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Implementation of In-Depth Learning in Science Material to Train Critical Thinking Skills of High School Students in West Seram Regency

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Abstract: Critical thinking skills will be easily measured if through a learning approach that can make students develop a learning culture and be more contextual and meaningful. An approach that can support these critical thinking skills is the immersive learning approach. This study aims to describe the Application of Immersive Learning to Train Critical Thinking Skills of High School Students in West Seram Regency. The subjects of this study were 26 students of class XB at State Senior High School A, West Seram Regency. This study used a descriptive quantitative and qualitative research type. The research design was one group pretest-posttest design. The instruments in this study were test and non-test instruments (learning activities). The test instrument was to measure students' cognitive abilities before and after the treatment while the non-test instrument was to measure students' learning activities during the treatment. Data analysis techniques used included: qualitative descriptive analysis, namely critical thinking skills and student learning activities using the immersive learning approach. The results of the pretest and posttest showed an increase in each indicator of critical thinking skills with an average increase of all indicators above 50%. The results of learning activities showed an increase in learning activities at each meeting, so it can be concluded that the immersive learning approach can train students' critical thinking skills.

Keywords: Critical Thinking Skills; Deep Learning Approach; Parabolic Motion.

Introduction

Education is a planned effort to create a learning environment and learning activities so that students can actively develop their potential (Purwaningsih et al., 2022). Education is vital and inseparable from life because it is one of the keys to our survival in this era (Makkawaru, 2019). Education is also a fundamental human need because every individual who experiences the learning process will experience positive impacts both personally and for the surrounding community. Therefore, the existence of educated people will always be considered (Abidin, 2021). Currently, education is oriented towards 21st-century education. 21st-century education is characterized by the rapid growth and development of information (Mardhiyah et al., 2021). This rapid growth and development of information requires students to have several skills. Skills that must be mastered by students in the 21st century include critical thinking skills, problem-solving skills, communication skills, collaboration skills, creativity, and innovation skills (Elitasari, 2022).

In today's global era, critical thinking skills are a necessity for students. Critical thinking is a process of reasonable or rational decision-making in determining appropriate beliefs or actions (Ennis, 2011). Critical thinking involves careful consideration, in-depth thought, and rational evaluation to reach acceptable conclusions or to determine appropriate actions (Pusparini et al., 2018). Therefore, critical thinking skills need to be taught and developed in schools. The goal is for students to be able and accustomed to facing and solving various problems around them, both now and in the future (Agustina, 2019). In line with this, Makhmudah (2018) states that critical thinking skills enable individuals to analyze arguments and develop logical thought patterns, thereby finding appropriate, rational, and careful solutions to solve problems.

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Observations through interviews with science teachers at a State Senior High School A in West Seram Regency revealed that the teaching of Parabolic Motion still uses conventional learning models and does not support the development of students' critical thinking skills. This is reflected in the analysis of multiple-choice questions designed to measure the critical thinking skills of 10th-grade students, where the average score was 38.7%. These results indicate that students' critical thinking skills are still relatively low. The low critical thinking skills of students are caused by the ineffectiveness of learning applied in everyday life (Anisa et al., 2021). Furthermore, the large number of students who often do not pay attention to teacher explanations and do not actively participate in class can also be reasons for low critical thinking skills. This means that students feel unenthusiastic about participating in teaching and learning activities (Marudut et al., 2020).

Based on the results of the critical thinking test, which showed a low category, students' critical thinking skills need to be improved through the use of appropriate learning approaches. This learning approach is expected to encourage students' active involvement in seeking information from various sources, analyzing information and situations they face, finding appropriate solutions when facing problems, and also evaluating and taking responsibility for every action taken (Cahyani & Setyawati, 2017). One learning approach that can be used to train and improve students' critical thinking skills is the in-depth learning approach.

Deep learning is an instructional approach that encourages students' active participation in understanding the significance of the material, connecting new information to prior knowledge, and reflecting on their learning process. According to (Agoestanto, 2022), deep learning involves intrinsic motivation, conceptual understanding, and an analytical approach to learning tasks. Strategies that support deep learning include group discussions, problem-solving, project-based learning, and critical reflection. In the context of physics, this approach can be applied through the presentation of contextual problems, concept exploration, and collaboration in finding solutions (Diana, 2023). According to (Fullan & Langworthy, 2014), deep learning occurs when students actively engage in complex thinking processes, going beyond memorizing information, and developing problem-solving, collaboration, and creativity skills that are essential for the future. This approach aligns with constructivism theory (Jean Piaget, Lev Vygotsky), which states that knowledge is built through students' active interactions with their environment, encouraging them to explore and construct their own knowledge. The Indonesian government has also implemented policies relevant to the deep learning approach for implementation in learning practices. The three principles of the Deep Learning approach, namely awareness, meaning, and joy, are the main foundation in creating a more holistic and effective learning experience (Syaifuddin et al., 2025). This shows that, comprehensively and systematically, deep learning not only improves the quality of education in Indonesia, but can also be a catalyst for transformation that can increase public awareness and accelerate the achievement of national education goals. By prioritizing relevant and enjoyable learning, Deep Learning can accelerate educational transformation, thus aligning with the national education goal of forming competent, character-based individuals who are ready to face future challenges.

Therefore, the purpose of this study is to describe the Application of In-Depth Learning to Train Critical Thinking Skills of High School Students in West Seram Regency.

Method

The type of research used is descriptive research with a one group pretest-posttest design with learning treatment using the Deep Learning Approach. The population of class X students at SMA Negeri A in West Seram Regency is 55 students with a research sample of 26 students in class B. The research instrument is

1. The test instrument consists of 12 essay questions covering 3 aspects of critical thinking skills, including: 1) Asking questions, 2) Planning strategies, and 3) Evaluating decisions (Rofiah, et al, 2013).
2. The non-test instrument is a learning activity observation sheet. The indicators of student learning activities during the observed learning follow the indicators of critical thinking skills: 1) Asking Questions, 2) Planning Strategies, and 3) Evaluating Decisions.

Data analysis in this study was conducted using quantitative descriptive analysis to describe the data as it is in percentage form and explain the data or events with explanatory sentences qualitatively. The data analysis techniques used include: qualitative descriptive analysis, namely critical thinking skills and student learning activities using an in-depth learning approach.

Results and Discussion

Critical Thinking Skills

Critical thinking skills data were obtained through a critical thinking skills test with 12 questions, where each critical thinking skills indicator contained 4

questions. The critical thinking skills assessed were (1) asking questions, (2) planning strategies, and (3) evaluating decisions. The average results of critical thinking skills in 26 students at SMA A in general are presented in Figure 1.

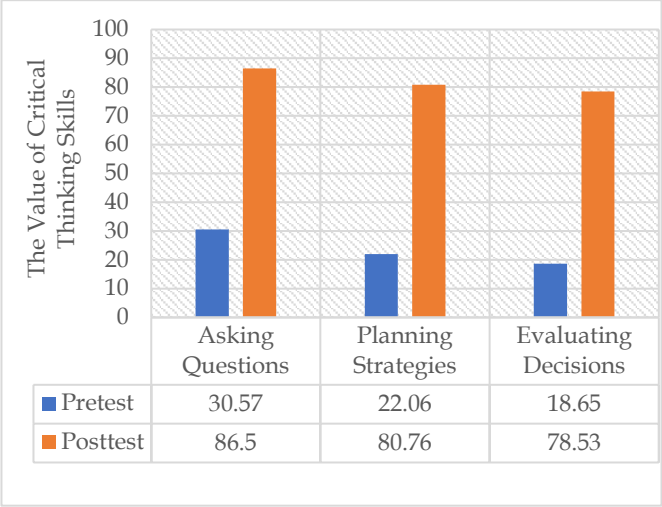

Figure 1. Results of Critical Thinking Skills

Critical thinking skills are skills that are not inherent in humans from birth (Rahmawati Ika, et al, 2016). Critical thinking skills are very necessary because Critical Thinking Skills themselves are not limited to ordinary thinking processes (Ghiffar, 2018). Critical thinking is a person's ability to find information and solve a problem from a problem by asking themselves to dig up information about the problem being faced (Christina & Kristin, 2017). The indicators of critical thinking that are trained are (1) asking questions, (2) planning strategies, and (3) evaluating decisions.

The indicator of the ability to ask questions cannot be separated from question words such as what, where, how, when, why, etc. In asking questions, students must know 2 things, namely (1) the question must have a question mark and (2) the question contains variables. This indicator got an average pretest score of 30.57 and a posttest score of 86.5, so that the indicator of the ability to ask questions got an increase of 55.93. The ability of students to formulate problems is very effective because it is related to the topic of the problem to be solved, helps focus students' ideas, and leads to the research to be carried out (O'Sullivan & Dallas, 2010). Question words such as what, why, and how are basic steps in conducting research and encourage students to analyze critically. The ability to analyze includes analyzing incoming information and dividing or structuring information into smaller parts to recognize patterns or relationships, identifying or formulating questions, and recognizing and distinguishing the causes and effects of a problem (Lewy, 2009).

The indicator of planning a strategy in critical thinking skills means planning solutions to problems through the application of physics concepts that students already have. This indicator includes the ability to write complete and sequential work steps. This indicator received a pretest score of 22.06 and a posttest score of 80.76, so that the indicator for planning a strategy received an increase of 58.7. Teachers must always prepare questions that will not be answered simply, but through systematic problem-solving strategies (Ariandari, 2015). In the physics learning process, students' critical thinking skills can be seen from how students respond to existing physics problems.

The decision evaluation indicator also requires a high level of analysis. In evaluating decisions, students must understand the strengths and weaknesses of the decision being evaluated, correctly calculate them, and draw complete conclusions from the problem-solving process. This indicator received a pretest score of 18.65 and a posttest score of 78.53, resulting in a 59.88 increase in the decision evaluation indicator. Students with high critical thinking skills tend to be able to re-evaluate their opinions based on their existing knowledge (Nugraha, 2017).

Based on these results, the indicator with the lowest increase in scores from pretest to posttest was asking questions. This indicator is quite difficult for students to grasp, as it requires a deeper understanding of variables and their types. The indicator with the highest increase was evaluating decisions, which saw a 59.88 increase, as students are beginning to be able to analyze consequences and reflect on and make decisions.

The conclusion from these results is that learning using an immersive learning approach can develop students' critical thinking skills. This is evident in the increase in scores from pretest to posttest of more than 50%.

Student Activities

Based on research using an in-depth learning approach, the data shows an increase in the quality of student activities from meetings 1, 2, and 3 as presented in Figure 2.

Based on Figure 2 above, it was found that the percentage of student activity in each indicator increased from the first meeting to the third meeting. This indicates that students at SMA A are starting to be able to apply critical thinking activities during the learning process using an in-depth learning approach because the in-depth learning approach positions teachers no longer as facilitators but as activators and developers of a learning culture so that students are required to be able to actively participate in learning. The better the teacher's activity in learning, the higher

the student activity in learning in class, which has an impact on higher student learning outcomes (Suriansyah, Aslamiah, & Sulistiyana, 2015).

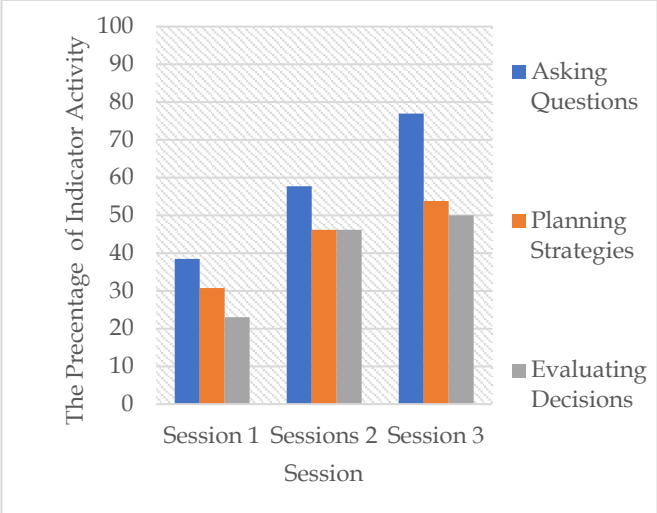

Figure 2. Student Activities

The goal of deep learning is to create a positive and enjoyable learning experience for students, supported by three main principles: mindful learning, meaningful learning, and joyful learning (Ramadan, 2025). Furthermore, Haryanti (2024) explains that deep learning is a learning approach that emphasizes comprehensive and in-depth mastery of concepts, going beyond simply recognizing facts or memorizing information. Meanwhile, Hattie (2020) defines deep learning as a learning method that focuses on in-depth understanding and critical use of knowledge. Furthermore, the learning process is designed contextually and can lead students to meaningful learning. Teachers should be able to implement learning in a more contextual direction and be able to guide their students to find meaning in the learning process (Fauzi & Metroyadi, 2020). According to Aslamiah and Agusta (2015), a question-and-answer session is beneficial for students to practice speaking skills to express their opinions. In line with the opinion of Suriansyah, Amelia, and Lestari (2019), students also have the ability to conduct scientific communication in discussion activities. In this process, students not only gain a deep understanding of the material, but also develop critical thinking skills that are important for facing real-world challenges (Fitriani and Santiani, 2025).

The increase in student activity occurred becauseTeachers improve the quality of learning. This improvement in learning quality is due to teachers' habit of always reflecting on each meeting and continuously striving to increase the number of highly active students. As a result, student activity meets success indicators and has a positive impact, which in turn results in a better learning process. Learning activities are a crucial part of the learning process (Prasetyarini et al., 2023).

Conclusion

The conclusion that can be drawn is that the in-depth learning approach can train students' critical thinking skills, this can be seen from the increase in test scores for each indicator above 50% and the increase in learning activities at each meeting.

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The authors declare no conflict of interest

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