

# Interactive Multimedia as Information Media Parasitic Infection with Multimedia Development Life Cycle Method

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**Abstract** – This study focused on the problem of lack of interactive multimedia-based educational information media that is interesting as a provider of information about parasitic infections in humans. This parasitic infection is very dangerous, especially for children who still lack knowledge about it. The aim of this research is to provide educational information media to the wider community, especially at the Seberang Padang Health Center, about parasitic infections in a way that is as interesting as possible and easy to use. Interactive multimedia is a solution to this problem. This research uses the Multimedia Development Life Cycle Method as a guide in building interactive multimedia with the stages of Concept, Design, Material Collecting, Assembly, Testing and Distribution. The results of the alpha test showed that all features of this interactive multimedia can function properly. A beta test was conducted on 30 respondents from the public who accompanied patients to the Seberang Padang Health Center. As a result, this interactive multimedia received a rating of 4.54 out of 5. Therefore, this interactive multimedia is very good and suitable for use as an educational medium for information about parasitic infections. With this interactive multimedia-based educational information media, it is hoped that the wider community can better understand and be aware of parasitic infections and preventive measures that can be taken to avoid these infections.

**Keywords** – *Multimedia Interaktif, Multimedia Development Life Cycle, Infeksi Parasit*

## I. INTRODUCTION

The problem discussed is that there is still a lack of interactive multimedia-based educational information media that is interesting as a provider of information about parasitic infections in humans. This parasitic infection is very dangerous, especially for children who still lack knowledge about it. Many dangers are posed by parasite infection because it can cause various diseases in humans. Some types of parasites that often attack humans are worms, fleas, mites, and flies. Here are some dangers of parasitic infections to watch out for:

1. Indigestion: Some parasites can invade the human digestive system, such as tapeworms and hookworms. This infection can cause diarrhea, nausea, vomiting, and abdominal pain.
2. Nervous system disorders: Parasitic infections such as *toxoplasma gondii* can cause disorders of the human nervous system. Symptoms include headaches, convulsions, and impaired coordination.
3. Anemia: Parasitic infections such as hookworms can cause anemia in humans. This happens because the parasite feeds on human blood.
4. Skin diseases: Some parasites such as scabies mites and head lice can cause skin diseases in humans. Symptoms that appear include itching, rashes, and wounds on the skin.

Respiratory system disorders: Parasitic infections such as *fasciolopsis buski* can cause disorders of the human respiratory system. Symptoms that appear include shortness of breath and coughing.

The development of information technology has provided many benefits to everyone. The use of information technology can facilitate many jobs, and continues to emerge various innovations in various fields such as online learning, interactive [1]games, interactive tutorials, [2]simulations, interactive product catalogs, interactive [3] animated videos [4] [5] , [6]interactive 3d presentations and [7] health education [8] . One form of technological development is an interactive multimedia-based system, which can be used as a medium of educational information as in this study which focused on parasitic infections in humans.

Interactive multimedia is one way to display information to be very interesting. There are still many systems that do not use interactive multimedia as a tool to display information because its manufacture takes time and also costs. Previous research on interactive multimedia, including by Wulandari in 2022 with the results of the use of interactive multimedia-based UNO card media, is feasible to be used to help improve early childhood cognitive abilities in recognizing and counting numbers[9]. Further research by Munawaroh, et al in 2022 with the results of interactive multimedia use has a significant influence on regional language learning in children. Interactive multimedia has an appeal that can grab



children's attention and is proven to improve their understanding associated with regional language learning at an early age[10]. Furthermore, by Wirantini, et al in 2022 with the results that interactive multimedia-based learning media cycle topics are feasible to use, interactive multimedia-based learning can help students in learning, especially in science material on water cycle topics.[11] Furthermore, by Yuliana, et al in 2022 with the results of interactive multimedia used as an addition to learning, so that children can access material anytime and anywhere without time and space restrictions. This product has been tested by experts and students, and is considered suitable for use as an effective learning media, as [12] well as many other studies such as h utan ebation animation[13], ornamental fish disease information [14] and plant disease information[15]. The application of interactive multimedia in this study is to provide information to the public about parasitic infections that can attack humans.

If there is no interesting information media to present this information, then most people, especially children, will feel less interested in reading it, even though this information is very important, knowledge regarding parasite information is still inadequate. This is caused by a lack of research on parasites, especially parasites that attack humans [16]. In developing interactive multimedia-based information media, there are several methods that can be used, such as the Rapid prototyping method, User-centered design, Agile development, Storyboarding, Object, Gamification and many other methods. In this research, the Multimedia Development Life Cycle method was used.

The MDLC method is a multimedia development consisting of six stages, namely the stages of *concept*, *design*, *material collecting*, *assembly*, *testing*, and *distribution* [17]. This method was chosen because it has complete stages in the development of an interactive multimedia system. This can be seen in the many multimedia-based application developments that use it, such as virtual reality as a medium for campus introduction by Citra, et al in 2022, then by Fatimah, et al in 2022 as a method for [18]learning jaipong dance.[19]

The purpose of this study is to create a medium of educational information to the wider public about parasitic infections. Through this media, it is hoped that the public can obtain information that is as interesting as possible and easy to use about the types of parasites, symptoms that appear, and how to prevent and treat appropriately. With sufficient knowledge, it is hoped that people can take better preventive measures and reduce the risk of parasitic infections.

## II. RESEARCH METHODOLOGY

### 2.1 Research Stages

In a study, a research method is a series of procedures that must be carried out. The goal is that the author can design the research appropriately and not deviate from the subject matter. In addition, the systematization of steps in research also aims to be easily understood and can be used as a clear guideline in solving existing problems. In this study, the author used the Multimedia Development Life Cycle (MDLC) method depicted in Figure 1. This method was chosen because it

has clear and systematic stages in designing and developing multimedia. .

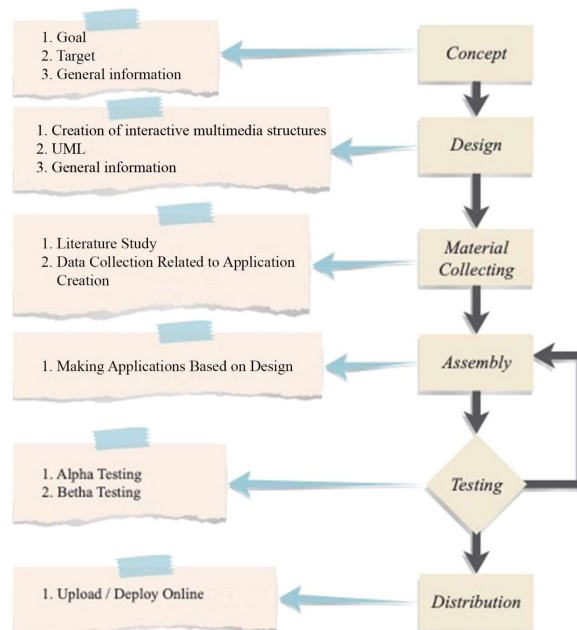


Fig 1. MDLC stage

There are six stages to the MDLC method, from Figure 1. can be described the process of MDLC, which is as follows:

#### 1. *Concept Stage*

This stage is the purpose of making the system and who is the user of the designed system and also analyzing the needs of the system.

#### 2. *Design*

The *design* stage is the stage of making program specifications such as material requirements or materials for the program, program display and program architecture. The design phase includes program structure, UML design and program design.

#### 3. *Material Collecting*

The stage of collecting the materials to be used first. Then the material that has been collected will be continued at the next stage, namely *assembly*.

#### 4. *Assembly*

The *assembly* stage is the stage of making all multimedia materials. Program creation is based on the design stage, program structure, UML design and program design.

#### 5. *Testing*

This stage is carried out after completing the *manufacturing* stage (assembly). This stage is carried out by testing by the maker (alpha testing) in *black box* testing and *beta testing*.

#### 6. *Distribution*

At this stage of distribution, the development team had to determine the right place to distribute interactive multimedia about parasitic infections. Some places that may be chosen include websites, mobile applications, or physical storage media such as CDs or flash drives. The selection of distribution sites must be adjusted to the target users and the purpose of the interactive multimedia. In addition, the development team must

also ensure that the interactive multimedia can be accessed easily and has good quality in order to provide optimal benefits for users.

### 2.1 Research Supporting Theories

There are several theories that will support this research process that are useful for the basis of research related to existing theories. The theory is as follows:

#### 1. Multimedia

Multimedia is one of the learning media that combines several media elements presented in computer media. Interactive multimedia is a solution in making it easier for students to learn material compared to monotonous textbooks/*e-books*. In research Farida & Rahayu (2017) showed a significant difference in learning outcomes in the use of interactive multimedia rather than using textbooks [20]. The use of multimedia in learning will be able to produce more interesting learning and can increase students' understanding of the material provided[21]

#### 2. Interactive Multimedia

Interactive Multimedia is a tool equipped with a controller that can be used by users to choose something expected, such as a gaming system and others. Interactive multimedia is a collection of several media such as technology, images, audio, *video*, and animation that are interactive in nature that are used to convey information[22]. Multimedia in learning allows everyone to process information visually and verbally, and utilize the brain's potential in learning. Making interactive multimedia can use a variety of systems or *software*[23].

## III. RESULTS AND DISCUSSION

The results that can be obtained from the implementation of the MDLC method in building a Parasitic Infection information system based on interactive multimedia packaged in the form of interactive media in the form of educational *videos* include several menu options that support the system. Details of the stages that have been carried out in this study are as follows:

#### 1. Concept

At this stage, researchers design the flow concept of a system that is built concisely and easily understood, so that this system can help educate about Parasitic Infections to the wider community, especially for children more easily. The concept flow built on this Parasitic Infection education system is as follows:

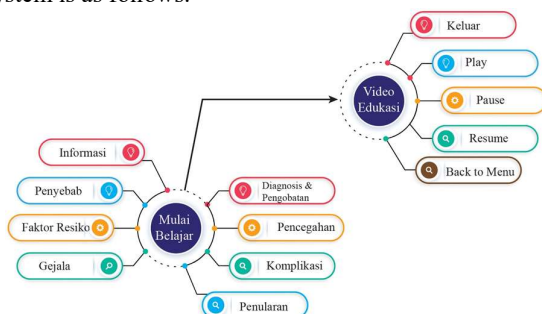


Fig 2. Interactive Multimedia Concept of Parasite Infection

#### a. Design

This design stage produces a research design using the program structure, UML and system design as an overview of the system that will be implemented later. The design made is made as attractive as possible so that people, especially children, are interested in using this interactive multimedia. For program structure design, UML and System design are as follows:

##### 1. Program Structure

The following is the program structure of the parasitic infection interactive multimedia system:

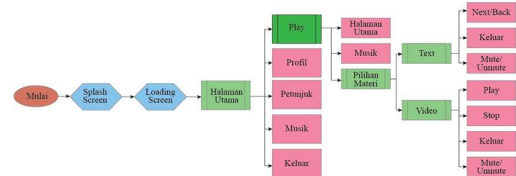


Fig 3. Structure of Parasitic Infection Interactive Multimedia System

##### 2. UML Design

In making interactive multimedia Parasitic Infection, using UML which serves to provide visual modeling language or images to users of various kinds of programming and general engineering processes. The diagram used is as follows:

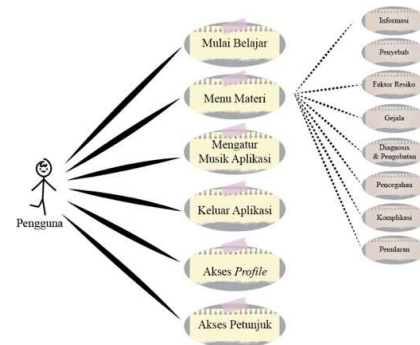
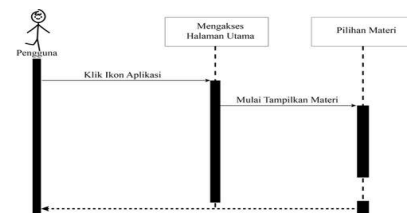


Fig 4. Use Case Interactive Multimedia Diagram

From Figure 4, a use case diagram is displayed from the interactive multimedia that is built, where the *use case diagram* will show how the interaction between the user and the system. In this interactive multimedia, there are one actor and eight main use cases and three use case include in the *material menu use case*. The next UML diagram is a *sequence diagram* as shown in figure 5.



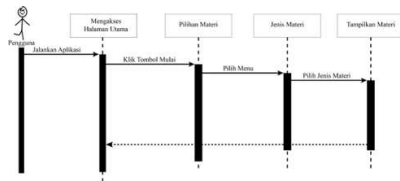


Fig 5. Interactive Multimedia Sequence Diagram

Sequence Diagram serves to explain and display the interaction between objects in a system in detail. In this interactive multimedia, there are two sequence diagrams, where the first sequence diagram shows the user when he wants to start the application. The second sequence diagram, when the user runs the application. The third diagram is the Activity Diagram.

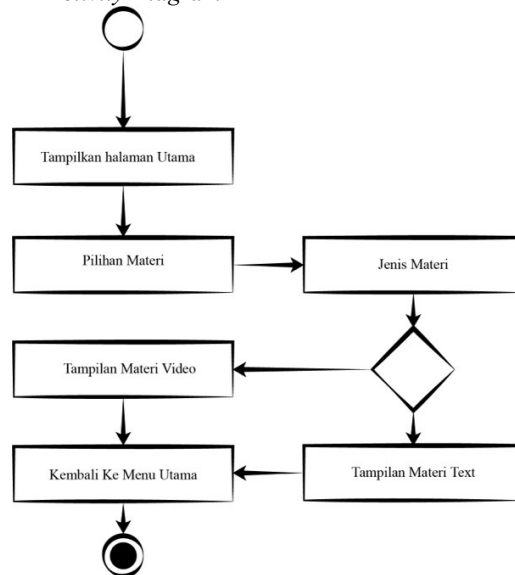


Fig 6. Interactive Multimedia Activity Diagram

The Activity Diagram will illustrate system activities not what actors do, so activities that can be performed by the system. In the interactive multimedia that will be built there are six activities that can be done by users, from displaying the main page, selecting material, choosing the type of material, displaying material in the form of text or video and returning to the main menu.

### 3. Design Program

Program design is one of the important things in building an interactive multimedia, from this design will be a guide to how the appearance and layout of menus and content will be displayed on interactive multimedia to be built. Here is the program design:



Fig 7. Interactive Multimedia Initial Display Design

The initial screen will be designed with five buttons consisting of profiles and instructions on the upper left side, mute and exit buttons on the upper right side, start button at the bottom. In the middle of the screen will be given text in the form of the title of the multimedia to be built. The next view is the profile page.

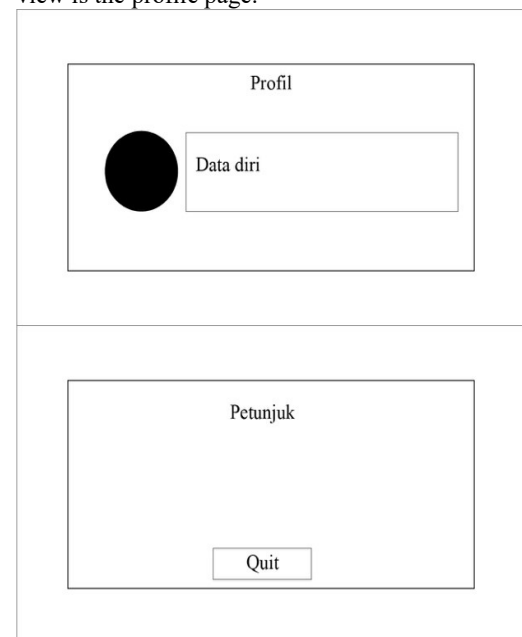


Fig 8. Profile Display Design & How-To Page

In the design of the profile page, it will be given a display in the form of photos from interactive multimedia creators and also personal biodata. On the top right, an exit feature will be given to exit the profile page and return to the main page. The next design is the instructions page.

On the instructions page will be designed with a display in the form of a page title in the upper center, then text will be given in the form of instructions at the bottom of the instruction title and on the upper right side will be given an exit button to return to the main page. Next page design type of Parasitic Infection



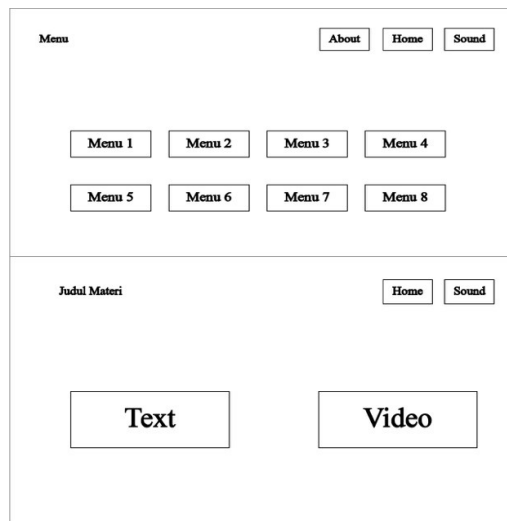


Fig 9. Menu Page Design Select Parasite Information Type & Material Selection Page

In the menu design, there is a choice in the form of a selection of materials regarding parasitic infections. If the user clicks on one of these menus, interactive multimedia will display a selection of material in the form of text material or *video* material, depending on the user's choice. On the upper left side is also displayed a button to return to the *home* page and a button to turn off music. Next, design the material selection page. On the design of the page the material appears, the title of the type of parasite information selected will be given, then in the middle will be given an option button in the form of text or *video* material, later the system will display material based on the choice of the user. At the top right will be given three additional buttons in the form of *home*, instructions and *mute*. The next design is a page of material text.

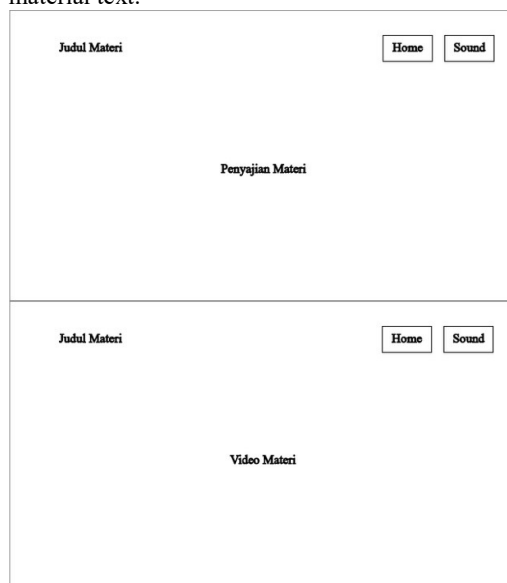


Fig 10. Material Text & Video Page Design

On the material text page, later the type of

parasitic infection will be displayed, then under the title will be given material in the form of text and on the left and right sides of the middle there will be navigation buttons for *next* and *previous* material. At the top right of the page there are three buttons, namely *home*, instructions and *mute*. The next design is the *Video* Material page. On the *video* material page, later the selected type of parasite information will be displayed, then under the title will be given material in the form of a *Video* that can be played by users and on the top right isis of the page there are three buttons, namely *home*, instructions and *mute*.

#### 4. Material Collecting

At this stage, researchers will collect mater materials and assets to make interactive multimedia. At this stage the author uses adobe animate and adobe illustrator.



Fig 11. Process Asset Collection with Adobe Photoshop & Asset Collection with Adobe Animate

The collection process using Adobe Illustrator by designing and creating the necessary assets according to the function of each asset for interactive multimedia Parasitic Infection. The next collection of assets using Adobe Animate.

This process combines assets that have been created in Adobe Illustrator. At this stage, the process of selecting animations, transitions, *placing frames*, and so on is also carried out so that when used by interactive multimedia users it can run as attractive as possible.

#### 5. Assembly

At this stage, researchers build interactive multimedia as interesting as possible that can meet information to users about Parasitic Infections, along with the results of the *assembly* process:



Fig 12. Home Interface

Setelah user open interactive multimedia, than the main page will appear, on the main page displayed several buttons that can be used by users to operate this Parasitic Infection interactive multimedia. These buttons are the *profile* button, hint button, music button, exit button and *play* button. *The next interface is the profile page.* 3



Fig 13. Interface Profile & Instructions

The profile page will appear when the user clicks the profile button on the main page. On the profile page is displayed the profile of the developer of interactive multimedia Parasitic Infection. The next page is the instructions page. The instructions page will be active if the user clicks on the hint button. On the page will appear instructions from *Video* material and text. Next, a Parasitic Infection drop-down menu page will be displayed that will be known information.



Fig 14. Menu Interface: Select Parasite Information Type &

Material Presentation Type

On this page, users will be presented with eight menus containing information on Parasitic Infections. If the user clicks on one of the Parasitic Infection options, the system will display information in the form of *Video* and text options. Next, the interface of the choice page type of information display. When the user clicks on one of the options menu for the type of Parasitic Infection, the system will display two options for presenting information, namely text and video. Next will be displayed the page of text material.



Fig 15. Display of Text Material

In the text material, information will be displayed in the form of text containing an explanation of the Parasitic Infection selected by the user. The text material is also provided with illustrative images so that users know the form of the Parasitic Infection in question. Next will be displayed *Video* material.



Fig 16. Video Materials

On the Video materi, information about the selected parasitic infection will be displayed, the information provided is also the same as the text but in the form of a *Video*, this is intended so that

users who cannot read the text can watch and listen so that they can better understand the information from the Parasitic Infection.

6. Testing

At this stage, researchers will carry out two testing processes, namely Alpha testing tested by researchers themselves and Beta testing tested

directly to users.

a) Alpha Testing

In this test, researchers will test the appearance and function of each button in the interactive multimedia Parasitic Infection as in Table 1.

Table 1. Alpha Testing

No	Components tested	Test Scenarios	Testing	Information
1	Start Page	Select the "Tap to Play" button	BlackBox	✓ Succeed
2	Home	Selecting the "Profile" button	BlackBox	✓ Succeed
		Selecting the "Hint" button	BlackBox	✓ Succeed
		Selecting the "Music" button	BlackBox	✓ Succeed
		Selecting the "Exit" button	BlackBox	✓ Succeed
		Selecting the "Play" button	BlackBox	✓ Succeed
3	Menu Options	Selecting the "Music" button	BlackBox	✓ Succeed
		Selecting the "Home" Button	BlackBox	✓ Succeed
		Selecting the "Insects" button	BlackBox	✓ Succeed
		Selecting the "Fish" button	BlackBox	✓ Succeed
		Selecting the "Reptile" button	BlackBox	✓ Succeed
4	Material Selection	Selecting the "Home" Button	BlackBox	✓ Succeed
		Selecting the "Hint" button	BlackBox	✓ Succeed
		Selecting the "Music" button	BlackBox	✓ Succeed
		Selecting the "Text" button	BlackBox	✓ Succeed
		Selecting the "Video" button	BlackBox	✓ Succeed
5	Material Page	Selecting the "Home" Button	BlackBox	✓ Succeed
		Selecting the "Hint" button	BlackBox	✓ Succeed
		Selecting the "Music" button	BlackBox	✓ Succeed
		Selecting the "Next" button	BlackBox	✓ Succeed
6	Video	Selecting the "Previous" button	BlackBox	✓ Succeed
		Selecting the "Play" button	BlackBox	✓ Succeed
		Selecting the "Pause" button	BlackBox	✓ Succeed
		Selecting the "Home" Button	BlackBox	✓ Succeed
		Selecting the "Hint" button	BlackBox	✓ Succeed
	Profile	Selecting the "Music" button	BlackBox	✓ Succeed
	Instructions	Selecting the "Exit" button	BlackBox	✓ Succeed

From Table 1. Eight tests were carried out on the features of interactive multimedia, each component can run properly without any errors.

b) Beta Testing

In beta testing, it will involve as many as 30 respondents or users to see the feasibility of interactive multimedia built. There are 14 assessment indicators and five values, namely: 1 = very not good, 2 = not good, 3 = not good, 4 = good enough, 5 = very good. For example, with the indicator "The material presented in interactive learning media is in accordance with the learning objectives"



Fig 17. Measurement of Indicator 1

In Figure 17. Showing measurements of assessment indicator 1 with results, 13 respondents gave very good marks, 15 respondents gave quite good marks, 2 respondents gave poor grades, 0 respondents gave bad and very bad grades. So if calculated by rating, it is as follows:

$$\begin{aligned}
 1 = \text{very bad} &= 0 * 1 = 0 \\
 2 = \text{not good} &= 0 * 2 = 0 \\
 3 = \text{not good} &= 2 * 3 = 6 \\
 4 = \text{good enough} &= 15 * 4 = 60 \\
 5 = \text{very good} &= 13 * 5 = 65 \\
 \text{Total} &= 30 = 131 \\
 \text{Rating} &= 131 / 30 = 4.37
 \end{aligned}$$

The calculation of ratings on other indicators



is also carried out with the following results:

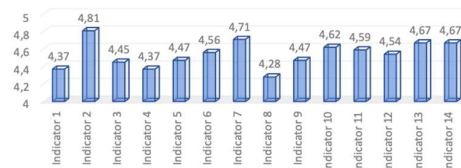


Fig 18. Rating Results

From the results obtained in Figure 18 is 4.54 out of a scale of 5, so with this value interactive multimedia that is built is very feasible to be used as a medium of information about Parasitic Infections.

#### 7. Distribution

The distribution process through websites and playstores, this is because at present, the most appropriate interactive multimedia distribution place for the general public is through websites and mobile applications. This is because the use of the internet is increasingly widespread and easily accessible to the public. In addition, interactive multimedia published through websites and mobile applications can be accessed anytime and anywhere by users.

#### IV. CONCLUSION

Interactive multimedia on parasitic infections is an effective educational information medium for improving public knowledge of parasitic infections. This interactive multimedia can be used by various stakeholders, such as health centers, hospitals, and public health organizations. It can be used to educate the public about parasitic infections, thus preventing the spread of the disease. This multimedia was developed using the MDLC method, which consists of six phases. Beta testing of 30 community respondents who accompanied patients for treatment at the Seberang Padang Health Center resulted in a highly positive evaluation. The interactive multimedia was rated as engaging and interactive, containing accurate and up-to-date information, and being easily accessible.

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