Chapter 1 Introduction

1.1. Background

Mathematics learning in elementary schools, especially concerning fractions, often becomes a challenge for 5th-grade students. Difficulties in understanding fraction concepts lead to low interest and motivation in learning. Therefore, innovation in learning that utilizes technological advancements in the current digital era is necessary[1].

Based on observations conducted on 20 5th-grade students at MI Ma'arif Surodikraman, it was found that students' interest in fraction material in Mathematics is still quite low. Out of the total 20 students observed, only 8 students (40%) expressed liking the fraction material, while 10 students (50%) admitted they did not like the material, and the remaining 2 students (10%) stated they strongly disliked fractions. This study indicates that most students are not interested in fraction materials, potentially affecting their understanding and learning outcomes. This suggests the necessity for developing more engaging and innovative learning media to enhance students' interest and understanding of fraction concepts.

The concept of conventional learning, such as using textbooks and images, basically has the advantage of direct interaction between teachers and students. However, this method often lacks the ability to attract optimal interest and attention from students, especially in subjects considered difficult, like fractions[2]. With the advent of multimedia and gamification-based learning applications, student engagement in the learning process can be significantly enhanced. This media not only provides more appealing visualizations but also offers a more interactive learning experience, thus motivating students to be more active in understanding the material[3]. Gamification method is an educational approach that integrates game

[1] Nur Fadhilah Amir and Andi Andong, "Kesulitan Siswa Dalam Memahami Konsep Pecahan," *Journal of Elementary Educational Research* 2, no. 1 (2022): 1–12, https://doi.org/10.30984/jeer.v2i1.48.

[2] Atikah Zahrani Purba et al., "Gamifikasi Dalam Pendidikan: Meningkatkan Motivasi Dan Keterlibatan Siswa," *Maximal Journal: Jurnal Ilmiah Bidang Sosial, Ekonomi, Budaya Dan Pendidikan* 1, no. 5 (2024): 1–7, https://malaqbipublisher.com/index.php/MAKSI.

[3] Dhiya Rahma, Nada Nupus Ihwani, and Nadila Sofia Hidayat, "Pengaruh Penggunaan Media *Digital* Sebagai Media Interaktif Pada Pembelajaran Dalam Meningkatkan Motivasi Belajar Siswa,"

elements into the learning process. The goal of this method is to enhance students' motivation, engagement, and learning experience through elements such as challenges, points, levels, rewards, and feedback in a fun manner. Thus, learning becomes more appealing and encourages active student participation[4].

This research focuses on developing a fraction-based Android learning media application by applying gamification methods. The application of gamification is expected to create a more interactive and enjoyable learning experience for students. Moreover, the developed learning media should incorporate concepts that attract interest and increase students' willingness to learn actively, thereby significantly boosting user engagement in the learning process[5].

This is an effort to make e-learning delivery more engaging, requiring a combination of educational elements with entertainment[6]. Additionally, care must be taken to ensure that gamification elements do not dominate, so the main learning objectives are not overshadowed by the game aspect. This study is titled "Development of Android-Based Fraction Mathematics Learning Media Application for 5th Grade Elementary Students with Gamification Method." Its purpose is to design an interactive and enjoyable learning media to improve students' understanding and motivation. This application allows students to learn actively, flexibly, and receive immediate feedback through the gamification approach.

With this approach, students are expected to understand the concept of fractions more clearly, concretely, and efficiently. Interactive learning through Android-based media and gamification methods enables students to learn in a way

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[4] Yogi Ageng Sri Legowo, "Gamifikasi Dalam Pembelajaran Di Sekolah Dasar," *JISPE: Journal of Islamic Primary Education* 3, no. 1 (2022): 13–30, https://doi.org/10.51875/jispe.v3i1.43.

[5] CI Cristina Ioana Muntean, "Raising Engagement in E-Learning through Gamification," *The 6th International Conference on Virtual Learning ICVL 2011*, no. 1 (2011): 323–29, http://icvl.eu/2011/disc/icvl/documente/pdf/met/ICVL_ModelsAndMethodologies_paper42.pdf.

[6] Isnanto Adi Prasetyo and Senie Destya, "Penerapan Konsep Gamifikasi Pada Perancangan Aplikasi Pembelajaran Al-Qur'an," *Seminar Nasional Teknologi Informasi Dan Multimedia 2016*, 2016, 6–7.

that suits their learning styles, while also enhancing engagement and comprehensive understanding of the material[7].

This application is also designed by embedding Islamic values, making learning a part of worship. Honesty is instilled through challenges that encourage students to solve them with their own efforts. In addition to understanding fractions, students are also guided to apply Islamic values, in line with the objectives of Islamic education which emphasizes noble character and spiritual awareness[8], with full awareness students have applied the values in accordance with the principles of Islamic education.

From an Islamic perspective, the learning process is an integral part of the effort to preserve and develop the mind *(Hifzh al-Aql),* one of the main goals of Sharia. The mind is a gift that distinguishes humans from other creatures and its use in seeking knowledge is viewed as a form of obedience. By optimizing the mind through education, humans can elevate their status in the eyes of Allah.

Therefore, the development of modern and interactive learning media, such as an Android application with gamification features, is an effort in line with this principle. This media not only facilitates the transfer of knowledge but also optimizes the potential of students' minds by making the learning process more structured, engaging, and enjoyable. Thus, this application contributes to elevating a person's status by enhancing their thinking capacity and understanding of knowledge.

On the other hand, conventional learning methods that are text and image-based, while still having the advantage of direct interaction between teachers and students, tend to be unable to fully capture the attention of students who are accustomed to a digital environment. Therefore, a learning approach that balances

[7] Gabriel Gaspersz, Juliana Selvina Molle, and Magy Gaspersz, "Analisis Kemampuan Pemahaman Konsep Pecahan Pada Siswa Smp," *Atom : Jurnal Riset Mahasiswa* 1, no. 1 (2023): 33–43, https://doi.org/10.30598/atom.1.1.33-43.
[8] M Aditiya Silvatama et al., "Penguatan Sikap Religius Siswa Melalui Pembelajaran Matematika Bermuatan Nilai Islam," *Educativo: Jurnal Pendidikan* 2, no. 1 (2023): 211–21.

educational and entertaining elements is needed, so that learning is not only informative but also entertaining and encourages active engagement.

1.2. Problem Formulation

The problem statement can be summarized as follows:

The low interest of 5th-grade elementary school students in fraction topics leads to a low motivation to learn the material, resulting in most students being less interested in studying it, which potentially affects their learning outcomes.

1.3. Research Objectives

The objectives of this research include:

Developing an Android-based Fractional Mathematics Learning Media Application for 5th Grade Elementary School Students using Gamification as an innovative approach in learning media.

1.4. Problem Limitation

This research has more specific problem limitations to ensure focus and efficiency, which include:

1. This application only focuses on fraction materials covering sub-chapters on the introduction to fractions, comparing and ordering fractions, as well as addition and subtraction operations on fractions, and is developed based on Android.
2. The design and features of the application are limited to educational games that are relevant to the applicable curriculum.
3. The focus of the research is on application development and small scope trials at MI Ma'arif Surodikraman Ponorogo school.

1.5. Benefits of Research

The benefits that the author expects from this research are as follows:

a. For the author

This research provides an opportunity for the author as a student understanding to:

- Deepen the understanding of the concept of gamification in education, especially in the context of learning mathematics in elementary school.
- Improve skills in designing and developing Android-based applications, including in terms of interface design, interactivity, and learning content integration.
- Apply the knowledge gained during lectures into real projects that contribute to the world of education.

b. For Readers

- This application can be an alternative learning media that is interesting and fun, so that it can improve understanding of fraction material more interactively.
- This media can be used as a tool that supports the teaching and learning process in the classroom, and helps teachers in delivering material in a more varied and contextual way.
- This application can also serve as a means of learning companion at home that is both educational and fun for students.

c. For Institutions

- This research can be used as a reference or inspiration in developing technology-based learning media in the school environment.
- Provide an overview of the importance of integration between technology, curriculum, and Islamic values in an effort to improve the quality of learning.
- Encourage schools to be more open to digital learning innovations that suit the characteristics of students in the modern era.

1.6. Systematics of Discussion

This research will use the following systematic writing:

Chapter 1 Introduction

- 1.1. Background
- 1.2. Problem Formulation
- 1.3. Research Objectives
- 1.4. Problem Limitation
- 1.5. Research Benefits
- 1.6. Systematics of Discussion

Chapter 2 Literature Review

- 2.1. Previous Research
- 2.2. Literature Review / Theoretical Foundations

Bab 3 Research Methodology

- 3.1. Activity Plan
- 3.2. Tools and Materials
- 3.3. Research Stages

Chapter 4 Results and Discussion

- 4.1. Android Application Development
- 4.2. Application Design Result
- 4.3. Testing
- 4.4. Discussion

Bab 5 Closing

- 5.1 Conclusion
- 5.2. Suggestions

Bibliography

Attachment