

## Application of the Multimedia Development Life Cycle (MDLC) Methodology to Build a Multimedia-Based Learning System

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### Abstract

*Success in the process of teaching and learning activities can be influenced by human resources from both educators and students, besides that success needs to be supported also by the existence of media that can assist the role of educators in delivering teaching materials and helping students to receive teaching materials, so that more interesting and interactive so that it can increase interest in learning. The media used is a multimedia-based learning system using the Multimedia Development Life Cycle (MDLC) methodology, with this methodology can build a system as expected by users in the teaching and learning process, the results of this study are a multimedia-based learning system that contains interactive media there are 6 (six) buttons to lead to the display of lesson plans, materials, exercises and evaluations, additionally added buttons to load the previous and subsequent views so as to make it easier for educators and students.*

### Keywords

Learning; media; methodology; multimedia development life cycle (MDLC)



## I. Introduction

In improving the quality of education, of course, there are several things that need to be considered, namely the improvement of the quality of human resources, both from the educators and from students. Media and techniques used in the teaching and learning process can affect the learning achievement obtained by students. (Suryanto et al., 2020)

Media is one that must be prepared for the learning process, because the media can channel messages and be able to stimulate the thoughts, feelings and desires of students so that it can encourage the process of learning interest in themselves. Creative use of media can improve student learning performance in accordance with the objectives to be achieved. (Magfirah Rashid, 2016)

The learning materials used can take advantage of the technology that is currently developing, namely the learning system in the world of multimedia-based education that is more interactive (Sutarno et al., 2015). Multimedia is an application that can be used as a tool to package teaching materials used by educators so that they can improve achievement or understanding for students. (Norma, 2018).

Human Resources (HR) is the most important component in a company or organization to run the business it does. Organization must have a goal to be achieved by the organizational members (Niati et al., 2021). Development is a change towards improvement. Changes towards improvement require the mobilization of all human resources and reason to realize what is aspired (Shah et al, 2020). The development of human resources is a process of changing the human resources who belong to an organization, from one situation to another, which is better to prepare a future responsibility in achieving organizational goals (Werdhiastutie et al, 2020).

Supporting technological devices allow it to be developed in various ways, and the learning system is no exception, in addition to having the advantage of delivering a variety of teaching materials through several media devices, the process is also supported by the ease of distributing application programs, easy and practical because it can be accessed from anywhere. anywhere and anytime, faster, cheaper and better access to information as well as being able to increase student interest in learning. Media development in the learning process can renew organizational culture with the hope of increasing professional human resources (HR) and to support informal learning to be of higher quality.

The types of multimedia that can be developed in the learning process of students in schools include, visual, audio, presentation group media, and computer-based interactive media. Of the several types of learning methods, basically they have their own characteristics and uniqueness, but the main focus is still on training students to be more independent and interact quickly when the teaching and learning process is being carried out in the classroom. With this multimedia assistance, teachers can more easily deliver various teaching materials because the presence of several multimedia devices such as computers can further foster student interest in learning plus a more innovative and creative learning atmosphere.

Changes in learning methods today are indeed widely supported by technological advances, in addition to the presence of technology in the world of learning, can help the task of teachers in fostering student interest in learning to be more independent and full of creativity. This can actually be introduced to students from an early age so that the potential for intelligence can be built as quickly as possible. With the multimedia learning method, students can learn independently at school about learning materials without having to wait to ask a teacher when experiencing difficulties, the use of multimedia in learning is able to provide a stimulus to students to be more enthusiastic and focus their attention on the teaching materials being taught. convey.

Currently the development of learning methods that are supported by technological advances can facilitate the task of teachers in growing student interest in learning independently and helping students' creativity to be developed in various ways, while the process is influenced by three main factors, namely learning effectiveness as measured by achievement, efficient learning as measured by learning time and learning costs, as well as learning attractiveness as measured by the willingness to learn.

In building a multimedia-based learning system, a methodology that suits its needs is needed, one of which is by using the Multimedia Development Life Cycle (MDLC) development model, in this methodology there are 6 (six) stages, namely Concept, Design, Material Collecting, Assembly, Testing and Distribution.

The concept stage itself is functioned to determine goals and programming, and to learn project management methodologies, besides that at this stage as well mdescribe the concept of an interactive learning media application for IT project management that will be built. Furthermore, at the design stage, it will be explained about the collection of materials that are in accordance with the needs being worked on. These materials include clip art images, photos, animations, videos, audio, and others that can be obtained for free or by ordering to other parties according to the design. This stage can be done in parallel with the assembly stage. However, in some cases, the material collecting stage and the assembly stage will be carried out linearly and not in parallel.

The manufacturing stage is the stage of making all multimedia objects or materials. Application creation is based on the design stage, such as storyboards, flowcharts, and/or navigation structures. The testing stage is carried out after completing the assembly stage by running the application / program and seeing whether there are errors or not. The first

stage at this stage is also known as the alpha testing stage (alpha test) whose testing is carried out by the maker or the maker's own environment. After passing the alpha testing, beta testing involving the end use will be carried out. And the last is the distribution stage where the application will be stored in a storage media. If the storage media is not sufficient to accommodate the application, compression of the application, compression of the application will be performed. (Sugiarto, 2018).

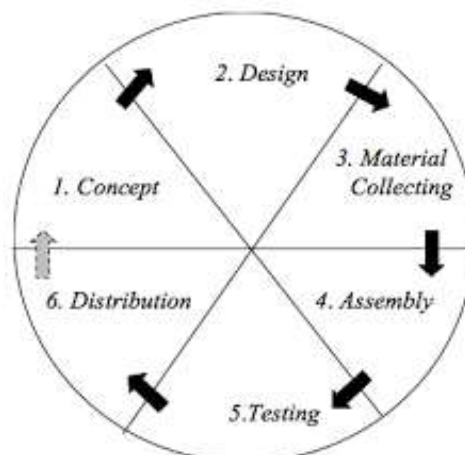
Multimedia is the basis for making students' learning atmosphere more interactive, because the process involves various combinations of graphics, text, sound, video, and animation. This merger is a unit that together displays information, messages or lesson content. Based on this opinion, it can be understood that interactive learning media which refers to multimedia are formed through a combination of graphics, text, sound, video, and several applications designed using a particular application in a computer device.

Based on the explanation of the background above, the researcher has focused the purpose of this research on the application of the multimedia methodology development life cycle To build a learning system among students, as for the benefits expected from the learning process, students can get to know more about multimedia-based learning methods and become a tool for teachers in delivering a variety of teaching materials. Because media and technology have a very important role in the learning process for students, besides that, the presentation of learning media is also supported with several advantages including graphics, audio, photos, and additional applications using computers. In learning media, the use of computer media plays an important role in distributing, storing and processing information, where the teaching-learning process becomes communicative, effective and efficient.

## II. Research Method

Methodology in system development is always associated with a framework with another term, namely framework, the purpose of realizing the framework is so that the research carried out has a clear direction so that it becomes a reference for researchers in developing the system. (Munir, 2002)

The methodology used in building this multimedia-based learning system is using the Multimedia Development Life Cycle (MDLC). This methodology is a version created by Luther which contains 6 (six) stages, namely: Concept, Design, Material Collecting, Assembly, Testing and Distribution.



*Figure 1. MDLC Luther (Binanto, 2010)*

The stages in the Multimedia Development Life Cycle (MDLC) are

### **2.1 Concept**

At this stage, it is carried out to determine the purpose of who is the user of the system, which can affect the development of a multimedia system as a reflection of the organizational identity so that it can determine what nuances are suitable for the user, besides that it can also determine the type of application such as presentation or interactive, and the purpose of the application for entertainment, training or learning.

### **2.2 Design**

The design stage is carried out to make specifications regarding the program's architecture, appearance, style and material requirements for the program. At this stage, you can use a storyboard to describe a description of each scene, so that each scene that is made complete with multimedia objects can be used as a reference for the next stage.

### **2.3 Collecting Materials**

*Collecting Materials* is the stage for collecting materials in accordance with the needs of the multimedia system to be built, for example, such as photos, videos, clip art images, audio and others.

### **2.4 Assembly**

*Addemply* is the stage of making all multimedia objects or materials, where the manufacture is based on the multimedia design stage, such as storyboards, flow charts or navigation structures. At this stage, software such as Macromedia Flash, Adobe Animate and others are used.

### **2.5 Testing**

At this stage, it is carried out after assembly by running the application and observing whether it is in accordance with the storyboard made so that it can determine whether there is an error or not from the multimedia system built. At this stage, testing is carried out with two techniques, namely alpha testing (Alpha Test) testing carried out by the maker or internal parties involved in the manufacture, and Beta testing involving end users who will use it.

### **2.6 Distribution**

At this stage, the system that has been built will be stored on the storage media, if it requires a large space, compression will be carried out on the system that has been built.

## **III. Results and Discussion**

In this study, it will produce a multimedia-based learning system that can help educators and students in a more interactive teaching and learning process, where this system will display several displays that appear based on the selected buttons, including the RPP, Material, Exercise button and Evaluation.


### **3.1 Concept**

The first stage we determine the user of this system is for elementary school so that the interface designed is simple and easy to use, besides that it must also be made as attractive as possible there are animations of the buttons it uses, the buttons that are made


include buttons for lesson plans, materials, Practice, Evaluation and each button brings up the next and previous sub buttons. This learning system is made in order to help the learning process so as to increase interest in learning in the students themselves.

### 3.2 Design

This stage is carried out to make a storyboard material design. The following is a storyboard design of the learning system that was built.

Visual	Sketch	Audio
<p>Inside this frame there is a background layer with a resolution of 1024 x 576, subject text, animation, organization logo and 4 buttons that can be selected, namely: lesson plans, material, training, and evaluation.</p>		<p>Musical instruments and the sound of the wind and the sound of buttons when clicked by the pointer</p>

*Figure 2. Main Menu Display Storyboard*

Visual	Sketch	Audio
<p>Inside this frame there is a background layer with a resolution of 1024 x 576, subject text, animation, organization logo and 4 buttons that can be selected, namely: lesson plans, material, training, and evaluation.</p>		<p>Instruments of musical instruments and the sound of the wind and the sound of buttons when clicked by the pointer</p>

*Figure 3. Storyboard RPP Display*

Visual	Sketch	Audio
<p>Inside this frame there is a background layer with a resolution of 1024 x 576, subject text, animation, organization logo and 6 buttons that</p>		<p>Musical instruments and the sound of the wind and the sound of buttons when clicked by</p>

<p>can be selected, namely: lesson plan, material, training, evaluation, next and previous.</p>	 <p>The image shows a software interface with a navigation bar at the top containing buttons for 'RPP', 'MATERI', 'LATIHAN', and 'EVALUASI', along with a home icon. The main content area displays the text 'Isi dari Materi' and a double-headed arrow at the bottom right.</p>	<p>the pointer</p>
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*Figure 4. Storyboard Material Display*

Visual	Sketch	Audio
<p>In this frame there is a background layer with a resolution of 1024 x 576, subject text, animation, organization logo and 4 buttons that can be selected, namely: lesson plan, material, training, evaluation. There are answer choices and number buttons to determine questions</p>	 <p>The image shows a software interface with a navigation bar at the top containing buttons for 'RPP', 'MATERI', 'LATIHAN', and 'EVALUASI', along with a home icon. The main content area displays the text 'Pertanyaan' and 'Hasil Jawaban'. Below the text are four multiple-choice options labeled A, B, C, and D, each with a corresponding input field. At the bottom, there is a row of numbered buttons from 1 to 10.</p>	<p>Musical instruments and button sounds when clicked by the pointer</p>

*Figure 5. Storyboard Exercise Display*

Visual	Sketch	Audio
<p>Inside this frame there is a background layer with a resolution of 1024 x 576, subject text, animation, organization logo and 5 buttons that can be selected, namely: lesson plans, materials, training, evaluation, and to start the evaluation</p>	 <p>The image shows a software interface with a navigation bar at the top containing buttons for 'RPP', 'MATERI', 'LATIHAN', and 'EVALUASI', along with a home icon. The main content area displays the text 'PETUNJUK PELAKSANAAN EVALUASI PEMBELAJARAN' and a button labeled 'Tombol Untuk Memulai Evaluasi'.</p>	<p>Musical instruments and the sound of the wind and the sound of buttons when clicked by the pointer</p>

*Figure 6. Storyboard Evaluation Display*

### 3.3 Collecting Materials

At this stage, the collection of learning materials used to build a learning system is carried out, starting from supporting images that function for making animations and the background of the learning system that is built. Then the audio can be used as background music for the learning system as well as the sound of the button when clicked by the pointer

### 3.4 Assembly

Assembly is the stage of doing a process of making a multimedia-based learning system in accordance with the storyboard that has been made in the previous stage so that its manufacture is in accordance with the desired expectations, along with the results of making a multimedia-based learning system.



Figure 7. Main Menu Display



Figure 8. RPP Display



Figure 9. Material Display



Figure 10. Material Display



Figure 11. Evaluation Display



Figure 12. Evaluation Display

### 3.5 Testing

After going through the assembly stage, the next is the testing stage on the learning system that has been built, testing is carried out with the Black Box Technique (Black Box Testing) by observing and running the learning system whether it is in line with expectations and no errors appear, here are the results of the tests that have been carried out.

**Table 1.** BlackBox Testing of Multimedia-Based Learning Systems

Input/Event	Process	Output	Test result
RPP button	Show RPP scene	Show RPP Scene	In accordance
Material Button	Showing Material scene	Show Material Scene	In accordance
Practice Button	Showing the Practice scene	Show Practice Scene	In accordance
Evaluation Button	Showing the Evaluation scene	Show Evaluation Scene	In accordance
Next Button	Show next scene	Show Next Scene	In accordance
Previous Button	Show Previous scene	Show Previous Scene	In accordance

### 3.6 Distribution

At the Distribution stage in building a multimedia-based learning system, a storage production process is carried out, namely by uploading it to Google Drive and converting a link that can be shared with users, both educators and students, for download. In addition to Google Drive, it is also stored on a flash disk so that it makes it easier for users if they don't have an internet connection to get the system that has been built.

## IV. Conclusion

Based on the description of the results and discussion of research related to building a multimedia-based learning system, this research produces several displays that can be controlled by 6 (six) buttons to lead to the display of lesson plans, materials, exercises and evaluations, in addition to adding additional buttons for load previous and next views. In addition, this learning system can provide convenience for students to capture students' understanding and interest in learning, this is because learning media are made more interesting and interactive and can be used at any time without the need for educators.

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