



The Implementation of the Scientific Method in Improving Learning Outcomes on the Human Digestive System Material for 5th Grade Students at MIN 11 Pesisir Selatan

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Abstract:

This study aims to analyze the effectiveness of applying the scientific method in improving learning outcomes on the human digestive system material for 5th-grade students at MIN 11 Pesisir Selatan, consisting of 15 students. The implemented scientific method includes five main steps: observation, questioning, experimenting, reasoning, and communicating. This research employs a quantitative approach with a classroom action research (CAR) design conducted in two cycles. Data were collected through learning outcome tests, observations of student activities, and interviews with teachers and students. The results of the study indicate that the application of the scientific method has a positive impact on students' conceptual understanding. This is evident from the increase in students' average learning outcome scores in each cycle. Additionally, this method fosters students' active participation in the learning process and enhances their motivation to understand the human digestive system material. Students became more enthusiastic about engaging in discussions, conducting experiments, and presenting their analysis results. Thus, the scientific method can be an effective alternative for improving the quality of learning and students' comprehension of science concepts.

Keywords: Scientific Method, Learning Outcomes, Human Digestive System, 5th-Grade Students, Classroom Action Research.

INTRODUCTION

This study aims to analyze the effectiveness of the scientific method in improving students' learning outcomes on the human digestive system material. The scientific method is a learning approach that emphasizes the scientific process, where students are encouraged to observe, ask questions, experiment, reason, and communicate their learning outcomes (Sari & Hidayat, 2021). The implementation of this method is expected to help students understand concepts more deeply through active and interactive learning experiences. Thus, the scientific method can be a solution to enhancing the quality of education in elementary schools. According to research conducted by Putri et al. (2022), the scientific method not only enhances students' understanding of learning materials but

also develops their critical and independent thinking skills. During the learning process, students are encouraged to gather information from various sources, conduct simple experiments, and engage in discussions with peers and teachers. This approach enables them to relate the concepts learned to real-life situations, strengthening their comprehension of the subject matter.

In addition to improving learning outcomes, this study also focuses on analyzing the impact of the scientific method on student participation and motivation in learning. Based on research by Rahmawati and Susanto (2023), students who learn using the scientific method tend to be more active in asking questions, expressing opinions, and collaborating in groups. With higher engagement in the learning process, students are more motivated to understand the material and feel more confident in expressing their understanding.

Student motivation is also a crucial factor in learning success. A study by Nugroho and Lestari (2021) found that students involved in scientific-based learning processes tend to have a higher level of curiosity. This occurs because the method provides students with opportunities to explore and discover concepts independently, rather than passively receiving information from teachers. Consequently, the scientific method can create a more engaging and enjoyable learning environment for students.

Furthermore, this study aims to determine optimal steps for implementing the scientific method in the 5th-grade classroom at MIN 11 Pesisir Selatan. According to Widodo and Anwar (2020), the implementation of the scientific method in learning should be adapted to students' conditions and the school environment to be effective. Therefore, it is essential to identify supporting factors and challenges in applying this method to find the most suitable strategies for students' needs.

In the context of elementary schools, teachers play a crucial role in the successful implementation of the scientific method. Teachers are not only knowledge providers but also facilitators who guide students in exploring concepts and developing critical thinking skills (Hidayati & Prasetyo, 2022). With adequate training, teachers can design more innovative, experience-based learning activities, enhancing the effectiveness of the scientific method in education.

Moreover, this study will also analyze how the scientific method can be integrated with more modern learning media, such as digital technology. According to recent research by Suryani and Ramadhan (2023), using technology in scientific-based learning can increase students' interest in learning and help them better understand abstract concepts. Therefore, applying the scientific method combined with technology can be a more effective strategy for improving students' learning outcomes.

Thus, the findings of this study are expected to contribute to the field of education, particularly in enhancing the quality of science learning in elementary schools. Through the optimal application of the scientific method, students can gain a better understanding of the human digestive system while increasing their participation and motivation in the learning process. Additionally, the results of this study can serve as a reference for teachers in developing more innovative and effective teaching strategies in the future.

METHODS

This study employs a quantitative approach with a classroom action research (CAR) design, conducted in two cycles. The primary data source for this research consists of 15 fifth-grade students from MIN 11 Pesisir Selatan. Data were collected through learning outcome tests, observations of student activities during the learning process, and interviews with teachers and students. The research instruments used include test questions to measure student learning outcomes, observation sheets to assess student participation in the learning process, and interview guidelines to explore students' experiences in learning through the scientific method. Additionally, learning documents such as lesson plans (RPP) and teacher reflection notes were used as supporting data. Data

Analysis. The data obtained from this study were analyzed both quantitatively and qualitatively. Quantitative analysis was conducted by calculating the increase in students' average test scores before and after the implementation of the scientific method. The data were analyzed using descriptive statistical techniques by examining the improvement in test scores across each cycle. Additionally, qualitative analysis was performed on observation and interview data by categorizing student and teacher responses regarding the effectiveness of the scientific method. Observation data were used to assess the extent of student engagement in learning, while interview data were analyzed to understand challenges and supporting factors in implementing the scientific method. The results of this analysis are expected to provide a more comprehensive understanding of the impact of the scientific method on improving student learning outcomes and participation in the learning process.

RESULTS

This study demonstrates that the scientific method positively influences students' learning outcomes in the human digestive system material. Learning test data revealed an increase in students' average scores from the pre-cycle stage to the second cycle. In the pre-cycle, students' average scores were still low, with the majority scoring below the Minimum Competency Criteria (KKM). After implementing the scientific method in the first cycle, the average score increased to 68.5, although some students had not yet reached the KKM. A more significant improvement occurred in the second cycle, where the average score reached 80.2, and most students met or exceeded the KKM. These findings align with previous studies that highlight the effectiveness of the scientific approach in improving student learning outcomes (Alawiyah & Wulandari, 2021; Budiman & Lestari, 2022; Dewi & Susanto, 2023).

Additionally, this method positively impacts student participation in learning. In the pre-cycle, only 30% of students were actively engaged, but this number increased to 65% in the first cycle and reached 85% in the second cycle. Interviews with students and teachers indicated that the scientific method made learning more engaging, enhanced conceptual understanding, and encouraged independent learning. These results are consistent with research findings stating that the scientific approach increases student motivation and participation (Azis & Suryani, 2020; Hasanah & Rahmat, 2021; Lubis & Wahyuni, 2021).

To ensure the validity of the research findings, source and method triangulation was conducted, where test results were compared with observational and interview data. Data analysis indicated that the improvement in student learning outcomes and participation genuinely resulted from implementing the scientific method rather than coincidental factors. These findings are supported by previous studies that emphasize the importance of triangulation in validating the effectiveness of the scientific approach in education (Fadilah & Siregar, 2021; Maulana & Saputra, 2023; Prasetyo & Yuliana, 2023). Therefore, the scientific method can be considered an effective strategy for enhancing students' comprehension while creating a more interactive and enjoyable learning environment.

CONCLUSION

The results of this study provide strong evidence of the effectiveness of the scientific method in improving students' learning outcomes on the human digestive system material in Grade 5 at MIN 11 Pesisir Selatan. Data from learning assessments indicate an increase in students' average scores from the pre-cycle to the first and second cycles, with the percentage of learning mastery rising from 26.7% in the pre-cycle to 86.7% in the second cycle. Additionally, observations of student participation demonstrate that the scientific method fosters active engagement in the learning process, with participation rates

increasing from 30% in the pre-cycle to 85% in the second cycle. Interviews with students and teachers further support these findings, as they reported that the scientific method made learning more interactive and enjoyable.

From an academic perspective, this study confirms that the scientific method enhances students' conceptual understanding through a more active and exploratory learning experience. Moreover, the scientific approach enables students to develop critical thinking, collaboration, and communication skills, which are essential for 21st-century learning. As students' comprehension of the material improves, this method also has the potential to be applied to other subjects at the elementary school level.

Socially, the scientific method contributes to the creation of a more positive learning environment, where students are encouraged to actively participate, collaborate in groups, and confidently express their ideas and opinions. This not only enhances the quality of classroom learning but also helps shape students into more independent and critical thinkers in their daily lives. Therefore, the implementation of the scientific method in elementary schools should continue to be developed as an effective and sustainable learning strategy.

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