Critical Thinking Skills through Problem Based Learning Model

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Abstract: Education in the era of the industrial revolution 4.0 requires students to have higher-order thinking skills. One of the high-level skills that students must have is critical thinking skills. These skills are one of the important skills in increasing the ranking of Indonesia's PISA (Program for International Student Assessment) which is still relatively low, so a learning model is needed that can affect students' critical thinking abilities. This study uses literature studies to describe the effectiveness of problem-based learning models on critical thinking skills in social science learning in elementary schools. After the researchers conducted a literature review from various sources. The research results found that the problem-based learning model has an effective influence on students' critical thinking skills in social science learning. The conclusion of the research results shows that educators play an important role in implementing and designing innovative learning models so that they can foster students' critical thinking skills in social science learning in elementary schools.

Keywords: critical thinking skills, problem-based learning

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INTRODUCTION

Social studies in elementary schools are an integration of several disciplines that are closely related to human life. The definition of social studies refers to studies that focus on the activities of human life. According to Supriatna et al., (2010) states that "the objectives of social studies education are grouped into three categories, namely the development of students' intellectual abilities, development of abilities and a sense of responsibility as members of society and the nation and self-development of students as individuals". In this regard, social studies are very important for students to learn because it hones students' ability to think and behave as well as face and solve problems that exist in their lives (Fitriyani, 2018).

It coincides with the entry of the 21st century where industrial development has stepped into the era of revolution 4.0 where many demands must be mastered by teachers or students, one of which is critical thinking (Abdelrazeq et al., 2016; Albantani et al., 2019). Some experts define critical thinking with different expressions but have the same meaning, critical thinking is the ability to think reflective that makes sense and is focused on determining what to believe or do (Griffin., McGaw., & Care, 2012; Piirto, 2011; Trilling & Fadel, 2009). Furthermore, it is said that critical thinking is related to five key ideas, namely reflective, practical, trustworthy, reasonable, and action. There are several indicators of critical thinking skills, (Ennis, 2005) describes the indicators of critical thinking in detail.

John Dewey emphasized that critical thinking is an active process in which someone thinks about something, asks questions, finds relevant information rather than passively waiting for information (Fisher, 2014). Critical thinking is a process where all knowledge and skills are mobilized to solve problems that arise, make decisions, analyze all assumptions that arise and carry out investigations or research based on the data and information obtained to produce the desired information or conclusions (Kobzeva, 2015; Tursiyanto, 2019; Fitriyani & Supriatna, 2019). Critical thinking skills are skills that must be developed and trained since primary education. By training students' critical thinking skills from the primary school level will provide good benefits and can be felt in further education.

(Wurdiman., Wahyuni, Jayani, 2018). Critical thinking skills can foster student independence from an early age and be able to mentally prepare students to learn to solve problems faced in the environment where students live in the community (Gunasekara, 2008; Lyytinen & Klein, 1985).

The importance of high-level skills, one of which is critical thinking, is to become a target of the government in fulfilling student character as the demands of the 21st century, teachers must be able to present innovative learning or learning models to support all variations of learning (Giacalone, 2015; Ratnaningsih, 2017). From that, the choice of variants and innovative learning models is one of the factors for the success of student learning. This is in line with the opinion of Trianto (2011) that the application of innovative models can develop and explore student knowledge. The social science learning model is one of the elements that must be mastered by teaching staff whose purpose is to create effective and efficient learning. So that students can understand the material presented more optimally. According to Bruner (1961), students will learn best if students can find their concepts, theories, or rules through examples in their daily lives.

A learning model that can improve thinking skills is a learning model that can encourage learning to take place in a real context. Learning that involves the real world will make the learning process more meaningful (Yuliyanto et al., 2019). One of the learning models in the real context that is considered capable of empowering thinking skills, one of which is the Problem Based Learning model. Arends (2013) states that the Problem Based Learning model is a teaching method with a focus on real problem solving, a process in which students carry out group work, feedback, discussion, which can serve as a stepping stone for investigation and investigation and final reports. In the Problem Based Learning model, teachers present problematic situations to students and ask them to investigate and determine their solutions (Camp, 1996; Chin & Chia, 2008; Prameswari et al., 2018). Thus, students are encouraged to be more actively involved in subject matter and develop critical thinking skills. In line with Qomariyah's (2016) opinion that problem-based learning can help students develop skills in giving reasons and thinking when looking for data or information to get a solution to a problem (Clayton & Pierpoint, 2001; Northwood et al., 2003). Besides, Problem Based Learning with an approach to authentic problems can make students compile their knowledge, develop higher skills, independent students, and increase self-confidence (Hakim et al., 2019; Kirschner, Paul. A Sweller, John Clarck, 2006). Problem-Based Learning Model is a learning model that uses the real problems of everyday life as a basis for gaining knowledge and concepts in developing problem-solving skills through higher-order thinking (Aryanti et al., 2017; Rahayuni, 2016; Wulandari et al., 2019). In this case, the Problem Based Learning model trains students to get used to solving problems in everyday life with a deep level of thinking (Salam et al., 2009). Therefore, the researcher intends to conduct a literature study to see the impact of learning on the curriculum on students' critical thinking skills.

METHOD

This research is based on the results of studies from several books, journals, and other literature reviews. The data collection used in this study is based on the literature study method by conducting a review of books, literature, and notes related to the issues raised (Nazir, 2013). According to Komariah (2017), it is explained that literature studies are research supporters that start from the views of experts in writing in the form of reference books, journals, research reports, or other scientific works.

From the explanation above, it is explained that literature studies have the meaning as a way to find research sources in the form of printed references and printed numbers that are by the research.

Research procedure

According to Zed (2008), there are several steps in the literature study as follows:

1. Prepare the equipment

   The tools used in this library method include laptops as a means and infrastructure to find data and record the required data, both for marking sentences and notebook ballpoints to manually record important things or materials.

2. Prepare a working bibliography

   This research source uses books as the main reference and journals and the internet as additional references.

3. Set the time

   This research begins with the purchase of a collection of books and journals related to the researcher's problem and then recorded as reflection material to be retyped, starting from data collection to reflecting on all sources, so that the research process gets the most effective and efficient time.

4. Read and take research notes

   Documentary notes that are important in research from several books and journals are written manually or digitally and mark books or journals with highlighters. The important thing is to arrange it into a single unit that is woven with a common thread according to the research procedures that have been prepared.

Data Collection Techniques and Instruments

Data collection in this study used literature study techniques, which were mostly taken from books, papers, and journals as well as several other important notes.

Data analysis technique

The content analysis technique was chosen to analyze the data used in this study, this is in line with the opinion of Holsti (1969) that "any technique for making conclusions objectively and systematically identifies the characteristics of a specified message" according to the literature. study research methods that do not perform calculations like quantitative research but in the form of studies of several books, articles, and other journals.

RESULTS AND DISCUSSION

Problem Based Learning Model Learning

There are three models suggested in the 2013 curriculum, namely discovery learning, problem-based learning, and project-based learning. Researchers chose problem-based learning as a learning model in this study.

According to Sanjaya (2015), Problem Based Learning is a learning model that uses students to learn based on real problems and must search or extract information to solve these problems (Kirschner, Paul, Sweller, Clarck, 2006). Thus, the learning process must be connected with problems in students' daily lives (Allo et al., 2019). The opinion above is in line with Arends (2013) which states that the PBL model is a learning model that provides authentic and meaningful problems to students that can function to train students to carry out investigations or investigations (Salam et al., 2009). From the above opinion, it can be concluded that the Problem Based Learning (PBL) Model is a learning model that can develop students' thinking skills in solving a real problem which is done by searching for information through investigation or observation (Camp, 1996; Northwood et al., 2003).

According to Sanjaya (2015), there are three characteristics of PBL, including the following: (1) Problem Based Learning is a series of learning activities, (2) learning activities are directed at solving problems, and (3) problem solving is carried out using a scientific thinking approach. This thinking process is carried out systematically, which means scientific thinking with certain stages and empirical, which means that the problem-solving process is based on clear data and facts (Chin & Chia, 2008). The

objectives of the Problem Based Learning (PBL) Model According to Susanto (2014) problem-based learning can help students develop thinking and problem-solving skills, learn various adult roles through their involvement in real experiences, become autonomous and independent learners (Kong et al., 2014). To find alternative problem solving through empirical data exploration to foster a scientific attitude (Arifin et al., 2019).

According to Susanto (2014), there are eight advantages of this learning model, namely (1) Problem solving is a technique that is good enough to better understand the content of the lesson. (2) Problem-solving can challenge the ability of students and provide satisfaction to find new knowledge. (3) Problem-solving can increase the learning activities of students. (4) Problem-solving can help students how to transfer their knowledge by understanding problems in real life. (5) Problem-solving can help students to develop new knowledge and be responsible for the learning they do. (6) Problem-solving is considered more fun and liked by students. (7) Problem-solving can develop the ability of students to think critically and develop their ability to adapt to new knowledge. (8) Problem-solving can provide opportunities for students to apply the knowledge they have in the real world (Clayton & Pierpoint, 2001).

There are several steps for the Problem Based Learning (PBL) model, one of which is. According to Arends (2013) Chin & Chia, (2008), the steps in the Problem Based Learning model in learning are divided into five phases. The five phases are presented in the following table.

Table 1. Steps Problem Based Learning Model

Step	Teacher's Behavior
Phase-1 Student orientation to the problem	The teacher explains the learning objectives, explains the logistics required, proposes phenomena, demonstrations, or stories to raise problems, motivates students to be involved in solving the selected problem.
Phase-2 Organizing students to learn	The teacher helps students to define and organize learning tasks related to these problems.
Phase-3 Helping students individually or in groups to learn	The teacher motivates, guides, and directs students to collect appropriate information, carry out experiments, to obtain data/information that can be used to solve problems.
Phase-4 Develop and present the work	The teacher assists students in planning and preparing appropriate work, such as reports and helps them to share assignments with friends.
Phase-5 Analyze and evaluate the problem-solving process	The teacher helps students to reflect or evaluate their investigations and the processes they use.

Source: (Arends, 2013)

Students' Critical Thinking

According to Woolfolk (2008) argues that critical thinking is used by someone when in the process of mental activity such as identifying the essence of each problem and assumptions in an argument, providing valid conclusions from data, making conclusions from the information or data provided, interpreting whether each conclusion guaranteed based on the data provided, and evaluating authentic evidence (Kopzhassarova et al., 2016). Critical thinking does not necessarily make someone happy to argue and oppose the wrong opinion of others, but critical thinkers can also provide solutions to falsification and expressed opinions that have clear information and evidence base (Jones, 2020). As is the case with Ennis (2005)

opinion that critical thinking is the ability to think logically or reasonably, which focuses on making decisions about what a person believes and does. Husamah & Pantiwati (2014) explain the stages carried out by critical thinkers including formulating problems, providing arguments, making deductions, inducing, evaluating, then making decisions, and determining actions (Guo, 2013). This opinion is similar to that presented by Duron et al., (2006) that is, he understands the problem, plans a solution, implements the plan, and re-checks it. Furthermore, the steps of reasoning taken by critical thinkers are more logical, rational, careful, detailed step by step according to fictional problems before making certain decisions (Changwong et al., 2018). Jones, (2020) argues that critical thinking is also more complex than ordinary thinking processes in general where it is limited to understanding concepts or problems without being able to identify and explore problems to find further solutions because critical thinking requires higher mental abilities and intellectual abilities. Continue according to (Chukwuyenum, 2013) explaining that critical thinking includes one's efforts in collecting, interpreting, analyzing, and evaluating information to arrive at a set that can be tested for validity. Meanwhile, Shapiro's opinion in (Friend, 2002) argues that critical thinking is a mental activity that focuses on the use of reason that uses mental processes such as paying attention, categorizing, choosing, and deciding to solve problems (Gunasekara, 2008). Based on the opinion of the expert opinion above, it is concluded that critical thinking is an activity that does not only rely on reasoning abilities, but more than that in which critical thinkers must be able to use mental processes in collecting, categorizing, analyzing, and evaluating information or evidence to make conclusions. valid to solve the problem (Karakoc, 2016). Furthermore, regarding the mental activity of students in critical thinking in solving problems, they can use the steps described by Facione (Peter, 2012), namely. identifies, defines, calculates, analyzes, lists, and self-corrects (Purvis, 2009). These steps can be abbreviated as IDEALS, for a brief explanation of each of these steps as follows:

1) Identification (I), which determines the main idea of the problem at hand

2) Define (D) is to determine a problem that is limited by the facts of the problem which includes what is known, asked about the problem, and what information is not used or not needed.

3) Enumerate (E), which is to determine or manage answer options that may arise on a problem.

4) Analysis (A), namely analyzing the best alternative answer.

5) List (L), which states the exact reasons for all the answers taken.

6) Self-Correct (S) is to check again thoroughly, whether there are actions to solve problems that have been passed. (Long, 2003).

Critical Thinking Skills of Elementary School Students through Problem Based Learning

The following are the results of several literature studies that describe the impact of the Problem Based Learning model on critical thinking skills of elementary school students, based on research findings (Wijayanti et al., 2018) which conducted classroom action research on the application of the Problem Based Learning model to improve skills critical thinking and social studies learning outcomes of grade 4 students, getting an average of 70.59 results in the first cycle, and increased to 78.31 in the second cycle. It can be concluded that the Problem Based Learning model in PTK research in grade 4 elementary school students can improve students' critical thinking, seen from the 2 cycles conducted by a researcher who acts as a teacher in learning.

In action research conducted by (Ningsih et al., 2018) Based on the results of research and discussion it can be concluded that; the application of Problem Based Learning on the theme of Energy and its Change can improve the critical thinking skills of grade

III students of SD I Klojen Kidul, especially in the ability to ask questions. This is indicated by an increase in critical thinking skills from the level of critical thinking and learning outcomes of grade 3 students. The results showed that the increase in critical thinking skills from 63.49% in cycle I to 76.98% in cycle II and increased to 84.12 % in cycle III.

In addition to the action research conducted by (Alita et al., 2019), the results in the first cycle of critical thinking skills and student learning outcomes increased to 4.3% very critical category, 21.7% critical category, 34.8% moderate category critical, 30.5% less critical category, and 8.7% non-critical category, so the overall learning outcomes in the first cycle were 52% complete and 48% incomplete. In the second cycle, the action increased again, namely 17.4% very critical category, 30.4% critical category, 43.5% very critical category, and 8.7% less critical category, so that student learning outcomes increased to 87% complete and 13% of students haven't finished.

Furthermore, in research (Rahayu, et al., 2019) (1) using research methods to get the results of action that there is an increase in students' critical thinking skills from pre-cycle 38% increase in cycle I to 73% then increased to 81% in cycle II. Increasing critical thinking skills has an impact on student learning outcomes, namely in the pre-cycle 35% increase in the first cycle to 77% then increased to 85% in the second cycle; (2) the application of the steps in the Problem Based Learning model can improve critical thinking skills and student learning outcomes by providing stimulation, formulating problems, collecting data, processing data, proving data, and drawing conclusions.

Then in experimental research conducted by (Sari et al., 2017) The level of critical thinking and learning outcomes based on data analysis, the average score of critical thinking skills gained in the experimental class is the same as 32.3, while the control class is 14.2. The results of the independent t-test analysis of the sample t-test show that the PBL pH-level learning model is 0.00 less than 0.05. This means that H0 rejects and H1 accepts it. It can be concluded that there is an influence of the PBL learning model on critical thinking skills. Furthermore, research (Pebriana, 2017) The level of critical thinking through the problem-based learning model based on the average value there is a difference in the results of the different gain test on the average critical thinking ability of experimental class and control class students get a significance value of 0.000. Because the value is smaller than α = 0.05, then H0 is rejected. That is, the average gain of the experimental class is higher than the average gain of the control class. It can be concluded that the increase in critical thinking skills in students whose learning uses problem-based learning models is higher than students whose learning uses conventional learning.

Furthermore, the results of the study concluded that there was a significant effect of the PBL model on students' thinking abilities. Of the four thinking factors studied, these factors recognized the dominant idea of the problem as the factor whose average score differed the most between the PBL group and the non-PBL group (Evasufi et al., 2020; Mustofa, 2020; Nursolekah, 2019).

Based on the results of a literature review of research that sees the impact of the problem-based learning model, it shows that there is a significant increase in increasing critical thinking skills (Bashith & Amin, 2017; Changwong et al., 2018; Purvis, 2009; Rudibyani, 2019; Yazar Soyadı, 2015). Judging from the increase in each cycle of each researcher, it can be concluded for a while that the problem-based learning model can improve students' critical thinking skills, even though there is a need for further research to see a comprehensive picture of the effect of problem-based learning models on elementary school students critical thinking skills.

In the discussion section, there are a link between the results obtained and the basic concepts and/or hypotheses, and there is a match or conflict with the research results of other researchers. It can also be written the implications of the research results from both theory and implementation.

CONCLUSION

Critical thinking skills are needed in the era of the 4.0 revolution. Teachers have naturally included these skills in every lesson as concrete steps that teachers are ready to accept the times and respond to the demands of 21st-century skills that are being faced by the Indonesian nation as a developed country. Problem Based Learning is an alternative solution to answer the problems above, seen from several sources that Problem Based Learning can improve critical thinking skills (Asyari et al., 2016; Kek & Huijser, 2011; Masek & Yamin, 2011). There is a significant value when researchers examine several research results taken from several journals. Some research results say that the success of improving students' critical thinking is because the problem-based learning model trains active students so that educators only work as facilitators (Asyari et al., 2016; Mustofa, 2020; Pebriana, 2017). Learning it also focuses on problem-solving by students themselves which according to some learning theories that are more meaningful for students (Permatasari et al., 2019).

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