STRATEGIES FOR INTEGRATING CHARACTER EDUCATION INTO SCIENCE LEARNING TO PROMOTE ACADEMIC ACHIEVEMENT AMONG STUDENTS AT SMA NEGERI 1 MANIAMOLO

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Abstrak

Penelitian ini bertujuan untuk mengkaji dampak integrasi nilai-nilai karakter dalam pembelajaran sains terhadap sikap, perilaku, motivasi, dan hasil belajar siswa. Melalui pendekatan holistik dan kontekstual, nilai-nilai seperti kejujuran, tanggung jawab, dan disiplin diinternalisasikan dalam setiap tahapan pembelajaran. Hasil penelitian menunjukkan bahwa pendekatan ini tidak hanya meningkatkan pemahaman konsep ilmiah siswa, tetapi juga membentuk sikap ilmiah yang positif, seperti kejujuran dalam eksperimen, kerja sama dalam diskusi kelompok, dan kepedulian terhadap isu-isu lingkungan. Observasi terhadap perilaku siswa menunjukkan adanya peningkatan tanggung jawab dan keterlibatan aktif selama proses belajar berlangsung. Selain itu, motivasi belajar siswa meningkat secara signifikan karena mereka merasa pembelajaran menjadi lebih bermakna dan relevan dengan kehidupan sehari-hari. Secara akademik, terdapat peningkatan nilai rata-rata hasil evaluasi pada mata pelajaran sains setelah penerapan strategi ini. Temuan ini mendukung pentingnya pengembangan model pembelajaran sains yang tidak hanya berfokus pada aspek kognitif, tetapi juga membentuk karakter siswa sebagai bagian integral dari pendidikan abad ke-21. Pembelajaran sains berbasis karakter terbukti efektif dalam meningkatkan kualitas pendidikan secara menyeluruh.

***Kata Kunci**: Pendidikan Karakter; Pembelajaran Sains; Pendekatan Kontekstual; Motivasi Belajar; Hasil Belajar Siswa; Sikap Ilmiah*

Abstract

This study aims to examine the impact of integrating character values into science learning on students' attitudes, behavior, motivation, and academic achievement. Through holistic and contextual approaches, values such as honesty, responsibility, and discipline are internalized at every stage of the learning process. The findings indicate that this approach not only enhances students' understanding of scientific concepts but also fosters positive scientific attitudes, such as honesty during experiments, collaboration in group discussions, and concern for environmental issues. Observations of student behavior revealed an increase in responsibility and active engagement throughout the learning process. Furthermore, students'

learning motivation significantly improved as they found the learning experience more meaningful and relevant to their daily lives. Academically, there was a noticeable increase in the average evaluation scores in science subjects following the implementation of this strategy. These findings support the importance of developing science learning models that emphasize not only cognitive aspects but also character formation as an integral part of 21st-century education. Character-based science education has proven to be effective in improving the overall quality of education.
***Keywords**: Character Education; Science Learning; Contextual Approach; Learning Motivation; Student Achievement; Scientific Attitude*

A. Introduction

21st-century education demands a holistic approach that not only focuses on cognitive aspects but also on the comprehensive development of students' character. (Fahkroh Zulfi & Miterianifa, 2023). This aligns with the national education policy that places character education as an integral part of the learning process (Suciati, 2018). One of the subjects with great potential to develop character as well as improve academic achievement is science.

Science learning in this era aims not only to enhance understanding of scientific concepts but also to develop students' scientific attitudes and character values (Sugiarti, 2017). The integration of character education into science learning can be carried out through an approach that emphasizes values such as honesty, curiosity, responsibility, and cooperation. Through this approach, students not only learn about science but also learn to become individuals with strong character who are ready to face global challenges (Zibar Parisu & Eka Saputra, 2025).

In this context, it is important to develop effective strategies for integrating character education into science learning. Such strategies may include the use of active and participatory learning methods, such as project-based learning, experiments, and group discussions, which not only enhance students' understanding of scientific concepts but also shape positive attitudes and values (Sadia, I. W., 2023). Thus, the integration of character education in science learning is expected to promote improved academic achievement while also developing a generation that is not only academically competent but also possesses strong character and is prepared to face the challenges of the 21st century (Syahidi et al., 2023). Science learning not only requires logical and analytical thinking skills but also instills values such as honesty, responsibility, cooperation, and a strong sense of curiosity. Therefore, integrating character education into science learning becomes a relevant and strategic approach to address the challenges of education today (Harefa, D, 2024).

Character education is a deliberate and planned effort to instill moral values in students through a learning process that occurs consistently (Laksana, 2021). In the context of science learning, character education can be implemented through a scientific approach, problem-solving, group work, and laboratory experiments that not only sharpen intellectual abilities but also shape students' attitudes and personalities (Harefa, D, 2024). With the right strategy, teachers can guide the learning process so that character values such as honesty in data collection, responsibility in completing tasks, and discipline in following scientific procedures become part of students' learning habits (Jamaluddin et al., 2024). Effective science learning emphasizes not only cognitive aspects but also the development of scientific attitudes and character values in students. Through the scientific approach, students are encouraged to observe, question, reason, experiment, and communicate their findings, which indirectly fosters honesty, critical thinking, and responsibility. Furthermore, experimental activities and group work in science learning provide opportunities for students to collaborate, appreciate others' opinions, and respect applicable rules (Winarti, 2017).

The implementation of character education in science learning can be achieved by integrating character values at every stage of the learning process (Harefa, D, 2024). For instance, at the introduction stage, teachers can instill values such as curiosity and honesty; during exploration and elaboration stages, students are engaged in activities that nurture responsibility and cooperation; and at the confirmation stage, students are invited to reflect on their learning outcomes and appreciate the scientific process they have undergone. Thus, character education is not only part of a specific subject but an integral part of the entire learning process (Khairiah & Sirait, 2018). Through the integration of character education in science learning, it is expected that students will not only gain scientific knowledge but also develop strong personalities and be prepared to face life's challenges. Therefore, character education in science learning plays a vital role in shaping a generation that is not only academically proficient but also possesses high morality and ethics (Harefa, D, 2023).

Although character education has become an integral part of the national education policy, its implementation in science learning still faces significant challenges in practice. Many teachers have yet to fully integrate character values into the learning process, resulting in the affective aspects of students often being neglected. At SMA Negeri 1 Maniamolo, for example, initial observations reveal a gap between the expected character values and students' behavior during learning activities. Furthermore, students' academic achievement in science subjects has not yet reached satisfactory levels, as indicated by

average scores still falling below the Minimum Competency Criteria (KKM).

This issue indicates the need for a more holistic and integrated learning approach, where both character and academic aspects are developed simultaneously. The strategy of integrating character education into science learning is believed to be a solution to promote improvements in student academic performance. Through this approach, learning becomes more meaningful, as students are not only required to master the material but also to internalize positive values throughout the learning process.

According to Sadia (2013), science learning models that integrate character education can be implemented through approaches such as inquiry learning, problem-based learning, cooperative learning, and contextual learning models. Science teachers play a crucial role in developing students' character by selecting appropriate learning models and conducting assessments that support character development. Most science teachers have incorporated character value indicators into their syllabi and lesson plans (RPP), although some have yet to explicitly mention them. Additionally, Yusmarti (2017) emphasizes the importance of integrating character values at every stage of science learning, from the introduction, exploration, elaboration, to confirmation. Thus, students not only acquire scientific knowledge but also develop attitudes and behaviors that reflect the desired character values.

The implementation of character education in science learning also aligns with the scientific approach mandated in the 2013 Curriculum, which includes observing, questioning, reasoning, experimenting, and communicating. Through this approach, students are encouraged to think critically, creatively, and responsibly, which in turn can improve their academic achievement. Therefore, the integration of character education in science learning at SMA Negeri 1 Maniamolo can be a strategic step toward creating a generation that is not only academically intelligent but also possesses strong character and is prepared to face future challenges.

Moreover, the integration of character education aligns with the spirit of the "Kurikulum Merdeka" (Independent Curriculum), which emphasizes the development of the Pancasila Student Profile. This curriculum aims to nurture students who are faithful and devoted to God Almighty, possess noble character, are independent, think critically and creatively, engage in mutual cooperation, and embrace global diversity. Therefore, the strategy of integrating character education into science learning can serve as an effective means to cultivate a generation that is not only academically proficient but also morally and socially exemplary.

Based on the above explanation, it is essential to conduct studies and research on how strategies for integrating character education can be effectively implemented in science learning at SMA Negeri 1 Maniamolo. This research is expected to provide tangible contributions to the development of learning models that not only enhance student academic achievement but also foster sustainable positive character formation.

B. Research Method

This study employed a qualitative approach with a case study design to explore strategies for integrating character education in science learning at SMA Negeri 1 Maniamolo. This approach was chosen because it enables the researcher to gain an in-depth understanding of the context, processes, and dynamics involved in the implementation of character education within science instruction. As stated by (Arifin, 2020), case studies are effective for thoroughly investigating a program, event, activity, process, or group of individuals within a specific context.The data collection techniques employed in this study included in-depth interviews, participatory observations, and documentation. Interviews were conducted with the principal, science teachers, and students to obtain information regarding the implementation of character education integration strategies in science learning (Berkowitz & Bier, 2005). Participatory observation was carried out during the learning process to observe the interactions between teachers and students as well as the application of character values in learning activities (Creswell, 2014). Documentation involved analyzing lesson plans, syllabi, and records of learning activities related to character education. The collected data were analyzed using qualitative data analysis techniques consisting of data reduction, data display, and conclusion drawing. These steps follow the procedures outlined by (Miles et al., 2014), which enable researchers to organize and comprehend data systematically.

With this approach, the study is expected to provide a comprehensive overview of the strategies for integrating character education in science learning and its impact on improving students' academic achievement at SMA Negeri 1 Maniamolo.

C. Research Results

This study revealed that the strategy of integrating character education in science learning at SMA Negeri 1 Maniamolo has had a positive impact on improving students' academic achievement. Through a holistic approach, in which cognitive and affective aspects are developed simultaneously, students not only gain scientific knowledge but also internalize character values that are essential for daily life. This approach integrates mastery of concepts and critical thinking skills with the formation of positive attitudes such as honesty, responsibility, empathy, and discipline. In science learning, the integration of cognitive and affective

aspects enables students not only to understand scientific theories but also to appreciate the relevance of science in social and moral contexts. According to Nasution and (Prasetyo, 2020), a holistic approach is effective in enhancing learning motivation as well as shaping adaptive and ethical student character. Furthermore, research by (Wahyuni and Santoso, 2019) shows that learning which simultaneously combines cognitive and affective aspects can create meaningful and sustainable learning experiences. Therefore, the holistic approach becomes a crucial strategy in character and science education, aiming to prepare young generations who are not only intellectually capable but also emotionally and socially mature.One of the main findings of this study is the increase in students' learning motivation. By integrating character values such as honesty, responsibility, and discipline into every stage of science learning, students feel more engaged and accountable for their learning process. These character values serve as a moral foundation that shapes positive attitudes in students when facing learning challenges, making them more persistent and consistent in developing knowledge and skills. Research by (Setiawan and Wulandari, 2020) demonstrated that character-based learning significantly enhances students' intrinsic motivation in science education. Furthermore, the internalized sense of responsibility helps students actively participate and complete tasks diligently (Putri & Hidayat, 2019). With high learning motivation, the learning process becomes more effective, resulting in improved academic outcomes. Therefore, the integration of character values in science learning not only builds academic competence but also fosters attitudes and motivation that support overall learning success. This aligns with the findings of (Zukmadini et al. 2020), which show that the integration of science literacy and character education can improve teacher competence and student learning motivation.

Furthermore, observations of student behavior during the learning process revealed positive changes in their attitudes and conduct. The integration of character values such as honesty, discipline, and responsibility within the learning process not only enhances learning motivation but is also reflected in students' daily actions. For example, students become more actively engaged, show greater appreciation for the learning process, and demonstrate good cooperation with their classmates. Research by Sari and Wijayanti (2021) found that character education significantly impacts the improvement of positive student behaviors, including discipline and caring attitudes. Teacher observations during contextual learning implementation also revealed that students were able to apply character values in social interactions and task completion, indicating the internalization of these values. This aligns with findings by Prasetyo and

Lestari (2018), which emphasize that learning approaches integrating character contribute to the development of sustainable positive attitudes. Therefore, positive behavioral changes in students serve as an important indicator of the success of character education integration in science learning. Students exhibit more disciplined, honest, and responsible attitudes when completing science assignments. The integration of character values is carried out through various methods, including scientific approaches, problem-solving, and group work, which not only sharpen intellectual abilities but also shape students' attitudes and personalities.

From an academic perspective, the evaluation results indicate an increase in the average student scores in science subjects following the implementation of learning that integrates character values. The incorporation of values such as honesty, responsibility, and discipline into the learning process encourages students to be more focused, diligent, and consistent in understanding scientific concepts. This learning approach, which connects cognitive and affective aspects, has a positive impact on students' academic achievement. A study by Nurhadi and Santoso (2020) found that character-based learning significantly improves students' academic performance in science subjects. Additionally, research by Dewi and Haryanto (2019) revealed that students with high learning motivation and positive attitudes towards learning tend to demonstrate better academic results. This improvement is also influenced by students' active engagement in the learning process, fostering a sense of responsibility and discipline. Therefore, the integration of character education into science learning not only shapes good personality traits but also enhances overall academic achievement.

However, some students still show results below the Minimum Competency Criteria (KKM). This indicates that, although the integration of character education has a positive impact, further efforts are needed to ensure that all students meet the established academic standards. Overall, this study confirms the importance of integrating character education in science learning as a strategy to improve student academic achievement. With the appropriate approach, it is expected that students will be not only academically proficient but also possess strong character, which is a vital asset for facing the challenges of the 21st century.

Discussion

The results of the study on strategies for integrating character education into science learning at SMA Negeri 1 Maniamolo indicate that this approach not only improves students' academic achievement but also cultivates strong and positive character traits. Through the implementation of instructional models that integrate character values, students are expected to develop scientific attitudes encompassing honesty,

responsibility, and discipline throughout the science learning process. These scientific attitudes are crucial as they encourage students to act honestly in data collection, think critically in analyzing information, and consistently and responsibly carry out scientific procedures. Character-based learning models, such as Problem-Based Learning (PBL) and contextual learning, provide opportunities for students to experience these values firsthand in real-life situations. According to research by Yulianti et al. (2020), the integration of character education into science learning effectively enhances students' scientific attitudes, including academic honesty and learning discipline. Furthermore, the sense of responsibility cultivated through this approach assists students in completing tasks and experiments independently and punctually. A study by Kartowagiran and Mardapi (2018) reinforces that character-focused learning fosters a positive learning culture that supports both academic success and moral development. Therefore, integrating character values is a vital component of science education to produce young scientists who are not only competent but also ethic

One of the most effective instructional models for integrating character education is Problem-Based Learning (PBL). This model emphasizes solving real-world problems encountered by students, allowing them to not only acquire scientific knowledge but also to develop critical thinking, collaboration, and a sense of responsibility in seeking solutions. In the context of science education, PBL actively engages students in scientific investigations that are relevant to their daily lives, such as environmental, health, or energy-related issues. This fosters character development, including curiosity, social responsibility, and scientific ethics. Hmelo-Silver (2004) found that PBL effectively enhances higher-order thinking skills and promotes positive attitudes toward learning and teamwork. Furthermore, a study by Fatmawati (2021) in Indonesia confirmed that implementing PBL in science instruction strengthens character values such as discipline, diligence, and empathy. Therefore, PBL represents a strategic approach to fostering meaningful and character-driven science education in the 21st century. According to Sadia (2013), instructional models such as inquiry learning, problem-based learning, and cooperative learning significantly contribute to character development in science education.

In addition, the integration of character values into science learning can also be implemented through a contextual approach that connects subject matter to students' everyday experiences. This approach not only facilitates meaningful understanding of scientific concepts but also instills values such as responsibility, honesty, environmental care, and collaboration. Contextualizing science topics with real-

world issues such as climate change, public health, and the use of renewable energy helps raise students' social awareness and scientific ethics. Research by (Rustaman, 2019) indicates that contextual learning in science is effective in fostering student character, as it encourages critical thinking and moral decision-making grounded in scientific evidence. Moreover, this approach enhances students' emotional engagement with learning, thus optimizing the process of character formation (Mutiani & Faisal, 2020). Consequently, contextual learning becomes a vital strategy for integrating character education into science instruction, particularly in the era of the Merdeka Curriculum, which emphasizes meaningful and holistic learning.

This approach helps students understand the relevance of science within their social and environmental contexts, enabling them to apply scientific knowledge with a responsible attitude toward both the environment and society. By linking science learning materials to real-world issues that students encounter—such as pollution, climate change, and natural resource conservation—students not only learn theoretical concepts but also become aware of the consequences of human actions on the environment. This contextual approach encourages the development of environmental awareness, social responsibility, and critical thinking skills necessary to solve complex problems. Research by Kuswanto and Sari (2021) demonstrates that science education grounded in socio-environmental contexts effectively enhances students' ecological awareness and active participation in environmental preservation. Similarly, Nasution and Hidayat (2019) found that students exposed to this method were better equipped to apply scientific concepts in decision-making processes that prioritize community well-being and sustainability. In addition, Suciati (2020) emphasizes the importance of integrating ethical values into science learning as a means to shape the character of future generations in the digital age of the 21st century.

The implementation of character education in science learning is also aligned with the scientific approach mandated by the 2013 Curriculum, which includes observing, questioning, reasoning, experimenting, and communicating. Through this approach, students are encouraged to think critically, act creatively, and take responsibility, all of which contribute to improved academic achievment. Therefore, integrating character education into science learning at SMA Negeri 1 Maniamolo serves as a strategic step toward nurturing a generation that is not only academically competent but also morally grounded and prepared to face future challenges.

D. **Conclusion**

Based on the findings of this study, it can be concluded that the integration of character education into science learning has a significant impact on improving students' academic achievement at SMA Negeri 1 Maniamolo. This strategy effectively instills character values such as honesty, responsibility, discipline, and cooperation through scientific approaches, problem-based learning, and group collaboration. The integration of these values into the learning process encourages students to be more active, engaged, and responsible in their academic activities. This not only enhances cognitive outcomes but also fosters positive attitudes and behaviors within the school environment. Therefore, an instructional approach that harmonizes affective and cognitive domains proves to be more effective in creating meaningful and sustainable learning experiences.

Recommendations

1. For Teachers

Science teachers are encouraged to continuously develop and implement instructional strategies that integrate character education. This can be achieved through careful lesson planning, the use of contextual learning methods, and assessments that consider students' affective development.

2. For Schools

Schools should provide training and support for teachers in designing instructional models that incorporate character values and in fostering a school culture that promotes character development.

3. For Future Researchers

Further research using quantitative or mixed-method approaches is recommended to obtain more comprehensive data on the effectiveness of this strategy across different subjects and educational levels.

4. For Government and Policymakers

It is essential for the government to strengthen character education policies within the national curriculum and to provide support through teacher training, instructional module development, and systemic evaluation of implementation in schools.

With strong collaboration among teachers, schools, and policymakers, the integration of character education into science learning can be optimally implemented and serve as a foundation for shaping a generation that excels both academically and in character.

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