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NEED ASSESSMENT FOR DEEP LEARNING MODEL THROUGH THE INTEGRATION SOCIO-SCIENTIFIC ISSUES IN ELEMENTARY SCHOOLS

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ABSTRACT

This preliminary study investigates the need for a learning model that integrates socio-scientific issues in deep learning to enhance critical thinking elementary students. It aims to identify the critical thinking skills students and the key instructional needs that must be addressed in developing a learning model to enhance students' critical thinking at the elementary school. The study uses sequential explanatory design model, involving 157 grade V students and 19 teachers. Quantitive data were collected through a critical thinking test to measure students' critical thinking skills. The qualitative data were collected through questionnaires and interviews to identify the key instructional needs that must be addressed in developing a learning model to enhance students' critical thinking at the elementary level. The findings show that that the average critical thinking of students in all indicator an average below 50, meaning that the ability is still low. Based on the questionnaire, it was found that most of the learning experiences not encourage students to be active and think critically yet, and teachers needed assistance in learning designing. Therefore, an alternative learning model is needed to develop students' critical thinking, which is easy to apply and does not require large costs.

Keywords: Critical thinking; Socio-Scintific Issues (SSI); Learning model; Deep Learning, Elementary schools.

INTRODUCTION

Pembelajaran Mendalam (PM) or Deep Learning has become a central goal of Indonesia education system, emphasizing students' ability to understand, apply, and reflect upon what they learn in real-life contexts (Fullan et al., 2020). In the context of Indonesian elementary education, PM is increasingly emphasized within the subject area of IPAS (Ilmu Pengetahuan Alam dan Sosial), a transdisciplinary subject that integrates natural and social sciences to help students understand the world through observation, inquiry, and reflection. IPAS is committed to fostering inquiry and reasoning by cultivating learners' abilities to investigate phenomena, collaborate in problem-solving, and make well-informed decisions as responsible members of society (BSKAP, 2022).

Based on Program for International Student Assessment (PISA) 2022 Indonesia's position of 68 out of 80 countries, which is still lower than Thailand, Malaysia and Brunei Darusalam (OECD, 2023). This results show that Indonesian students continue to score in the lowest proficiency levels in science, reading, and mathematics, with particularly weak performance in items requiring higher-order thinking, argumentation, and problem-solving (OECD, 2023). The integration of science and natural sciences subjects into IPAS, which is considered to have the potential to improve critical thinking skills (Cervetti et al., 2012; Kinoshita, 2022; Swanson et al., 2020; Zakarina et al., 2024), has

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not been fully implemented (Damayanti & Muhroji, 2022; Desstya, 2014; Dyaning Wijayanti & Ekantini, 2023; Wanti & Chastanti, 2023; Zvoch et al., 2021). This is despite being stated in one of the objectives of science and natural sciences lessons, namely having the ability to solve problems through real-life actions (BSKAP, 2022). This gap highlights the urgent need for pedagogical innovation that centers critical thinking start from elementary school.

The socio scientific issues (SSI) approach is a top priority for achieving this goal. SSIs are authentic, controversial, and unresolved challenges. These issues arise from the complex interconnections among science, technology, and society, and they can be examined through various social dimensions, including ethical, economic, environmental, and political perspectives (López-Fernández et al., 2022). SSI creates an active context for the development of knowledge and processes that contribute to critical thinking, such as forming evidence-based arguments, reaching consensus, moral reasoning, and understanding and applying scientific content (Hernández-Ramos et al., 2021; Ke et al., 2020; Muis et al., 2021). It focuses on developing individuals' abilities to make informed decisions. Addressing socio-scientific challenges enables learners to apply scientific knowledge, while integrating these issues into science learning helps elevate the role of education in fostering active and informed citizenship(İpek Akbulut & Demir, 2020). Therefore, SSIs are an interesting and significant topic for science educators (Ozden, 2020).

SSI-based learning emphasizes the importance of students' direct involvement in understanding and solving global problems that are naturally connected to various disciplines (Ke et al., 2021), as well as innovating sustainable solutions (Choi et al., 2021), to instill the awareness and sensitivity needed to address socio-cultural issues in everyday life (Ariza et al., 2021; Erten, 2021; Häyrynen et al., 2021). Therefore, SSI-based learning not only emphasizes a good understanding of content but also applies this understanding to solve problems encountered in everyday life, ultimately forming conscious citizens. SSI-based learning is very relevant to the PM approach which emphasizes in-depth understanding through learning experiences of understanding, applying and reflecting.

The explanation above highlights the urgency of integrating science and social studies learning models by connecting social issues within the local community and incorporating moral and ethical considerations, in order to enhance students' critical thinking in line with the demands of Pembelajaran Mendalam (Deep Learning). A learning model that integrates socio-scientific issues (SSI) needs to be developed to facilitate effective implementation by teachers. In response to these challenges, this study aims to examine students' critical thinking skills and identify the need for a framework that supports science and social studies learning through an SSI-based approach to strengthen critical thinking among elementary school students.

METHOD

This study uses a sequential explanatory design as the research methodology. The quantitative phase is conducted through a critical thinking test to measure students' critical thinking skills. The critical thinking test of students in terms of formulating questions/problems (focus), expressing reasons based on evidence (reason), using information that is appropriate to the problem (situation), making conclusions (inference), assessing conclusions (clarity). The qualitative phase is carried out through questionnaires and interviews to gain a deeper understanding of the test results and to

explore the factors influencing students' critical thinking abilities. The combined findings from both phases are then used to identify the key instructional needs that must be addressed in developing a learning model to enhance students' critical thinking at the elementary school.

RESULTS AND DISCUSSION

The first findings of this study are presented as a qualitative description, with the goal of depicting the critical thinking skills of 157 grade V students from four Madrasah Ibtidaiyyah (elementary schools) as shown in Table 1.

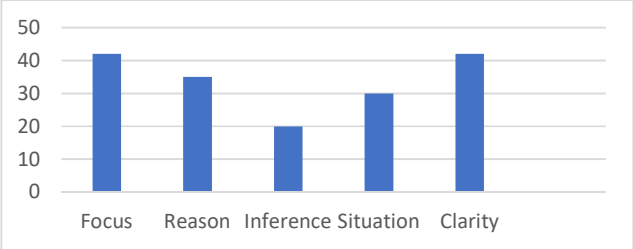

Figure 1 Critical thinking test results

The test results show that the average of all critical thinking indicators shows a score of 50. This means that students' critical thinking is still low. This is related to the student's learning experienced as shown in the following table 2.

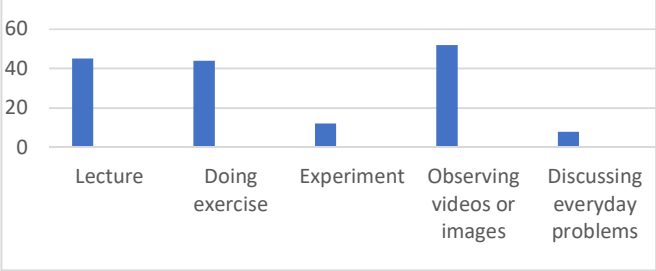

Figure 2 Learning Experiences

The table indicates that students' learning experiences are still predominantly centered on listening to teacher explanations, either through lectures or by observing videos and images. In addition, practice exercises remain the most frequently used learning activity. This suggests that current learning experiences do not yet adequately support the development of students' critical thinking skills. Learning models that provide learning experiences involving problem solving, argumentation, and inquiry are the most effective for developing critical thinking skills (Ananda et al., 2023; Fajari et al., 2020; Fitriadi et al., 2025).

These findings are reinforced by the analysis of lesson plan documents. The findings indicate that the learning patterns used by all teachers are similar, with three stages: concept introduction, practice, and a summative test. The concept introduction stage is dominated by lectures and observation of the material through videos or images. The

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practice stage is dominated by practice problems, occasional lab work, homework assignments, and discussions. For the summative evaluation, all teachers administered a written multiple-choice test..

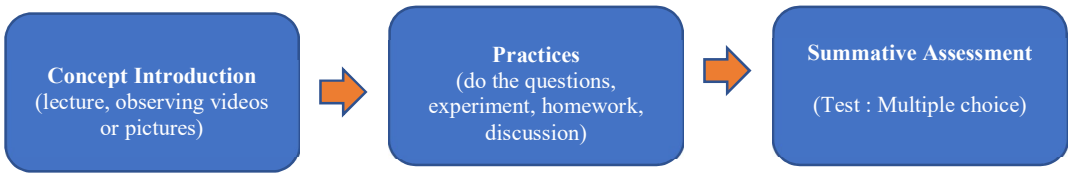

Figure 3 Teaching Stages

Based on the teachers questionnaire results, it was found that 63.2% of teachers used the cooperative learning model as shown in the picture 4.

Figure 4 Used The most Learning Model

Further information was obtained from interviews. Teachers explained that cooperative learning involves students in learning. This indicates that teachers have not implemented cooperative learning according to procedures. Almost all teachers also explained that they still separate science and social studies learning and experience difficulties in implementing PBL, citing difficulties in integration, time constraints, and cost. Several teachers expressed this as follows:

> “I still teach separately, for IPAS, the schedule is also separate, only in the textbooks used are combined between science and social studies. The assessment is also still separate, because the report must be separate.”
>
> (ibu W, guru kelas V, 30 April 2025).

> “I like to teach using PJBL to prepare for P5 activities, but it is rare in science subjects. I am still confused about combining science and social science CP using PJBL and sometimes it costs money. Sometimes if you use a project, the time also tends to be longer, even though there is still a lot of material to be taught"
>
> (ibu OK, guru kelas V, 29 April 2025)”.

Interview results also showed that all teachers had incorporated environmental issues into their lessons. A total of 60% of teachers stated they were familiar with SSI, but the environmental themes presented by the teachers did not reflect a true definition of SSI.

Table 1 Environment Themes

No	Theme	Number of respondent
1	Waste: the impact of plastic, how to sort waste, waste recycling, waste management, keeping waste clean	16
2	Impact of plastic	1
3	Environmental pollution	1
4	Water filtration	1
5	Global warming, solar system, tolerance	1

The final findings of this preliminary research are as seen in the picture 68.4 % of teachers do not yet understand PM and need assistance in the form of training to understand how to implement it in the classroom, relevant and innovative LKPD and books, guidebooks on how to teach material in PM, media and teaching aids

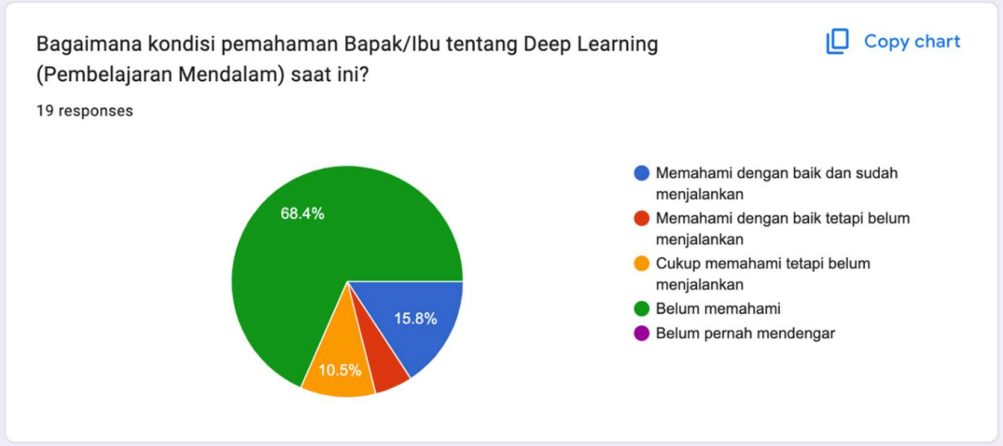

Figure 5 Teachers' understanding of PM

CONCLUSION

The findings of this study suggest that the critical thinking skills of grade V students continue to differ. One factor that significantly influences critical thinking is learning experiences and learning models. Student-centered learning model and learning experiences based on inquiry, problems, and argumentation are needed to support students' critical thinking. The findings of this study highlight the need for educational interventions to improve students' critical thinking skills, particularly in developing learning models that integrate SSI into PM. Integrating the two significantly supports the development of critical thinking and in-depth understanding.

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