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Enhancing Elementary School Students' Motivation to Learn Natural Science (IPA) through the Science, Environment, Technology, and Society (SALINGTEMAS) Learning Model

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Abstract
This study aims to increase the motivation to learn Natural Science (IPA) in elementary school students through the Science, Environment, Technology, Society (SALINGTEMAS) learning model. This research was conducted at SD Negeri Sindang III, Majalengka, Indonesia, where the research method used was Classroom Action Research (CAR) with two cycles. In cycle I, meeting II, student learning motivation reached 71%, while in cycle II, meeting II, there was a significant increase to 84%. In addition, observation data of educators' learning actions showed that in cycle I, meeting II the percentage reached 44%, while in cycle II, meeting II, it increased to 78%, exceeding the desired target. Observations of student learning actions also showed an increase, from 66% in cycle I, meeting II, to 88% in cycle II, meeting II, exceeding the target set. Thus, the results of this study indicate that the application of the SALINGTEMAS learning model is effective in increasing the motivation of elementary school students to learn science.

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Introduction

The motivation to learn is a critical factor in the educational process, significantly influencing students' engagement and achievement [1]. In the context of elementary education, fostering a high level of motivation is essential to cultivate a lifelong interest in learning and academic success [2]. Natural Sciences (IPA) as a subject plays a crucial role in developing scientific thinking, environmental awareness, and technological literacy among students [3]. However, traditional teaching methods often fail to engage students effectively, leading to decreased motivation and suboptimal learning outcomes.

In recent years, educational researchers and practitioners have been exploring innovative pedagogical models to address this challenge [4]. One such approach is the Science, Environment, Technology, Society (SALINGTEMAS) learning model, which integrates science education with real-world environmental and technological contexts, and societal issues [5]. This model aims to create a more

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relevant and engaging learning experience by connecting classroom content with students' everyday lives and broader societal concerns.

Previous studies have shown that contextual and integrative learning models like SALINGTEMAS can enhance student motivation and learning outcomes [6]. By linking scientific concepts to practical applications and societal relevance, these models make learning more meaningful and interesting for students. Despite the promising potential of SALINGTEMAS, there is a need for empirical research to validate its effectiveness in different educational settings, particularly in elementary schools [7].

This study aims to investigate the impact of the SALINGTEMAS learning model on the motivation to learn Natural Sciences among elementary school students. Specifically, it seeks to measure the changes in students' motivation levels and evaluate the effectiveness of this integrative approach in enhancing their engagement and interest in the subject. Through a Classroom Action Research (CAR) methodology, this study will provide insights into the practical implementation and outcomes of the SALINGTEMAS model, contributing to the broader discourse on innovative educational practices.

Research Methods

This study employed a Classroom Action Research (CAR) methodology to investigate the impact of the Sains, Lingkungan, Teknologi, Masyarakat (SALINGTEMAS) learning model on the motivation to learn Natural Sciences among elementary school students. The research was conducted at SD Negeri Sindang III, Majalengka, Indonesia. The CAR approach was chosen due to its iterative nature, allowing for continuous observation, reflection, and refinement of teaching practices [8].

A. Research Design

The study was conducted in two cycles, each consisting of four stages: planning, action, observation, and reflection. This design enabled the researchers to implement the SALINGTEMAS model, observe its effects, and make necessary adjustments based on the observations and reflections.

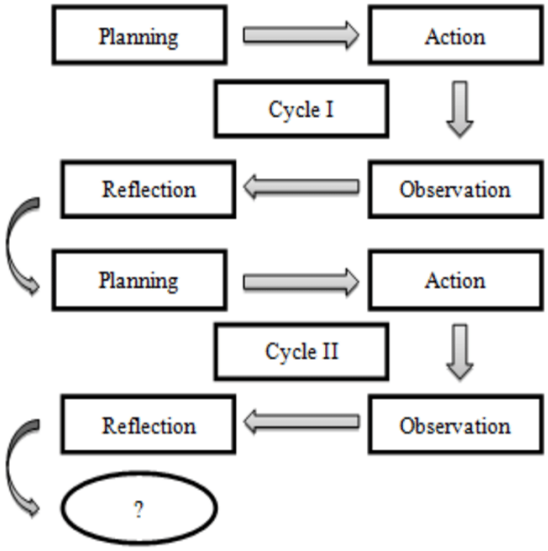

Figure 1. Design of Classroom Action Research (CAR)

B. Participants

The participants of the study were 30 fifth-grade students (15 males and 15 females) and their Natural Sciences teacher at SD Negeri Sindang III. The selection of the class was based on convenience and the teacher's willingness to participate in the research.

C. Intervention

The SALINGTEMAS learning model was implemented over a period of eight weeks, with each cycle lasting four weeks. The intervention included integrating science education with environmental, technological, and societal contexts. The specific activities involved hands-on experiments, environmental projects, the use of technology for research and presentations, and discussions on the societal implications of scientific concepts.

D. Data Collection

Data were collected through a combination of quantitative and qualitative methods:

Motivation Questionnaire: A pre- and post-intervention questionnaire was administered to measure changes in student motivation. The questionnaire included items on interest, engagement, and perceived relevance of Natural Sciences.

Observation Checklist: An observation checklist was used to assess the implementation of the SALINGTEMAS model and its impact on student and teacher actions during the lessons. The checklist included indicators such as student participation, collaboration, and enthusiasm, as well as teacher instructional practices.

Interviews: Semi-structured interviews were conducted with the teacher and a sample of students to gain deeper insights into their experiences and perceptions of the SALINGTEMAS model.

E. Data Analysis

Quantitative data from the motivation questionnaire were analyzed using descriptive statistics to determine the percentage changes in motivation levels between the two cycles. Qualitative data from the observation checklists and interviews were analyzed thematically to identify recurring themes and patterns related to student engagement, teacher practices, and overall effectiveness of the SALINGTEMAS model.

Informed consent was obtained from the students' parents and the participating teacher. Participants were assured of the confidentiality of their responses and the voluntary nature of their involvement. The study was conducted in compliance with ethical guidelines for educational research. This methodological approach allowed for a comprehensive examination of the impact of the SALINGTEMAS learning model on student motivation, providing valuable insights into its effectiveness and potential for broader application in elementary education.

Research Results

The implementation of the Sains, Lingkungan, Teknologi, Masyarakat (SALINGTEMAS) learning model at SD Negeri Sindang III, Majalengka, Indonesia, led to significant improvements in students' motivation to learn Natural

Sciences. The results of this Classroom Action Research (CAR) are presented in terms of quantitative changes in student motivation and qualitative observations of student and teacher behaviors.

A. Quantitative Findings

The motivation questionnaire administered before and after each cycle showed a marked increase in student motivation levels. The data is summarized in Table 1.

Table 1. Student Motivation Levels

Cycle	Meeting	Student Motivation (%)
Cycle I	Second	71%
Cycle II	Second	84%

The initial implementation of the SALINGTEMAS model in Cycle I resulted in a motivation score of 71%. This increased significantly to 84% in Cycle II, demonstrating the effectiveness of the model in enhancing student engagement and interest.

B. Qualitative Observations

Qualitative data from the observation checklists and interviews provided deeper insights into the changes in student and teacher behaviors. These are summarized in Table 2.

Table 2. Observation Checklist Scores

Cycle	Meeting	Teacher Practices (%)	Student Actions (%)
Cycle I	Second	44%	66%
Cycle II	Second	78%	88%

Student Engagement: There was a noticeable increase in student participation, collaboration, and enthusiasm. In Cycle I, students were initially hesitant but became more active as they engaged in hands-on experiments and environmental projects. By Cycle II, students were more proactive in their learning, frequently asking questions and expressing curiosity about the scientific concepts being taught.

Teacher Practices: The teacher's instructional practices improved significantly. In Cycle I, the teacher's use of the SALINGTEMAS model was still developing, with a focus on integrating environmental and technological contexts into the lessons. By Cycle II, the teacher had fully embraced the model, effectively facilitating discussions on societal implications of scientific concepts and incorporating technology to enhance learning.

Student Actions: The observation of student actions showed a similar trend. In Cycle I, 66% of students actively participated in the learning activities. This increased to 88% in Cycle II, indicating a high level of engagement and collaboration among students.

C. Interview Insights

Interviews with the teacher and a sample of students corroborated the quantitative and observational findings. The teacher reported that the SALINGTEMAS model made the lessons more relevant and engaging, helping students connect scientific concepts to real-world contexts. Students

expressed that the hands-on activities and the integration of environmental and technological aspects made learning more enjoyable and meaningful.

In summary, the results of this study demonstrate the effectiveness of the SALINGTEMAS learning model in significantly improving the motivation to learn Natural Sciences among elementary school students. The combination of quantitative and qualitative data provides a comprehensive understanding of the model's impact, highlighting its potential for broader application in educational settings.

Conclusion

The findings of this study indicate that the implementation of the Sains, Lingkungan, Teknologi, Masyarakat (SALINGTEMAS) learning model significantly enhances the motivation to learn Natural Sciences among elementary school students at SD Negeri Sindang III, Majalengka, Indonesia. The Classroom Action Research (CAR) methodology, conducted over two cycles, demonstrated notable improvements in both student and teacher engagement. Specifically, student motivation increased from 71% in Cycle I, second meeting, to 84% in Cycle II, second meeting. Furthermore, the observation of teacher instructional actions improved from 44% in Cycle I, second meeting, to 78% in Cycle II, second meeting, while student actions increased from 66% to 88% over the same period, exceeding the set targets. These results underscore the effectiveness of the SALINGTEMAS model in creating a more engaging and relevant learning environment. By integrating scientific concepts with real-world environmental and technological contexts, the model fosters a deeper connection between students' academic experiences and their everyday lives. This integrative approach not only enhances motivation but also promotes a more holistic understanding of Natural Sciences, preparing students for future academic endeavors and fostering a lifelong interest in learning [9]. The successful application of the SALINGTEMAS model in this study suggests its potential for broader adoption in elementary education. Future research could explore its implementation in diverse educational settings and with different student populations to further validate its effectiveness. Additionally, longitudinal studies could provide insights into the long-term impact of this learning model on student motivation and academic achievement. In conclusion, the SALINGTEMAS learning model represents a promising pedagogical approach for enhancing motivation and engagement in Natural Sciences education. Its contextual and integrative nature makes learning more meaningful and relevant, ultimately contributing to improved educational outcomes and fostering a positive attitude towards science and technology among elementary school students.

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Author Contributions

Ayu Dewi Astiti: conceptualization; formal analysis; methodology; writing-review and editing. Salman Rashid: methodology; writing-original draft; writing-review and editing. Yanti Murni: formal analysis; data curation; methodology.

Muhammad Akbar Chaniago: writing-original draft; writing- review and editing. M. Irfandi: formal analysis; writing-original draft; writing- review and editing.

Availability of data and materials

All data are available from the authors.

Competing interests

The authors declare no competing interest.

Additional information

No additional information from the authors.

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