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Rain Process Education as Interactive Multimedia in Early Childhood using the Multimedia Development Life Cycle (MDLC)

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ABSTRACT

Learning media has a positive impact because it can be fun, increase students' interest in learning, and be interactive. The learning method in Early Childhood Education (PAUD) Ratnanigsih uses a Sentra approach and the environment by playing sambal learning to develop the intelligence of a potential child. The facts in PAUD Ratnaningsih found obstacles in the teaching and learning process. These obstacles occur due to the lack of visualization or media for teachers, and the absence of variations in learning can cause saturation in children. Users in this study are early childhood teachers in PAUD Ratnaningsih. Based on these problems, a learning press is needed for teacher and child relations educated at PAUD Ratnaningsih. The learning media design method in this study uses the Multimedia Development Life Cycle (MDLC) approach and learning media using Macromedia Flash 8. The results of this study are in the form of storyboard design, visualization of interface design, implementation of learning media, and testing with *Blackbox Testing*. Based on the conclusions of this study shows that all components and features of learning media function properly and can be used by teachers in the learning process "Universe" with the sub-theme "Rain".

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1. INTRODUCTION

Education is one of the essential things for the future of individuals or society. The general explanation of education has been contained in Law No. 20 of 2003 Section 1, and it is explained that education is a conscious and planned effort to create a learning atmosphere and learning process so that students actively develop their potential, have spiritual, mental strength, self-control, personality, wisdom, noble character, and skills [1]. According to Munirah in Rahmi [2], there are several components in national education, such as the environment, facilities and infrastructure, resources, and the community, so they support each other to achieve an education. The development of technology can make it easier for us to do everything and do daily activities. As a result, technology can facilitate information delivery to anyone without time restrictions [3]. Technology can also play a role in helping students succeed in understanding learning topics from teachers [4].

Each educational institution, almost all of them use technology to support the process of implementing learning. One such technology is interactive-based multimedia. Interactive multimedia is used to assist students in accepting the knowledge delivered by the teacher [5]. If interactive-based technology is not used in a learning medium, it will be difficult for teachers and parents to provide an

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excellent lessons to students [5]. Learning media is a significant factor in learning because learning media is related to the student's learning experience. One of the objectives of implementing learning using interactive multimedia is to replace and complement the objectives, materials, methods, and assessment tools that exist in the teaching and learning process as much as possible. The importance of learning media is to provide convenience in achieving a learning goal and increase students' interest in learning. The application of learning with multimedia will be more interesting, and this is under the statement of Ida Bagus Ketut Trinawindu et al. in the research of Wahyu Tisno Atmojo et al. [6] that the essence of using multimedia today must be more dynamic Because of the existence of multimedia, this is not only reading in the form of text but can be by using voice or audio, music, video, and images [6].

Many studies related to learning media have been carried out. Research conducted by Andrian Syahputra et al. related to learning media in introductory physics courses obtained results that the material was entirely feasible and the suitability and depth of the material with a percentage value of 82.85% that the learning media in the study could function, and use it in the learning process well [7]. The research conducted by Hidayatu Munawaroh et al. on interactive learning media on the theme of the universe for early childhood 4 to 6 years, results in the study found that interactive media is effective in the learning process in the classroom. An evaluation was carried out on the early childhood with an E-Test PR score with an average of 2.07 to 2.73 in the post-test with an achievement result of 80% so that it experienced a significant increase [8]. Early Childhood Education (PAUD) Ratnaningsih is one of the places of educational institutions or early childhood education facilities before the elementary school (SD) education level is implemented. PAUD Ratnaningsih is located in the Bantul area, DI Yogyakarta province. PAUD Ratnaningsih has created students who excel and have a noble characters. The learning method carried out at PAUD Ratnaningsih is currently the Center & Circle Approach, which is a method of playing while learning at a child-centered center to develop all the potential of children's intelligence (multi-intelligence).

One of the themes in the curriculum at PAUD Ratnaningsih is "The Universe" with the sub-theme "Rain." Based on the results of an interview with PAUD Ratnaningsih, the primary approach method, and the "Universe" curriculum circle experienced obstacles in the teaching and learning process. These obstacles are caused by the lack of visualization or media for teachers, and the absence of variations in learning can be possible to encounter saturation in children. Not only learning materials but learning media can also add games. The game indicates structured and semi-structured activities with the aim of entertainment and can sometimes be used as a means of education to evaluate the understanding of learning [9]. The game's fun, motivating, and collaborative character makes this activity popular with many people. Based on these problems, the purpose of this study is to create a learning media in the process of rain based on Macromedia Flash 8. Furthermore, with this learning media making it easier for students to learn the process of forming rain, it is hoped that it can increase students' interest in learning and facilitate the delivery of material.

2. RESEARCH METHOD

2.1. Development Method

In this section, this research used the *Multimedia Development Life Cycle* (MDLC) method. The MDLC method is a method for interactive multimedia development with six stages. The six stages are concept, design, material collecting, assembly, testing, and distribution [10]. The flow of the research stages of the method can be seen in Figure 1.

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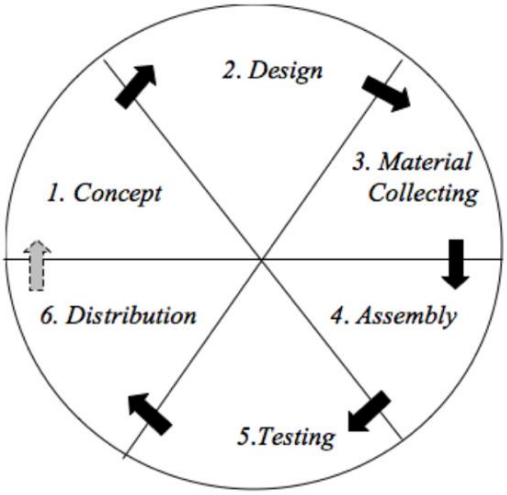

Figure 1. MDLC Method Stage Flow

As shown in Figure 1 f is an explanation of the steps of the Multimedia Development Life Cycle (MDLC) development method concept:

1. Concept
   The first stage is to conceptualize by determining the initial goal, end output, and end users who will use the learning media for the process of this rain. Concept design is the overall determination stage of designing the concept of an interactive multimedia program to be built to have a clear goal.
2. Design
   The second stage is to do a detailed sketch per the theme of delivering the material. The design stage in this study begins with the design of the menu structure architecture, learning content pages (main or homepage display, learning materials, evaluation games), storyboards, and interface design so that it can be continued to the implementation stage.
3. Material Collecting
   The third stage is the stage of collecting necessities. The materials used in this study use materials that are appropriate (relevant) to the learning media to be made. These materials include images, animations, audio, learning materials, and other materials.
4. Assembly
   The fourth stage in the study divided the two sub-components. First, the storyboard and interface design that have been designed are implemented into multimedia materials using Macromedia flash professional 8 software. Second, the creation of material along with the audio dubbing that has been available.
5. Testing
   The fifth stage of this study was completed after all the components in the fourth stage were completed. Based on these results, testing was carried out to test the feasibility of this learning media from the user side using the Blackbox testing concept.
6. Distribution
   At the distribution stage in this study, the first step is to socialize with teachers at PAUD Ratnaningsih to ensure that the learning media that has been done is appropriate and there are no errors.

2.2. Designing The Concept of Learning Media Components

The concept of learning media in this study consists of several components of the flow of use from beginning to end. The details of the pipeline can be seen in Figure 2.

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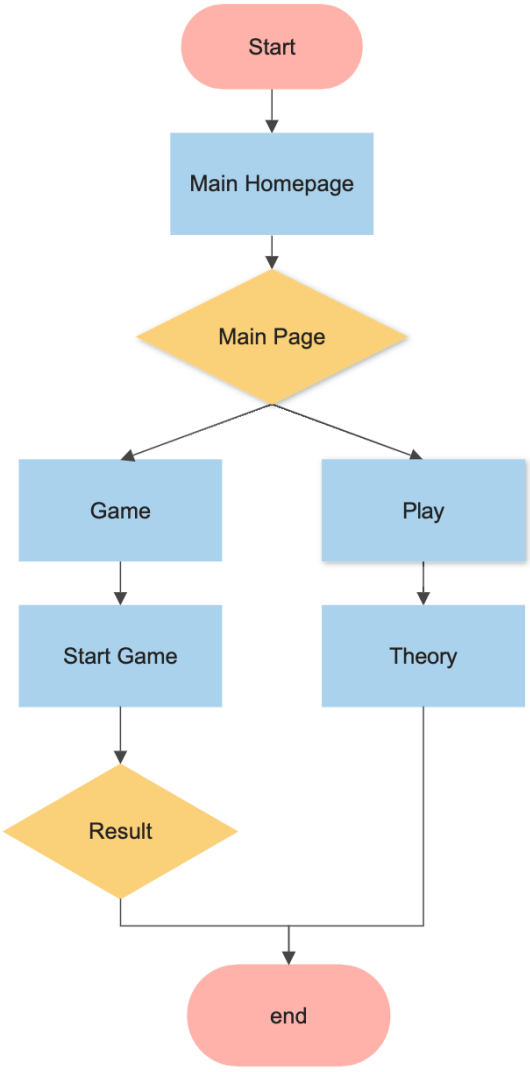

Figure 2. Learning Media Flow

Figure 2 describes the components or features available in the learning media in this study. The segment consists of the main homepage. The main homepage serves as the main page that will appear for the first time when users use this learning media, and the main homepage also has a game menu button and a play menu button for learning materials.

3. RESULTS AND DISCUSSION

3.1. Concept Results

The creation of this media takes the concept from the background of the problem, namely "How to Make Learning Media the Process of Rain," to facilitate the teaching and learning process. At this stage generates several formulations of concepts in the study, as follows:

1. The purpose of learning media in the rain process is to provide information and educate early childhood about rain formation.
2. Users of this learning media are teachers and early childhood students at PAUD Ratnaningsih.
3. The description of this learning media provides information related to the process of this rain that can be operated on a computer device. Learning media consists of material that is presented visually, animated, and audio, as well as games that can be done to attract early childhood interest.

3.2. Design Results

This design stage resulted in the design of the menu structure, storyboard, and interface design of each menu in the learning media in this study. These designations include:

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1. Menu Structure Design

The design of the menu aims to create a chart. It is a significant part of demonstrating the capabilities and facilities for the user. The design of the menu structure can be seen in Figure 3.

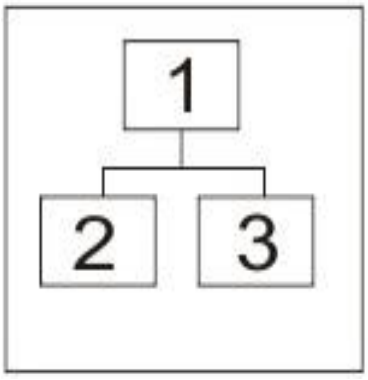

Figure 3. Menu Structure

Based on Figure 3 above, there are 3 main components, namely:

1.) Main View (Home)
Generally, a learning application or other applications presents an overview of the application on the main page. This is useful for leading users to understand the multimedia application's purpose. In this draft, the main page will contain the application's navigation buttons and main menus. Later there will be a Material menu and a Game menu. Each menu on the main page will have a different submenu for each stage.

2.) Learning Materials Menu
This menu was created based on an analysis conducted at PAUD Ratnaningsih. In this menu, learning materials are placed with explanations using voice (audio). In the material menu, a submenu will direct the user to the student's learning page. After that, a game menu on the front page will require users to use the game as an evaluation.

3.) Menu Game
As explained above, a game menu (evaluation) of students is intended to evaluate the user's ability to master the material that has been given.

2. Storyboard and Interface Design

The design of the storyboard, in this case, is to create a script. Storyboards are used to depict storylines according to the story's content, accompanied by explanations of the storyline in each frame of the learning media so that the application program created becomes user-friendly. The storyboard in this study consists of frames 1 to 3, which can be seen in Figure 4, Figure 5, and Figure 6 below:

1.) Visual Frame 1
Frame 1 is a design for the main page in the learning media by containing the appearance of the menus contained in this learning media. The visualization in frame 1 can be seen in Figure 4.

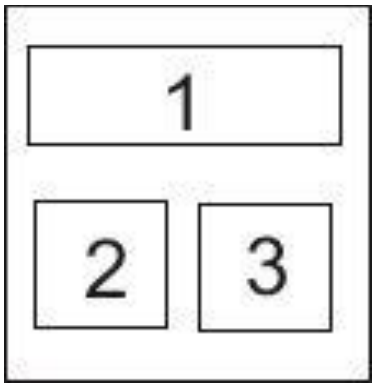

Figure 4. Visual Frame 1

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Based on figure 4 above, it is the design of The main page consists of a background image, title (number 1), game menu (number 2), and material menu (number 3).

2.) Visual Frame 2

In frame 2 is the design of the material page. The visualization in frame 2 can be seen in Figure 5.

Figure 5. Visual Frame 2

Based on Figure 5 above, the Frame is an animated design (number 1) for the material presentation page. The user will be directed to the material explaining how the rain process will be studied.

3.) Visual Frame 3

Visual Frame 3 is a game page containing a simple puzzle game that is useful as a user's evaluation after seeing the material that has been presented. The visualization in frame 3 can be seen in Figure 6.

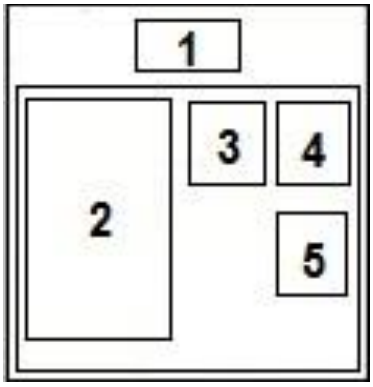

Figure 6. Visual Frame 3

Based on Figure 6 above, it is the design of the main page of this learning media, the animation design (number 1) for the material presentation page. This page consists of the title (number 1), puzzle board (number 2), puzzle box (number 3), game processing time (number 4), and score (number 5).

3.3. Material Results

This study collected materials by conducting interviews with teachers at PAUD Ratnaningsih and collecting material from several sources that support the pattern of providing suitable material for early childhood. Related to the materials for making interactive multimedia collected are images for backgrounds, buttons, and other components online, as well as voice (audio) dubbing for material presentation. Creation of learning media using Macromedia flash professional 8 and Corel Draw X5 software to create and process learning media.

3.4. Assembly Results

At this stage, the implementation of making learning media using Macromedia flash software professional 8, then creating designs using Corel Draw X5 Software. The final results of the performance of making learning media in this study are based on the design design at the design stage, as follows:

1. Main Page View

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This main page view is displayed first when the learning media is run. The main menu display has menus that can be selected. The main menu has a game menu and a material menu. Here's a look at the main menu that can be seen in Figure 7.

Figure 7. Main Page View

Based on Figure 7 above, there are two buttons. The "Game" button, if a click action is performed, will lead to a simple game page in the form of compiling puzzles. However, acting on the "Play" button will redirect to the learning materials page. The choice of full color is a consideration in the background setting to attract children's attention using this learning medium.

2. Material Page View

The material page display contains an animation of the delivery of material from the rain process and is accompanied by sound (audio) in the presentation. The function of the audio is so that early childhood can understand easily. The following view of the material page is seen in Figure 8.

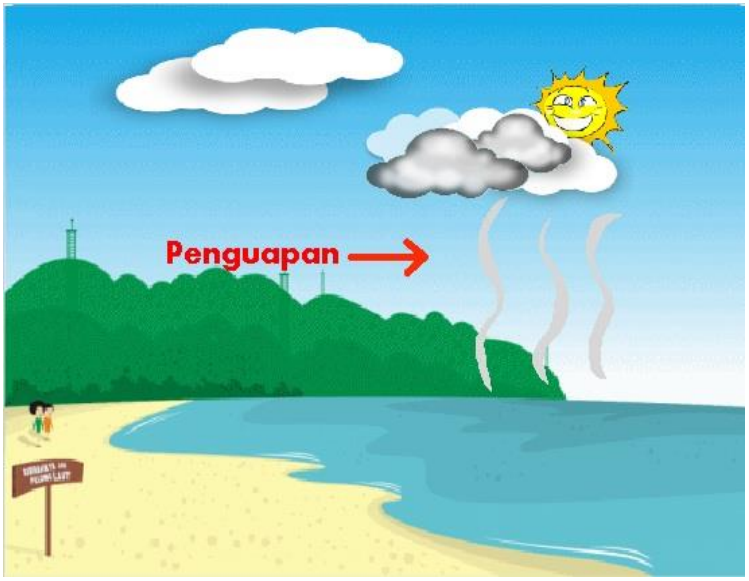

Figure 8. Material Page View

Based on Figure 8 above is a page of material presentation. The process of delivering material by creating an animation that can move to explain better the details of the operation of the rain and each of these processes is also accompanied by a sound (audio) that can be heard directly by the user.

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3. Game Page View

Game page view is an animated display of puzzel games in this learning medium. The following display of the game page can be seen in Figure 9. The following view of the game page can be seen in Figure 9.

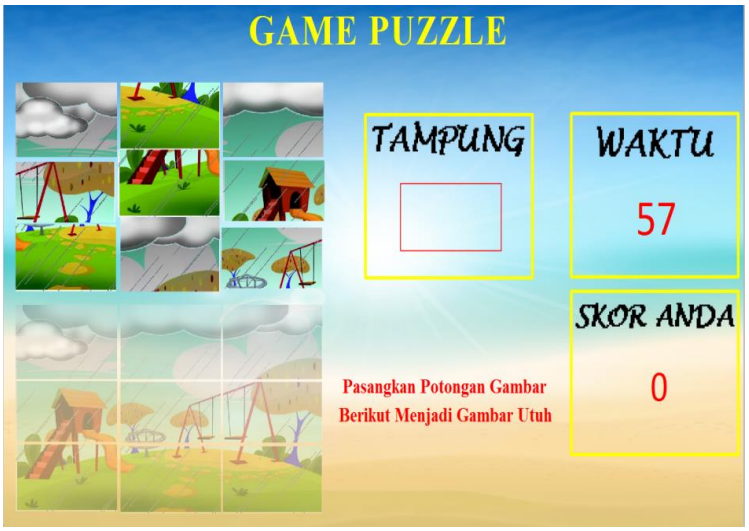

Figure 9. Game Page View

Based on Figure 9 above is the puzzel game page. The game page display is an evaluation page for users, in this puzzle-shaped game students are invited to pair puzzle pieces into a complete picture. Puzzel games serve as a medium for evaluating the achievement of material understanding from students.

3.5. Testing Results

The testing stage is carried out after the completion of the assembly stage process. The test is performed using a beta test. The beta test method will test the learning media of the user series (in this test, the user is a teacher) before the learning media can be used for early childhood students in PAUD Ratnaningsih. Blackbox test tests focus on the functionalities and components in this learning media and whether they can function correctly. Testing consists of several activities. The activity consists of testing audio or sound, animations, and buttons in the media. Details of the Blackbox test results in this study can be seen in Table 1.

Table 1. *Blackbox* Test Results

No	Component	Testing Activities	Test Results
1	Sound/Audio	Sound testing when delivering material	Ok
		Sound testing on buttons when clicked	Ok
2	Animation	Testing on loading	Ok
		Animation testing on material discussion	Ok
3	Knob	Test on the game button when clicked	Ok
		Test on the play button of the material when clicked	Ok

3.6. Distribution Result

The results at the distribution stage of this study, learning media have been socialized to teachers at PAUD Ratnaningsih for their use, and it has been confirmed in the test results that the learning media that has been made is appropriate and there are no errors.

4. CONCLUSION

Based on the results of research on interactive learning media for early childhood at PAUD Ratnaningsih, in understanding the process of rain, it was concluded that the media learning using

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the Multimedia Development Life Cycle method could function properly. It can also be viewed based on the test results using a Blackbox, getting the results of all feature components such as sound or audio of material delivery and on the button when clicked, animations in the delivery of material, as well as game buttons and buttons, can run properly. With this learning medium, children at an early age can help to understand the occurrence process in the "Universe" subtheme of an event. Rain by adding audio to make it easier for early childhood to understand the material.

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