant to the material being studied [34][35][36].

## **Results**

Problem-based learning is a learning approach that places students as the center of learning [37][38]. In problem-based learning, learners are invited to solve real problems that are relevant to everyday life. The teacher acts as a facilitator who guides learners in the problem-solving process.

Based on the observation, it is found that teachers have implemented problem-based learning effectively, teachers present authentic and challenging problems for students. The problem is related to the material being studied and encourages students to think critically. In addition, teachers also create a collaborative learning atmosphere, where learners

can discuss and exchange ideas with their peers. Teachers provide complex problems, then guide learners to solve the problems gradually.

During the learning process, teachers use strategies to encourage learners to think critically. One tactic that is evident is posing open-ended questions that call for students to consider, assess, and synthesize their knowledge. Instructors urge students to seek information from various sources, either books, the internet, or other sources. In addition, teachers also facilitate group discussions to share ideas and different perspectives.

Teachers provide constructive feedback to learners to ensure the successful implementation of problem-based learning. The feedback is in the form of comments, suggestions and questions that help learners improve their understanding. In addition, teachers have provided opportunities for learners to reflect on the learning process they have gone through. Thus, learners learn from their mistakes and improve their critical thinking skills.

Problem-based learning has been shown to be successful in cultivating critical thinking abilities in students [39][38]. Through problem-based learning, students are encouraged to participate fully in the educational process by solving problems that are relevant to real life. Several studies have shown that problem-based Learning can significantly affect on various aspects of critical thinking.

One of consequences of learning via problems the improvement of learners' ability to solve issues. In problem-based learning, learners are trained to identify problems, gather information, analyze alternative solutions, and evaluate results. Research shows that learners who follow problem-based learning tend to be more confident in facing new problems and apply more effective problem-solving strategies. Observations show that learners are able to present more complex problem solving results compared to learners who follow conventional learning.

In addition, problem-based learning can improve learners' ability to analyze information. In addition to the implementation of learning, learners have been required to search, evaluate and integrate various sources of information, some supporting documentation of learners' work was also found. Searching for various sources of information helps learners develop critical thinking skills needed to distinguish relevant and irrelevant information, and to assess the credibility of information sources.

The problem-based learning observed also encourages learners to collaborate with peers in solving problems, working together in groups to share ideas, perspectives and knowledge. This not only develops their relationship skills, but also improves their ability to communicate effectively and work together in teams. Research shows that learners who participate in problem-based learning tend to be more open to others' ideas and more able to work together in groups to achieve a common goal.

The implementation of problem-based learning in the classroom does offer many benefits, but it is not free from various challenges, both teachers and students can face obstacles during the process of implementing problem-based learning.

As for the results of interviews with classroom teachers who application problem-based learning, in this learning there are several challenges including time constraints. Problem-based learning requires quite a long time to be applied effectively. Starting from the planning stage of the problem to be given, group discussions, to the final presentation. This often clashes with the demands of a dense curriculum and limited learning time. In addition, teachers also need to prepare relevant and interesting learning materials so that students remain motivated during the learning process.

The different abilities of learners are also a challenge in implementing problem-based learning. Not all learners have the same ability to solve problems, communicate or work together in groups. Higher ability learners tend to dominate the discussion, while slower learners may find it difficult to keep up. Teachers need to have special strategies to accommodate these differences in learners' abilities, for example by forming heterogeneous groups or providing additional guidance to learners who need it.

The next challenge in applying problem-based learning is adaptation to new learning methods, this is not only a challenge for teachers but also for students. Problem-based learning is a different learning model from conventional learning models. Teachers need to change their role from a teacher to a facilitator who guides learners in the learning process. Meanwhile, learners need to learn to think critically, work together and take responsibility for their own learning. This adaptation process takes time and continuous support from various parties.

The last challenge is the limited availability of resources which can also be an obstacle in the application of problem-based learning. Resources include not only learning materials, but also facilities and technology that support the learning process. For example, to conduct research, learners need access to the library or utilize the internet.

Teachers often respond favorably to the use of problem-based learning, according to the findings of participatory observation and interviews. Although there are some challenges to be faced, teachers observed a significant improvement in learners' critical thinking abilities after this kind of instruction. Teachers stated that learners become more active in finding solutions, critically analyzing information, and evaluating their work. In addition, teachers also see the improvement of learners in collaborating with their peers.

Learners also gave positive responses to the implementation of problem-based learning. They feel more challenged and motivated to learn when faced with real problems. Learners also feel more confident in expressing opinions and arguing. However, the observation also shows that some learners find it difficult to understand complex problems, work together in heterogeneous groups, and In front of the class, they present their work.

Based on this, both teachers and learners have a positive perception of problem-based learning in improving the students' critical thinking abilities. Through issue-based learning, students can practice higher order thinking abilities as problem analysis, evaluation, and solution. However, the successful implementation of problem-based learning is greatly influenced by several factors, such as support from schools, teacher competence, and learner readiness.

## **Discussion**

According to the study's findings, kids' critical thinking abilities might be greatly enhanced by introducing problem-based learning into elementary schools. This outcome is consistent with earlier research that emphasizes the value of problem-based learning in the development of higher-order cognitive abilities [27][28].

However, this research makes a unique contribution by focusing on authentic problems that are relevant to the cultural and social context of learners. This research contributes to the development of learning models that are more relevant and meaningful to learners, and consider cultural and social diversity.

Furthermore, this study also identified some challenges in implementing problem-based learning in elementary schools, such as time constraints and diverse learner characteristics [40][41]. However, this research provides a new perspective with time management that is done well by teachers can answer the challenges of time constraints, besides that teachers are also able to design learning by presenting discussion methods so as to motivate students to work together heterogeneously. Thus, this research provides a more thorough comprehension of the complexity of implementing problem-based learning in elementary schools.

Overall, this study makes a significant contribution in expanding our understanding of the implementation of problem-based learning in primary schools. The findings can serve as a reference for educators, policy makers and other researchers in developing more effective strategies to improve the quality of learners' learning. This research also opens up further opportunities for example by focusing research on developing innovative problem-based learning strategies by utilizing technology.

The study's findings have important implications for the development of learning in schools. First, there needs to be continuous training for teachers to improve their competence in implementing problem-based learning. Second, schools need to provide adequate resources to support the implementation of problem-based learning, such as books, teaching aids and technology. Third, the curriculum needs to be designed more flexibly to accommodate active learning approaches such as problem-based learning.

The study's findings have implications that are highly relevant to the development of education at the global level. In this increasingly complex and dynamic era, critical thinking abilities are a valuable asset. Problem-based learning, which has been proven effective in improving learners' critical thinking skills, is in line with the demands of 21st century skills. By engaging learners in authentic problem solving, problem-based learning not only transfers knowledge, but also develops learners' ability to analyze information, evaluate multiple perspectives, and make rational decisions.

These skills are needed to face global challenges such as climate change, social inequality and rapid technological development. Learners trained through problem-based learning will be better prepared to become global citizens who are active, innovative and able to contribute to solving world problems. In addition, problem-based learning is also in line with the sustainable development goals (SDGs) which emphasize the importance of quality education, critical thinking, and problem solving.

## **Conclusions**

The results showed that problem-based learning has significant potential in developing students' critical thinking skills. Through problem-based learning, learners are encouraged to participate fully in the educational process, analyze problems, find solutions, and evaluate results. This allows learners to develop critical thinking skills which include analysis, evaluation, inference, and problem solving. This research contributes to the development of problem-based learning theory by providing empirical evidence on the effectiveness of problem-based learning in improving learners' critical thinking abilities in primary schools. The results of this study also enrich the existing literature on problem-based learning. Future research can focus on the development of innovative problem-based learning strategies by utilizing technology.

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