

CHAPTER I. INTRODUCTION

1.1 Research Background

The digestive system is a system that functions to process food into nutrients that the body can absorb. The organs are connected to the human digestive process. Starting from entering food or liquid into the body, it is then digested into small pieces that enzymes in the body can use. Enzymes chemically digest these pieces of food to produce nutrients that will be absorbed and transported throughout the body. This system also plays a vital role in human digestion to ensure that all food and liquids ingested through the mouth can be converted into nutrients and chemicals that the body can use to produce human energy.¹

Allah SWT gives gifts to his servants in the best possible form so humans can carry out daily activities. The organs in the human body are created and integrated according to their respective functions. Therefore, humans must keep their bodies healthy by paying attention to the food and drinks they consume in moderation and choosing halal and *tayyib* food ingredients², as Allah says in the Qur'an letter 'Abasa,' verse 24.

فَلْيَنْظُرِ الْإِنْسَانُ إِلَى طَعَامِهِ ﴿٢٤﴾

Meaning: So, let a man be mindful of his food ('Abasa: 24)³

This shows that Allah created everything, starting from the little things around us. But sometimes humans are negligent of what has been given by Allah SWT.

Information technology continues to develop rapidly. This development is driven by scientific innovations that are created to make it easier for humans to live their daily lives. Technological advances must also be addressed wisely so that they can have a positive impact in various aspects, especially in the field of education.⁴ Entering the era of society 5.0, where people from multiple sectors are required to

¹ Khairunisa Ramadhani and Rachmawati Widyaningrum, *Dasar-dasar Anatomi dan Fisiologi Tubuh Manusia Bagi Mahasiswa Gizi dan Kesehatan* (UAD PRESS, 2022).

² Faizah Nur, M. Rezeki Muamar, and Maulida Sari, "Sistem Pencernaan (Zat Makanan, Alat Alat Sistem Pernafasan Proses Pencernaan, Dan Menjaga Kesehatan Organ Pencernaan)," *Modul Digital Konsep Dasar Sains I Berbasis Qurani Program Studi PGSD*, 2020, Topik 6.

³ "Surat 'Abasa: Arab, Latin dan Terjemah Lengkap | Quran NU Online," n.d., <https://quran.nu.or.id/abasa>.

⁴ Umi Samsiyanawati et al., "The Influence of Augmented Reality (AR) Based Learning Media on Elementary School Students' Learning Interest in Human Digestive System Material," *Social, Humanities, and Educational Studies (SHES): Conference Series* 6, no. 3 (November 30, 2023), <https://doi.org/10.20961/shes.v6i3.82352>.

interact with technology, is a challenge, especially for teachers and lecturers, to continue to innovate to provide the best education at school.⁵ One proof of technological advancement today is using technology as a creative, educative, and innovative learning medium. Incorporating technology tools into the curriculum is part of good education. Technology provides a way to increase student and teacher participation and interest in teaching and learning activities.

One of the information technologies that is growing quite rapidly in the world of education is Augmented Reality. With AR, students can experience the world of digital information by combining circumstances in the real world and the virtual world.⁶ So, users will not feel a striking difference when interacting with AR compared to what is seen or felt in the real world.⁷ Augmented reality has an excellent opportunity to develop learning media while introducing technological developments to students and teachers.⁸ Materials in the field of education can be applied in the form of 3D models that allow students to interact with objects in the material. This can be used with AR media to teach the digestive system in educational games.

Educational games are a type of media that aims to provide learning and expand the knowledge of its users through unique and engaging media. Gamification can be used to increase motivation in both informal and formal formats.⁹

Researchers surveyed respondents regarding the learning of the digestive system and Augmented Reality media by conducting interviews in questionnaires with Biological Science teaching teachers. Based on interviews with teachers teaching Biological Science subjects MTs. Al-Kautsar Depok, researchers found responses to questions about obstacles in teaching and learning activities, the effect

⁵ “Mengenal Revolusi Industri 5.0,” n.d., <https://www.djkn.kemenkeu.go.id/kpkn-lahat/baca-artikel/16023/Mengenal-Revolusi-Industri-50.html>.

⁶ Mohammed A. M. AlGerafi et al., “Unlocking the Potential: A Comprehensive Evaluation of Augmented Reality and Virtual Reality in Education,” *Electronics* 12, no. 18 (September 20, 2023): 3953, <https://doi.org/10.3390/electronics12183953>.

⁷ Andani Achmad, Zahir Zainuddin, and Muhammad Fadhil Husain, “Augmented Reality 3D untuk Pengenalan Organ Tubuh Manusia,” *ILKOM Jurnal Ilmiah* 12, no. 3 (December 29, 2020): 233–40, <https://doi.org/10.33096/ilkom.v12i3.680.233-240>.

⁸ Kusuma Dewi and Alfi Sahrina, “Urgensi augmented reality sebagai media inovasi pembelajaran dalam melestarikan kebudayaan,” *Jurnal Integrasi dan Harmoni Inovatif Ilmu-Ilmu Sosial (JIHI3S)* 1, no. 10 (October 25, 2021): 1077–89, <https://doi.org/10.17977/um063v1i10p1077-1089>.

⁹ Selia Aysiah et al., “Desain Game Edukasi Bertema Penerapan Akhlakul Karimah Menggunakan Framework Mechanics Dynamics Aesthetics,” 2020.

on the quality of the teaching and learning process, and the lack of learning media. Teachers stated that the limitations of teaching aids are an obstacle to explaining scientific concepts visually and interactively to students. In addition, the limited teaching aids also limit creativity in delivering materials and learning based on hands-on experience. There are 31 out of 47 students from class 8 of MTs Al-Kautsar Depok who are highly interested in learning about the digestive system. Still, few of them struggle to understand the digestive system material. Some of them like learning methods in the form of visual media and educational games rather than classroom discussion methods. Learning media helps students understand an abstract concept to be concrete by visualizing the material of the digestive system interactively.

Based on the facts above, researchers intend to use augmented reality-based technology to learn about the digestive system. Researchers use the MDA Framework method to implement an essential framework that improves the effectiveness of game design by providing a structured approach to analyzing and designing games.¹⁰ The author plans to develop an AR technology application to learn about the digestive system using a learning game base. This human digestive system learning game application uses Augmented Reality technology to provide an enjoyable learning experience by visualising Digestive System learning at school.

1.2 Research Problem

- a) Limited teaching aids and learning media in the Biology Science subject of class 8 SMP / MTs Al-Kautsar Depok about the human digestive system

1.3 Research Limitation

- a) This application is designed to learn the human digestive system, from the entry of food or liquid objects that pass through the mouth to the final process of food processing in the augmented reality-based body.
- b) Applying the marker-based AR method in its creation

¹⁰ Tan Guo Xin, "The Framework of a Game Design (MDA Framework)," *Technical University of Malaysia* Malacca, 2022, https://www.researchgate.net/publication/360018773_The_Framework_of_a_Game_Design_MDA_framework.

- c) Display objects in the form of digestive system organs equipped with an explanation of the functions of the digestive organs and the processes that occur in them
- d) This application is only as a support for learning media for grade 8 students of SMP / MTs Al-Kautsar Depok
- e) Referring to the Science-Biology Class 8 SMP / MTs Subject Book
- f) The software used is based on Unity, 3D Blender, Adobe Illustrator
- g) Applications can only be used on Android mobile devices
- h) Designed with the MDA Framework method.

1.4 Research Objectives

- a) Apply augmented reality technology with the MDA framework method in biological science learning media as an engaging learning medium in the form of digestive system games.

1.5 Research Benefits

- a) For Researchers

This research benefits researchers by providing experience related to learning biology, especially in the digestive system. It can also be implemented into Augmented Reality technology through learning games to develop knowledge from lectures and outside lectures.

- b) For Students and Teachers

This research is expected to be able to study anatomy in Biology Science subjects, especially in the digestive system material with more interaction. It is hoped that with this research, the teacher can more easily provide explanations to teach students about the material of the human digestive system.

- c) For Teaching Schools

This research is expected to be useful for schools, as it will help them make student learning facilities more interactive and introduce Augmented Reality technology for teaching students.

- d) For Researchers After

Hopefully, this research will serve as a reference and a stepping stone for better research in subsequent studies.