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Analyzing the Issues of Science Learning Media on the Topic of States of Matter in Elementary Schools

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Abstract

The aim of this research is to evaluate the problems faced in the use of science learning media, especially material material, at the elementary school level. This research uses a qualitative descriptive method and uses data collection methods such as observation, interviews and documentation studies. The research involved fourth grade teachers from five elementary schools in Bandar Baru District. The results of the research show several main problems, namely: (1) limited number of concrete learning media that can show changes in the shape of objects, (2) little variation in learning media that can show abstract concepts about the characteristics of solid, liquid and gas objects, and (3) little use of technology-based learning media to help understanding (4) Teachers' difficulties in developing learning media that suit the characteristics of the material and elementary school students, and (5) The use of learning media is not yet optimal in facilitating active and exploratory learning. Recommendations from this research include: procurement of adequate learning media, training in developing innovative learning media for teachers, as well as optimizing the use of learning media in the science teaching and learning process in elementary schools.

Keywords– *Learning Media, Elementary Science, Forms of Substances, Problem Analysis*

1. Introduction

Natural Sciences (IPA) is an essential subject in the Elementary School (SD) curriculum, aiming to develop students' understanding of their surrounding environment. Science education plays a strategic role in fostering logical, critical, and systematic thinking skills in students from an early age. Through science learning, students are expected to comprehend natural phenomena and develop essential scientific process skills for their lives.

According to Hasanah, Astra, & Sumantri, (2023), instructional media are intermediaries that convey messages or information with instructional objectives or teaching purposes. Issues with science learning media are a significant concern in education, especially at the elementary and secondary school levels. Appropriate learning media can help students understand scientific concepts, which are often abstract. However, various challenges frequently hinder its effectiveness. Hardiansyah, & Wahdian (2023) also state that instructional media are tools that assist teachers in delivering material to students. If instructional media are unavailable or inadequate, the learning process becomes less optimal. Education experts such as Fatra, Darmayanti, & Dhakal (2023) emphasize the importance of utilizing adequate technology to support more effective learning.

In practice, science education at the elementary level still faces significant challenges and issues. Several factors underlying the need to analyze the problems in elementary school science education include:

a. Limited Facilities and Infrastructure

Many elementary schools, especially in remote areas, lack adequate laboratory facilities, teaching aids, and practical materials. These limitations make it difficult for teachers to implement experiment-based learning, resulting in theoretical and less engaging lessons.

b. Teacher Readiness and Competence

Not all elementary school teachers have a specialized background in science. Consequently, their understanding of scientific concepts may be shallow, impacting their teaching methods. Additionally, some

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teachers still rely on lecture and rote-learning methods, which do not encourage students' critical thinking and scientific skills.

c. Lack of Variety in Teaching Methods

Science education requires interactive approaches such as discussions, experiments, and problem-solving. However, in practice, lessons tend to be monotonous, focusing on memorization rather than providing opportunities for students to explore and conduct direct observations.

d. Time Constraints

The allocated time for science lessons in elementary schools is often insufficient to conduct in-depth practical activities or experiments. Additionally, science competes with other subjects in the curriculum, causing teachers to rush through the material.

e. Lack of Environmental Support and Parental Involvement

Optimal science education requires support from the school environment, parents, and the community. Unfortunately, not all parents recognize the importance of science education or provide sufficient support, such as helping students study at home or encouraging them to engage in scientific exploration.

f. Low Student Motivation

Some students perceive science as a difficult and less appealing subject. This perception may stem from teaching approaches that do not align with students' interests and learning styles. The lack of engaging media and activities also reduces students' enthusiasm for learning science.

To address these challenges, innovative efforts are needed in the process of science learning in elementary schools (Boari et.al., 2023; Pradana, & Uthman, 2023; Yusuf, 2023). Teachers should develop creative and engaging teaching methods, such as project-based learning, the use of digital technology, and simple experimental activities. Improving teacher competence through training and providing adequate facilities and infrastructure should also be prioritized.

Additionally, parental and community involvement in the learning process can enhance students' motivation and the relevance of science education to everyday life.

Sanulita et.al. (2024) argues that instructional media should be interactive to enable students to learn more independently and deeply understand concepts. Interactivity allows students to actively participate in the learning process and enhances their comprehension. Fitria (2023) also supports the use of interactive multimedia-based instructional media to improve the quality of science education.

By overcoming these obstacles, science learning in elementary schools can become more effective in shaping a young generation equipped with critical, logical, and scientific thinking skills and a sense of environmental awareness. Sugianto, Darmayanti, & Sah (2023) emphasized that effective learning should be experience-based, where students are directly involved in the learning process through experiments and observations. Science education should include practical activities that allow students to test scientific theories directly. Similarly, Charline, Jo, & Frederic (2023) highlighted that experiential learning helps students better understand abstract concepts.

Building on the background described earlier and narrowing the scope of discussion, the researcher aims to conduct an in-depth analysis of various issues related to the use of instructional media in science learning, particularly on the topic of states of matter at the elementary school level.

2. Method

This research employs a descriptive qualitative approach. To collect data, the researcher conducted school surveys through observation, interviews, and document studies. The descriptive qualitative research method involves several steps, with qualitative descriptive analysis used to process the collected data. The teachers participating in this research are fourth-grade teachers from five elementary schools in the Bandar Baru subdistrict.

The data analysis technique includes the following steps:

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a. Data Reduction: Selecting relevant data.
b. Data Presentation: Organizing the data in a descriptive format.
c. Conclusion Drawing: Interpreting the research findings.

To ensure data validity, source and method triangulation were employed. This methodology is designed to ensure:

a. Comprehensive data collection.
b. In-depth and systematic analysis.
c. Valid and accountable research results.
d. Meaningful findings for improving the learning process.

3. Result and Discussion

The research findings on the issues of science learning media for the topic of states of matter in elementary schools reveal a range of interconnected and complex challenges. One prominent issue is the limited availability of concrete learning media, such as teaching aids for demonstrating changes in states of matter. The number of available tools is often insufficient to accommodate all students, and some media are in poor condition or no longer functional. This problem is compounded by financial constraints that hinder schools from procuring new resources. In addition to availability, the variation of media presents another challenge. The existing tools are inadequate for explaining abstract concepts, fail to cover all subtopics comprehensively, and heavily rely on conventional media, with limited options for interactive learning.

The integration of technology into learning media remains underdeveloped due to teachers' lack of proficiency in utilizing digital tools, limited supporting infrastructure such as electricity and internet access, and the incomplete incorporation of technology into science education. Moreover, teachers face significant difficulties in developing effective media. Time constraints, limited understanding of effective media criteria, and challenges in aligning media with students' characteristics are exacerbated by the lack of training in media development.

Implementation issues further hinder the effective use of learning media. Many teachers struggle to systematically incorporate media into their lessons and face difficulties managing time effectively during its use. Moreover, students' participation in media-based learning activities is often minimal, and media is not optimally used for exploratory learning. These challenges significantly impact learning outcomes, leading to suboptimal conceptual understanding among students, difficulties in connecting theory with practice, and diminished interest and motivation to learn. Consequently, several educational objectives remain unmet.

Administrative and management aspects also pose challenges. Schools often lack systematic inventories for managing media, face difficulties in storing and maintaining tools, and experience inadequate collaboration among teachers regarding media usage. Additionally, the absence of standard operating procedures for media use further complicates the situation. The lack of supporting factors, such as technical assistance, collaboration with external parties, and reference materials for media development, coupled with the underutilization of science laboratories, further exacerbates these problems.

Overall, these findings emphasize the need for a comprehensive approach to address issues related to media availability, teacher competence, supporting infrastructure, learning management, and their impact on learning outcomes. Tackling these challenges will be crucial in improving the effectiveness of science education for elementary school students (Tuhuteru et.al., 2023).

A deep understanding of these findings is essential to formulate effective solutions for enhancing the quality of science education in elementary schools. By analyzing the issues comprehensively, educators and stakeholders can identify the root causes and develop strategies tailored to address specific challenges. This involves improving the availability and variety of learning media, enhancing teacher competencies through training and professional development, and providing adequate technological and infrastructural support. Moreover, systematic management of learning media and fostering active student participation in exploratory activities can significantly contribute to achieving the

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desired learning outcomes. Through a well-coordinated approach, the quality and relevance of science education in elementary schools can be significantly improved, fostering critical thinking, scientific reasoning, and a greater interest in the subject among students.

4. Conclusion

The issues surrounding science education media encompass several aspects that affect the effectiveness of learning. Many learning media are not contextual and lack relevance to students' daily lives, making it difficult for them to grasp the material thoroughly. Additionally, the limited availability of interactive media and practical experiments results in students being less actively engaged in the learning process. Some of the media used are also not aligned with students' cognitive development, especially at the elementary school level. Other challenges include the lack of teacher competence in utilizing technology and digital media, as well as the limited facilities in schools, particularly in remote areas. Experts emphasize the importance of selecting media that cater to students' needs and characteristics, as well as integrating technology to create a more interactive and engaging learning environment. By addressing these issues, it is hoped that science education media can become more effective in enhancing students' understanding and skills.

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