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Interactive Learning Application for Introduction to Healthy Lifestyle for Elementary Schools at Panca Budi Elementary School, Medan

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ABSTRACT

This study aims to develop an interactive learning application about healthy lifestyles for elementary school students at SD Panca Budi Medan. The background is the importance of healthy lifestyle education from an early age, which affects the physical and mental development of children. However, conventional learning methods are often less interesting for students, so innovation is needed. This study uses the Multimedia Development Life Cycle (MDLC) method, which consists of the stages of conception, design, material collection, assembly, testing, and distribution. The application developed has an easy-to-use interface, with various menus such as quizzes, materials, and instructions. Application testing using Black Box Testing ensures that all features, including buttons, navigation, and material content, run well. The test results show that the application is effective in helping students understand healthy lifestyles in an interactive way, as well as increasing their interest in learning. This application offers an interesting and fun learning experience, and can function as a relevant and useful teaching aid in improving students' understanding of the importance of maintaining health and cleanliness. Overall, this study shows that this Android-based application is effective in delivering healthy lifestyle material in an interesting and easy-to-understand way for students.

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1. INTRODUCTION

It is very important for elementary school children to adopt a healthy lifestyle from an early age because now they are forming habits that will affect their health in the future. If children start adopting healthy habits, they can stop the chain of disease transmission[1]. Lack of knowledge and awareness of healthy lifestyles at school age can increase the risk of various health problems later in life, such as obesity, non-communicable diseases, and weak immune systems. Implementing a healthy lifestyle, such as eating nutritious foods (vegetables and fruits), exercising regularly, and getting

enough rest, plays an important role in maintaining children's immunity [2][3]. The habit of maintaining cleanliness, such as washing hands with soap, is effective in preventing infectious diseases and supporting overall health. A healthy lifestyle not only strengthens the immune system, but also supports physical growth and mental development[4], so that children grow up more active and enthusiastic. In addition, healthy habits that are implemented from an early age form an independent character and awareness of the importance of health in the long term[5].

Conventional methods for health education, such as lectures or textbooks, are often ineffective in attracting students' attention, as they prefer interactive approaches that use technology. Conventional learning is often considered less effective because it tends to be monotonous, which can result in a decrease in students' enthusiasm for learning. Its less interesting nature and minimal interactive elements make students feel less involved, so that their interest in learning tends to decrease. This has the potential to hinder the achievement of educational goals, because a lack of enthusiasm for learning can reduce students' understanding of the material presented and reduce the effectiveness of the overall learning process [6]. To overcome these challenges, this study focuses on the development of an interactive Android-based learning application designed to introduce healthy lifestyles in a more interesting and enjoyable way. This application is built using the Unity game engine, which allows for interactive graphic displays and easy-to-use features for children. The method applied in the development of this application is the Multimedia Development Life Cycle (MDLC), a multimedia development method that is divided into six stages, namely concept, design, material collecting, assembly, testing, and distribution. MDLC was chosen because of its flexibility in combining various multimedia elements such as animation, sound, and images, which can help convey health material in an interesting and easy-to-understand way for elementary school students[7].

Several previous research that can be used as a basis for this study, as well as the method used for the first time, are studies by Fauzan Febriansyah & Sumaryana, (2021), this study aims to develop interactive multimedia-based learning applications for grade 1 elementary school students using the Multimedia Development Life Cycle (MDLC) method. This MDLC approach involves six main stages: concept, design, material collection, creation, testing, and distribution. The application results of the development include interactive learning materials, videos, quizzes, and games, with animated displays, sound, and videos created using Adobe Flash CS6 Professional. Testing was carried out using the black box method and questionnaires filled out by 17 elementary school teachers, resulting in a very good assessment with a satisfaction level of 92.92%, which shows the effectiveness of the application in supporting the learning process of students Fauzan Febriansyah & Sumaryana, (2021). Another study written by A, this study aims to develop multimedia-based learning media for mentally retarded children in grade V, using Contract 2 software, which includes the introduction of numbers from 1 to 100 and calculations up to 2012. The development process follows the Multimedia Development Life Cycle (MDLC) method, which consists of the stages of concept, design, material collection, assembly, testing, and distribution. Media testing was carried out using the black box method and questionnaires, showing positive results with a questionnaire approval rate of 42.5, which is considered feasible to use. In conclusion, this learning media has succeeded in increasing the enthusiasm and understanding of mentally retarded students in learning numbers and calculations, and is designed to be accessible on Android devices, allowing parents to accompany their children to study at home[8].

In addition, this application has features such as interactive quizzes, educational materials, and visual and text instructions that can be accessed independently by students. With this learning application, it is expected that students of Panca Budi Elementary School Medan can more easily understand and practice healthy lifestyles in their daily lives. In addition, this application can be a tool for teachers in delivering health materials more effectively and interactively, and is expected to be a model in the development of health education materials at other elementary school levels. Based on the explanation of the background of the problem above, the topic or title taken in this study is "Interactive Learning Application for Introduction to Healthy Lifestyle Patterns at Elementary School Level at Panca Budi Elementary School Medan".

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2. RESEARCH METHOD

2.1 Research Objects and Subjects

The object of research in this study is an interactive multimedia-based learning application that uses digital technology as an educational medium to improve students' knowledge about healthy lifestyles. The subjects of the study were students in grades IV and V at SD Panca Budi Medan. The selection of grades IV and V as research subjects was based on their age characteristics which are in the optimal cognitive development stage to understand the basic concepts of healthy lifestyles.

2.2 Research Tools and Materials

Software

Table 1 Required software specifications

No	Software	Function
1	Unity 3D	Used as the main platform for developing interactive learning applications with multimedia-based visual and interactive features.
2	Canva	Used for creating and processing images, icons, and other visual assets used in applications.

Hardware

Table 2 Minimum hardware specifications required

No	Hardware	Specification	Function
1	Laptop	Intel Core i7, RAM 8GB, INTEL HD Graphics 4000	Used for application development, running Unity software and graphics editing.
2	Smartphone Android	Android OS 9.0 atau lebih tinggi, RAM 4GB	Used for testing applications on devices commonly used by students, ensuring optimal compatibility and performance.

Material

Table 3 Reseach Materials

No	Material	Function
1	Health Learning	Contains information about healthy lifestyles taken from textbooks and sources from the Ministry of Health. Used as content in the application.
2	Educational Images	Visuals and audiovisuals that explain healthy lifestyles, such as how to wash your hands, the importance of exercise, and balanced nutrition.
3	Evaluation Questionnaire	Used to measure student understanding after using the application, which will be filled in before and after learning.

2.3 Research Stages

This study uses the Multimedia Development Life Cycle (MDLC) method, which consists of six main stages: Problem Identification, Data Collection, Design and Development, Testing, and Distribution[9][10]. Each stage is carried out sequentially and in a structured manner to achieve the research objective, namely to create an effective and efficient application in supporting the learning process.

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Figure 1 Research Stages

3. RESULTS AND DISCUSSION

In this study, the interactive learning application aims to introduce healthy lifestyles to elementary school students at SD Panca Budi Medan.

3.1. Application View

This application consists of several main menus designed to support the interactive learning process. Each menu has different functions and purposes, with the main focus on supporting student learning about healthy lifestyles.

3.1.1 Initial Menu View

The main menu presents the main options for users to start a quiz or view the materials available in the application. The design emphasizes clarity and ease of navigation so that students can quickly select options. This menu is the central point of the application, providing direct access to key features that support learning.

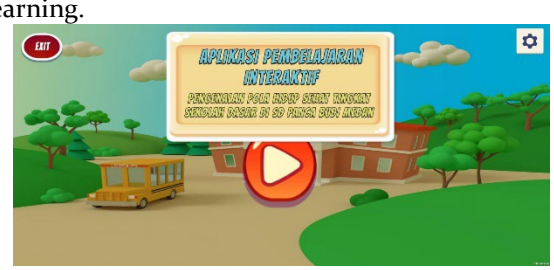

Figure 2 Initial Menu View

3.1.2 Settings Menu View

The "Settings" menu provides settings that allow users to adjust some features of the application, such as sound settings. In this menu, there is a button to turn the sound on or off, as well as a button to return to the main menu. This menu allows students to control their interactive experience by adjusting their preferences, especially in terms of the sound that accompanies the materials and quizzes.

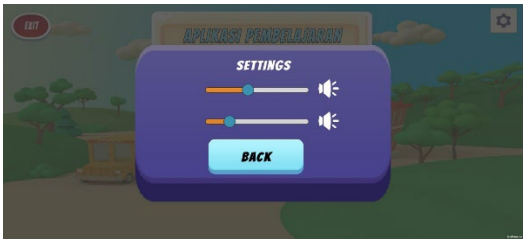

Figure 3 Settings Menu View

3.1.3 Main Menu View

The Main Menu display serves as the main gateway to access all application features. Here, users are given the option to enter various menus such as "Materials," "Quiz," and "Instructions."

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This display is designed to be simple but attractive so that students can easily understand and select the desired menu. Navigation on this menu is very important to ensure that all application functions can be easily accessed.

Figure 4 Main menu view

3.1.4 Material Menu View

The Material Menu contains various information about healthy lifestyles, such as exercise, washing hands, throwing out trash, brushing teeth, and nutritious food. Each material is equipped with a "Next" button to move to the next slide, and a "Back" button to return to the material list. The goal is to provide students with basic knowledge about the importance of a healthy lifestyle.

Figure 5 Material Menu View

3.1.5 Quiz Menu View

The Quiz menu contains questions about healthy lifestyles in multiple choice form. After the user starts the quiz, the system will display a timer showing the time, as well as a score that records the correct answers. If the quiz is finished, students will be given the option to return to the main menu or try the quiz again. The main purpose of this menu is to measure students' understanding of the material that has been studied.

Figure 6 Quiz Menu View

Figure 7 Display when quiz ends

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3.1.6 Instructions Menu View

The Instructions menu contains a guide for users on how to use the application and complete the quiz. This menu is equipped with an exit button that makes it easy for users to return to the main menu after reading the guide.

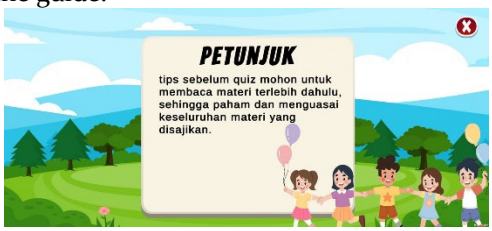

Figure 8 Instructions Menu View

3.2 Black Box Testing

Black Box testing aims to test the functionality of each application feature based on the input provided without looking at the program code[11][12]. The following is an explanation of the testing for each feature.

3.2.1 Main menu button testing

The purpose of this test is to ensure that the button to open the main menu works properly and directs users to the correct page.

Table 4 Main menu button testing

No	Types of Testing	Testing Objectives	Test Results
1	Main menu button testing	Make sure the button can open the main menu properly	Buttons work normally, menu opens
2	Main menu display testing	Make sure the main menu looks perfect	Normal display, no errors

3.2.2 Testing the settings menu

This test aims to ensure that the settings buttons work properly, including the sound settings and back button which function as expected.

Tabel 5 Testing the settings menu

No	Types of Testing	Testing Objectives	Test Results
1	Testing the setting button	Make sure the button opens the sound settings	Buttons work normally
2	Sound settings testing	Make sure the sound settings are working	The sound can be adjusted properly
3	Testing the back button in the settings menu	Make sure the back button works from the settings menu	The back button works normally

3.2.3 Testing material menu

The purpose of testing the material menu is to ensure that each material presented in this interactive learning application functions properly. Testing is carried out on the content of the material and navigation, including the "Next" button to move between slides and the "Back" button to return to the list of materials. The following are the details of the testing for each material:

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Table 6 Testing material menu

No	Types of Testing	Testing Objectives	Test Results
1	Testing the appearance of selected materials	Ensures the selected material appears clearly.	Normal view, material appears
2	Testing the "Next" button	Make sure the "Next" button can go to the next slide	The "Next" button works normally
3	Back button testing	Make sure the back button can go to the main material menu	The back button works normally

3.2.4 Testing the quiz menu

The quiz menu works as expected. The "Start" button is used to start the quiz, the timer runs accurately, and the score is updated according to the answers given by the user. After the quiz is finished, the options to return to the main menu or repeat the quiz also work well.

Table 7 Testing the quiz menu

No	Types of Testing	Testing Objectives	Test Results
1	Testing the "Start" button	Make sure the quiz starts after the "Start" button is pressed.	Buttons work normally
2	Timer testing	Ensure the timer runs for the specified duration.	Timer runs according to duration
3	Scoring testing	Ensure scores are calculated correctly	Scores are calculated according to correct answers
4	Question navigation testing	Make sure the next question appears after the correct answer	The next question appears correctly
5	Game over testing	Ensures users return to results after time is up	Functions are running normally
6	Back button testing	Make sure the button returns to the main menu after the quiz is finished	Buttons work normally

3.2.5 Testing the hint menu

The hint menu works well, and all information on how to complete the quiz is clearly displayed. The exit button works normally, returning the user to the main menu without any errors or glitches.

Table 8 Testing the hint menu

No	Types of Testing	Testing Objectives	Test Results
1	Testing the display instructions	Make sure the instructions are clear and functional	Normal view, instructions appear complete
2	Exit button testing	Make sure the exit button can return to the main menu	Buttons work normally

4. CONCLUSION

Based on the results of the study on "Interactive Learning Application for Introduction to Healthy Lifestyle Patterns at Elementary School Level at SD Panca Budi Medan," it can be concluded that the development of this application was successfully implemented through the Multimedia Development Life Cycle (MDLC) method, which includes all stages from concept to distribution. This process involves problem identification, data collection, application design, content creation, and functionality testing using the Black Box Testing method, which shows that the application functions well and is easily accessible. The application interface is designed to be attractive and child-friendly, making it an effective learning tool. In addition, this application is able to help children understand healthy lifestyles through interactive and interesting materials, as well as quiz features that encourage active participation. With a gamification approach, this application has succeeded in increasing children's

motivation and interest in learning about health, thus creating a deeper and more enjoyable learning experience.

REFERENCE

[1] Wijayanti N. A., "Implementation Of Role Playing Method In The Hygiene Hadith Learning Toward Early Childrenâs Healthy Behavior Of Group B In Dabin Aggrek Gunungpati Semarang," BELIA Early Child. Educ. Pap., vol. 6, no. 2, pp. 126–130, 2017.

[2] Ikadarny, Ikadarny., Syafruddin, Muhammad Akbar. "Perilaku Pola Hidup Sehat Siswa Usia Sekolah Dasar Di Kota Makassar". Jurnal Ilmiah Stok Bina Guna Medan, Vol 11 No 2, Okt 2023. pp. 171-181. https://doi.org/10.55081/jsbg.v11i2.1231

[3] Yani, Leli Zarina., Rachmayani, Ika., Sriwarthini, Ni Luh Putu Nina., Nurhasanah, Nurhasanah. "Identifikasi Penerapan Pola Hidup Sehat Bagi Anak Usia Dini Melalui Pembiasaan Sarapan Bergizi Di Kecamatan Janapria". Jurnal Ilmiah Pendidikan Dasar, Vol 9 No 1, Mar 2024. https://doi.org/10.23969/jp.v9i1.12819

[4] Oktapia, Srininta., Herawati, Julita. "Peningkatan Kesehatan Anak Usia Dini Dengan Penerapan Perilaku Hidup Bersih Dan Sehat Pada Anak Usia Dini". Jurnal Pendidikan Sosial dan Humaniora, Vol 2 No 3, 2023.

[5] H. I. Safitri and H. Harun, "Membiasakan Pola Hidup Sehat dan Bersih pada Anak Usia Dini Selama Pandemi Covid-19," J. Obs. J. Pendidik. Anak Usia Dini, Vol 5, No 1, p. 385, Jun. 2020, doi: 10.31004/obsesi.v5i1.542

[6] M. Albina, A. Safi'i, M. A. Gunawan, M. T. Wibowo, N. A. S. Sitepu, and R. Ardiyanti, "Model Pembelajaran Di Abad Ke 21," War. Dharmawangsa, vol. 16, no. 4, pp. 939–955, Oct. 2022, doi: 10.46576/wdw.v16i4.2446.

[7] M. Fauzan Febriansyah and Y. Sumaryana, "Pengembangan Aplikasi Media Pembelajaran Sekolah Dasar Menggunakan Metode Multimedia Development Life Cycle (MDLC)," Informatics Digit. Expert, vol. 3, no. 2, pp. 61–68, Nov. 2021, doi: 10.36423/index.v3i2.838

[8] V. H. Saputra and E. Febriyanto, "Media Pembelajaran Berbasis Multimedia Untuk Anak Tuna Grahita," J. Pendidik. Mat., vol. 1, no. 1, p. 15, 2019.

[9] Sugiarto, Hari. "Penerapan Multimedia Development Life Cycle Pada Aplikasi Pengenalan Abjad Dan Angka". Indonesian Journal on Computer and Information Technology, Vol 3 No 1, Mei 2018. pp 26-31.

[10] Borman, Rohmat Indra., Purwanto, Yogi. "Impelementasi Multimedia Development Life Cycle pada Pengembangan Game Edukasi Pengenalan Bahaya Sampah pada Anak". Jurnal Edukasi dan Penelitian Informatika, Vol 5 No 2, 2019. https://doi.org/10.26418/jp.v5i2.25997

[11] Permatasari, Indah., Adhania, Febrianti., Putri, Shafa Aurelia., Nursari, Sri Rezeki Candra. "Pengujian Black Box Menggunakan Metode Analisis Nilai Batas pada Aplikasi DANA". Jurnal Konstelasi: Konvergensi Teknologi dan Sistem Informasi, Vol 3 No 2, Desember 2023. https://doi.org/10.24002/konstelasi.v3i2.8289

[12] Pratama, Stevanu Dika., Lasimin, Lasimin. Dadaprawira, M Noviarsyah. "Pengujian Black Box Testing Pada Aplikasi Edu Digital Berbasis Website Menggunakan Metode Equivalence Dan Boundary Value". Jurnal Teknologi Sistem Informasi dan Sistem Komputer TGD, Vol 6 No 2, Juli 2023. pp 560-569