

CHAPTER I

INTRODUCTION

1.1 Background

Natural Sciences is a field of science that studies a series of processes called scientific processes (Muttaqin *et al.*, 2022). In general, science is based on a scientific attitude that produces three main components, namely concepts, principles, and theories that form the foundation of science learning. However, in its application in schools, problems are often encountered in the form of students' lack of understanding of science concepts, which can result in low learning outcomes. One of the causes is the low participation of students in learning activities, which makes students feel bored and less interested in the topic and learning activities being carried out (Ahmad, 2021).

The use of ineffective or unengaging learning media can cause students to become passive and bored, which negatively affects their learning outcomes. When students are not actively involved, their understanding of the material becomes superficial, leading to lower retention and poor performance on assessments (Suryani & Wulansari, 2023). Learning media are essential for clarifying topics, boosting interest, and creating interactive experiences that enhance learning (Ramadani *et al.*, 2023). However, monotonous or irrelevant media can decrease motivation, increase boredom, and hinder student engagement (Risanatul & Junaidi, 2022; Susanti *et al.*, 2024). Therefore, using interactive and engaging media, such as simulations or technology, is crucial for improving student participation and overall learning outcomes (Hasan *et al.*, 2021; Nurfadhillah *et al.*, 2021).

Based on interviews with a science teacher at SMP Negeri 27 Medan, the science learning process especially on the topic of Indonesian Biodiversity faces several challenges despite the implementation of the Merdeka Curriculum, which allows flexibility in teaching methods and materials. Teachers use textbooks, digital media, videos, and discussions, yet some students struggle to understand concepts through static images or videos alone due to their varying levels of comprehension and limited visualization skills. The students, who are audio, visual and kinesthetic

learners, respond better to hands-on activities, interactive tools, and contextual learning that connects lessons to real-world experiences. Result of these challenges, many students achieve low learning outcomes, as reflected in their daily test scores, responses to exercises, and science exam results, which often fall below the Minimum Competency Criteria. This indicates a need for more engaging and effective teaching strategies to address diverse learning styles and improve academic performance.

Observations to students at SMP Negeri 27 Medan also revealed that students have a high interest in science subjects (80.5%), but the availability of learning media that supports active participation remains low (47.4%), which has resulted in suboptimal understanding of Indonesian biodiversity (51.8%). The students tend to be enthusiastic yet passive learners, characterized as visual and interactive learners who respond better to innovative media such as visual aids, educational games, and interactive technology. The lack of engaging learning media makes lessons monotonous, hindering deeper exploration of concepts and the connection between theory and practice. The high demand for interactive learning media (85.8%) highlights the urgent need for tools that foster active participation, critical thinking, and independent exploration, enabling students to optimize their interest and achieve a deeper understanding of the material.

One of the media that is expected to create enjoyable science learning for students is monopoly learning media. Monopoly media was chosen for use in the learning process because monopoly is a game that is widely liked and usually played by students and is easy to play (Suciati *et al.*, 2019). Monopoly media has several advantages, including being a game that has been known to students since they were little and fun to do, being able to make students active in learning, providing direct feedback to students, and having rules that are easy for students to understand (Cahyani *et al.*, 2020).

Several studies have highlighted the effectiveness of modified monopoly games as learning media for science education. Damayanti *et al.* (2021) developed Monoicado, a modified monopoly game aimed at improving students' understanding of light and optical instruments, and it significantly improved student learning outcomes, with an 85.62% positive response. Similarly, Laliyah *et al.*

(2021) adapted monopoly for Solar System topic, achieving high validation scores and improving students' understanding of concepts that require memorization. Cahyani *et al.* (2022) created a monopoly-based educational tool focused on environmental conservation, which received score of 81.45%. Aryani *et al.* (2021) developed a monopoly game for cell topic, which was validated as practical and effective, with student responses scoring 83,5%. Lastly, Sabono *et al.* (2023) used monopoly to improve students' mastery of optical instruments, achieving a high gain value of 0.77, confirming its effectiveness in enhancing physics learning.

The Monopoly learning media developed in this research will feature a rectangular design with an attractive image arrangement, tailored to the Indonesian Biodiversity topic for Class VII Junior High School students. Indonesian Biodiversity topic was chosen due to its complexity and abstract nature, which can be challenging for students, especially when learning about the distribution of flora and fauna and the threats to biodiversity in Indonesia. The development will follow the Research and Development method using the ADDIE model, which ensures a systematic and structured approach, allowing for revisions at each stage to create a more effective and relevant product (Basyar, 2020).

The monopoly media also will incorporate QR Code technology, which will link students to additional learning resources such as videos, animations, and articles, enhancing their understanding of key concepts in Indonesian Biodiversity which comes from various sources or platforms that have been adapted to the indicators and learning objectives. QR Code technology was chosen because it is simple, accessible, and cost-effective, allowing students to connect directly to diverse multimedia content using smartphones or tablets, which aligns with their familiarity and interest in digital tools. Given that the majority of students are visual and kinesthetics learners, QR Codes provide an interactive experience by bridging traditional learning with modern technology, enabling students to explore materials independently and actively engage with the content (Riansah, 2021).

The monopoly will combine a hard-copy board game with digital resources accessed via QR Codes, providing a hybrid approach that enhances engagement and understanding. Students interact with the physical board game while scanning QR Codes to access information. Monopoly media utilizes the cooperative learning

model, where students collaborate in small groups to achieve shared learning goals. The choice of cooperative learning is based on its alignment with the Merdeka Curriculum, which emphasizes active, student-centered learning that develops critical thinking, communication, and teamwork skills (Sumilat *et al.*, 2023). Combining tactile gameplay, digital resources, and cooperative learning, this approach offers an innovative, student-centered way to deepen understanding of Indonesian Biodiversity concepts.

Based on the description above, the researcher is interested in conducting research with the title "*Monopoly Development Using QR Code Technology as A Science Learning Media on the Topic of Indonesian Biodiversity at SMP Negeri 27 Medan*".

1.2 Problem Identification

According to the research background, the following problems can be identified:

1. Lack of students' understanding of the science concept.
2. The lack of active participation in science lessons.
3. The use of monotonous or ineffective learning media cause student become passive and bored that affects their learning outcomes.
4. The lack of availability of interactive learning media to increase student understanding due to their diverse comprehension levels and limited visualization skills.
5. The high demand for interactive and engaging learning media that can foster active participation, critical thinking, and deeper understanding of the topic like Indonesian Biodiversity.

1.3 Scope

The scope of this research is as follows:

1. The research will focus on the development of learning media in the form of a monopoly game equipped with QR Code technology and Indonesian Biodiversity topic.
2. The monopoly media to be developed is aimed for grade VII students at SMP Negeri 27 Medan.

3. The research follows the ADDIE (Analysis, Design, Development, Implementation and Evaluation) development method.

1.4 Problem Limitation

The problem limitations in this research are as follows:

1. The research will only develop learning media in the form of a monopoly game equipped with QR Code technology and the topic discussed in this research is limited to concepts related to Indonesian Biodiversity.
2. The research will only include validation by content experts, media experts and assessments expert, and limited trials on science teachers and a number of grade VII students to see student responses related to the use of monopoly media and increasing the learning outcomes on the topic of Indonesian Biodiversity.
3. The measurement of student's learning outcomes in this research limited to the cognitive aspect.

1.5 Formulation of the Problem

The formulation of problems in this research are as follows:

1. How is the design of the development of monopoly learning media assisted by QR Code technology on the topic of Indonesian Biodiversity at SMP Negeri 27 Medan based on content experts, media experts and assessments expert?
2. How do teacher and students respond to the development of monopoly learning media assisted by QR Code technology on the topic on Indonesian Biodiversity at SMP Negeri 27 Medan?
3. Is there an improvement in students' learning outcomes on the topic of Indonesian Biodiversity after using Monopoly learning media integrated with QR Code technology at SMP Negeri 27 Medan?

1.6 Research Objectives

The objectives of this research are as follows:

1. To develop a monopoly learning media design assisted by QR Code technology on the Indonesian Biodiversity topic at SMP Negeri 27 Medan based on content experts, media experts and assessments expert.
2. To analyze teacher and students' responses to the development of monopoly learning media assisted by QR Code technology on the topic of Indonesian Biodiversity at SMP Negeri 27 Medan.

3. To determine the improvement in students' learning outcomes on the topic of Indonesian Biodiversity after using Monopoly learning media integrated with QR Code technology at SMP Negeri 27 Medan.

1.7 Benefits of Research

This research aims to enhance the learning process by introducing engaging and innovative educational media, ultimately improving students' academic outcomes. By integrating technology into instructional tools, such as QR Code-assisted Monopoly learning media, this study addresses challenges in understanding complex topics like Indonesian biodiversity. This approach not only strengthens student engagement and comprehension but also creates a more interactive and enjoyable learning experience.

Furthermore, this research serves as a foundation for future studies on the development of interactive, technology-based educational tools. The findings offer valuable insights into the effective use of modern learning media to enhance student performance, particularly in science education. By demonstrating the potential of blending traditional and digital learning methods, this study contributes to ongoing efforts to innovate and refine teaching strategies for 21st-century learners.