The Implementation of the Reflective Inquiry Learning Model to Improve Students' Metacognitive Skills in Informatics Subject at State Senior High School 1 Amurang

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ABSTRACT

Metacognitive skills are an essential aspect of Informatics learning, as they are closely related to students' ability to plan, monitor, and evaluate their own thinking processes. However, learning outcomes indicate that students' metacognitive skills remain relatively low. This study aims to improve students' metacognitive skills through the implementation of the Reflective Inquiry learning model. This study employed Classroom Action Research (CAR) conducted in two cycles, each consisting of planning, implementation, observation, and reflection stages. The research subjects were 33 eleventh-grade students at SMA Negeri 1 Amurang. Research instruments included a metacognitive questionnaire, observation sheets of teacher and student activities, and learning achievement tests. The results showed an improvement in students' metacognitive skills from Cycle I to Cycle II, as indicated by an increase in the average metacognitive score and the percentage of students categorized as having high metacognitive skills. Therefore, the Reflective Inquiry learning model is effective in improving students' metacognitive skills in Informatics learning.

Keywords: High School, Informatics, Metacognition, Reflective Inquiry.

INTRODUCTION

Education is a crucial process in shaping human character and plays an important role in improving intelligence, skills, and competencies in accordance with individual identity and environmental conditions. Education also serves as an effort to accelerate the development of human potential so that individuals are able to perform the tasks assigned to them, as humans are both educable and capable of educating others. Educational system reform requires a national education development strategy, which includes the development and implementation of competency-based curricula and the provision of educational learning facilities. Government Regulation Number 19 of 2005 states that curriculum implementation should apply a multi-strategy and multimedia approach, utilize adequate learning resources and technology, and make use of the surrounding environment as a learning resource. To achieve this, educators are expected to utilize learning media that support effective and efficient instruction. Twenty-first century learning demands students to possess higher-order thinking skills, one of which is metacognitive ability. Metacognition refers to individuals' awareness of their own thinking processes, including the ability to plan, monitor, and evaluate learning strategies. These skills are particularly important in Informatics subjects, which emphasize problem-solving and logical thinking.

Initial observations at SMA Negeri 1 Amurang revealed that Informatics learning was still predominantly teacher-centered, with limited emphasis on students' thinking strategies during learning activities. This condition has contributed to students' low metacognitive skills. One alternative learning model that can address this issue is the Reflective Inquiry learning model. This model emphasizes inquiry processes accompanied by systematic reflection, enabling students to construct understanding and awareness of their own thinking processes. Therefore, this study aims to implement the Reflective Inquiry learning model to improve students' metacognitive skills in Informatics learning.

Relevant research by Flavell (1979) emphasized that metacognitive skills play a vital role in controlling students' thinking processes, particularly in planning, monitoring, and evaluating learning strategies. This theoretical foundation supports the idea that learning environments providing opportunities for reflection can enhance students' learning awareness. Burns (2010) further stated that the use of reflective inquiry models in learning can increase student engagement, improve the quality of discussion, and enhance higher-order thinking skills. Additionally, Mertler (2014) argued that the implementation of Classroom Action Research using a reflective approach can improve instructional processes through continuous cycles of planning, action, observation, and reflection.

Based on these findings, the Reflective Inquiry learning model is considered highly relevant for Informatics learning to improve students' metacognitive skills and learning outcomes.

METHOD

This study employed a Classroom Action Research (CAR) approach conducted in two cycles. Each cycle consisted of four stages: planning, action implementation, observation, and reflection.

Classroom Action Research aims to improve and enhance the quality of learning through real actions implemented in the classroom. According to Didik Komaidi and Wahyu Wijayanti (2010), CAR

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is an approach to improving education by making corrective changes to educational and learning outcomes. Through CAR, educators are expected to enhance their professionalism in managing the learning process, thereby improving overall instructional quality.

The research was conducted at SMA Negeri 1 Amurang, located on Trans Sulawesi Road, Bitung Village, Amurang District, South Minahasa Regency, North Sulawesi Province. The research subjects were 33 students of class XI B in the odd semester of the 2025/2026 academic year. The learning approach applied in this study was the Reflective Inquiry learning model to improve students' metacognitive skills.

Data collection techniques included a metacognitive ability questionnaire, observation sheets for teacher and student activities, and learning achievement tests. Data were analyzed descriptively using quantitative methods to identify improvements in metacognitive scores and qualitative methods to describe learning activities.

The indicator of research success was determined by an increase in the average metacognitive score and at least 75% of students achieving a high metacognitive category.

RESULTS AND DISCUSSION

This study aimed to examine the improvement of students' metacognitive skills through the implementation of the Reflective Inquiry learning model in Informatics learning at SMA Negeri 1 Amurang. The Reflective Inquiry model combines inquiry (active investigation by students) with reflection (deep meaning-making of learning experiences). This approach encourages students to actively ask questions, seek answers, analyze data, and reflect on what they have learned to develop stronger understanding and independent learning skills. Research data were obtained through direct observation of students' learning activities and engagement during the instructional process. These data were used to support findings from observation sheets, metacognitive questionnaires, and learning achievement tests.

The research was conducted in two cycles, each consisting of planning, action, observation, and reflection stages. The results of the metacognitive questionnaire in Cycle I showed that most students were in the moderate category. Many students were hesitant to express their opinions, tended to wait for teacher instructions, and group work had not yet functioned effectively. Only a small number of students actively participated in discussions. Students were not yet accustomed to planning problem-solving strategies or evaluating learning outcomes.

After improvements were implemented in Cycle II, particularly through strengthening reflection and discussion stages, students' metacognitive skills increased. The average metacognitive score improved, and the percentage of students in the high category increased. Student learning activities also improved, as evidenced by increased participation in discussions, expression of opinions, and reflection on learning outcomes. These results indicate that the actions implemented in Cycle II had a positive impact on students' learning activities.

Learning outcomes were analyzed based on pretest scores (Cycle I) and posttest scores (Cycle II). The data showed improvements in both quantitative and qualitative aspects. The average pretest score in Cycle I was 70.58, while the average posttest score in Cycle II was 83.15, indicating an increase of

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12.58 points. Learning mastery improved from 11 students (28.27%) in Cycle I to 28 students (72.72%) in Cycle II, representing an increase of 45.45%.

The N-Gain analysis showed no students in the high category (0%), 29 students (87.9%) in the moderate category, and 4 students (12.1%) in the low category. This indicates that most students experienced moderate improvement, demonstrating that the Reflective Inquiry learning model effectively enhanced students' understanding in Cycle II. Based on the analysis of learning activities, group discussions, and learning outcomes, the study found improvements in student learning activity, learning achievement, and the effectiveness of instructional actions and learning strategies.

Overall, the implementation of the Reflective Inquiry learning model positively impacted both the learning process and outcomes in Informatics learning at SMA Negeri 1 Amurang. Learning shifted from being teacher-centered to student-centered, enabling students to actively engage in discussions, problem investigation, and reflection on their learning experiences. In Cycle I, students began to engage in discussions and problem-solving activities; however, metacognitive skills had not yet developed optimally. This was reflected in students' limited ability to plan, monitor, and evaluate learning, as well as the lack of classical learning mastery.

After improvements were implemented in Cycle II through refinement of student worksheets, strengthened reflective guidance, and more structured discussion management, significant improvements were observed. Students were able to express ideas more systematically, reflect on learning difficulties, and demonstrate awareness in managing learning strategies. Improved metacognitive skills directly contributed to better learning outcomes.

The improvement in students' metacognitive skills was attributed to the characteristics of the Reflective Inquiry model, which emphasizes active student involvement in the learning process. The reflection stage helped students recognize the thinking strategies they used and evaluate their effectiveness. These findings are consistent with previous studies stating that Reflective Inquiry learning enhances students' metacognitive awareness. In the context of Informatics learning, the Reflective Inquiry model provides opportunities for students to think systematically and reflectively in solving problems.

CONCLUSION

The implementation of the Reflective Inquiry learning model encourages students to actively identify problems, express opinions, gather information, and reflect on learning processes and outcomes. Improvement in metacognitive skills is evident in students' enhanced ability to plan, monitor, and evaluate their learning activities. The N-Gain results indicate the effectiveness of learning, with most students categorized as experiencing moderate improvement. This suggests that the Reflective Inquiry model is sufficiently effective in improving students' understanding of digital literacy and media ethics materials. In Informatics learning, the Reflective Inquiry model helps students understand concepts more deeply through discussion, problem-solving, and reflection, making learning more meaningful and contextual. The application of the Reflective Inquiry learning model has been proven to improve students' metacognitive skills in Informatics learning at SMA Negeri 1 Amurang, as indicated by improvements in metacognitive questionnaire scores and student learning

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activities. This model can serve as an alternative instructional approach to enhance the quality of Informatics learning.

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