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DEVELOPMENT OF INTERACTIVE LEARNING MEDIA IN BASIC PROGRAMMING SUBJECTS BASED ON LEARNING MANAGEMENT SYSTEM (LMS)

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Abstract: Interactive Learning Media has a very important role in the process of teaching and learning activities (KBM) in schools, especially during a pandemic, where KBM activities must be carried out online (in a network). To streamline online learning activities are stored in the Learning Management System (LMS), which is a web-based software program for the management, documentation, monitoring, reporting, administration, and distribution of educational content, training programs, technical manuals, instructional videos or digital library materials, and projects learning and development. Interactive Learning Media is a multimedia-based tool that can describe messages or information from teacher to students in which active two-way communication occurs between multimedia and users (students) so that it can facilitate the online learning process. This study used the Multimedia Development Life Cycle (MDLC) method with six stages, namely: concept, design, material collecting, assembly, testing, and distribution. The research objective is to create interactive learning media for basic programming subjects using Articulate Storyline software. The results of designing learning media are in the form of a scam application that can be integrated into the school's Learning Management System (LMS) and can be accessed by students anywhere and anytime via a laptop or smartphone.

Keywords: Interactive Learning Media; Multimedia Development Life Cycle (MDLC); Learning Management System (LMS); Articulate Storyline Software.

INTRODUCTION

The condition of the Covid-19 pandemic has made all aspects of life undergo changes that are increasingly worrying. Direct and indirect transmission through objects, contaminated surfaces, and air, makes all humans in the world have to keep their distance in interacting. This makes all sectors of human life regress.

One of the biggest impacts of the pandemic is education. Learning process activities cannot be carried out, especially face-to-face, in which in the end the material is not well presented and makes the quality of education decrease. To achieve learning objectives, the learning process activities are carried out online.

One of the efforts of the online learning process is to use the Learning Management System (LMS), which is a web-based software program for the management, documentation, monitoring, reporting, administration, and distribution of educational content, training programs, technical manuals, instructional videos or digital library materials, and learning and development projects. LMS is used to deliver training and educational materials to students or external users via the Internet. It delivers content in a format that can be accessed, downloaded, and worked on from any location where an Internet connection is available. This flexibility and cost savings are two key elements of an LMS (Tafiardi., 2005).

So that the learning content in the LMS can be more interesting and effective, one of the important content in the training material is the creation of interactive learning media. Interactive learning media is anything in the form of learning media whose use can provide a bond between the audience and the learning media by giving each other influence and giving each other actions and reactions between one in helping to deliver learning material (Arsyad, 2011).

Learning media is a messenger technology that can be utilized for learning purposes. In addition, the media has various benefits, including helping teachers in delivering their teaching materials, the media is also seen as a communication tool that bridges abstract ideas and the real world (Sadiman, 2011).

One of the teaching materials that requires the creation of interactive learning media is the Basic Programming lesson because the level of difficulty of this subject matter requires an internal learning system. This subject belongs to the group productive subjects because in general vocational schools are divided into productive, normative, and adaptive lessons. where in addition to learning in the classroom, the learning process is also carried out in the laboratory because this subject has practicum material as stipulated in the vocational school curriculum whose derivatives are based on the syllabus and KI KD (Ministry of National Education, 2008).

Creating interactive learning media requires applications that already support the latest technology, one of which can be compatible with various devices and then in accessing unlimited time and place. The application that meets the criteria above is Articulate storyline, which is one of the multimedia authoring tools used to create interactive multimedia applications with content in the form of text, images,

graphics, sound, video, and even animation and simulation. For now, articulate storyline software is widely used, because it has advantages over other interactive media software (Yumini, 2015). Among them are:

1. Having this AS feature is very similar to the feature present on Ms. PowerPoint
2. Easy to learn for beginners who already have the basics of creating media using Ms. PowerPoint
3. Supports Game-based learning because it is Interactive
4. Content can be a combination of text, images, graphics, sound, animation, and video
5. The results of the publication can be run through:
   a. Desktop, in the form of an application file (.exe)
   b. Web browser, in the form of an HTML5 file
   c. Android smartphones, by converting them to APK
   d. LMS (Learning Management System) such as Moodle, in the form of SCORM files.
6. It has a relatively small file size of publications and APK conversions so it is lightly installed on a smartphone.

The development of interactive learning media requires software development methods, one of the development methods that can be used is the Multimedia Development Life Cycle (MDLC) method. Nurajizah (Mustika, 2017)has used the MDLC method in developing a multimedia-based children's song recognition application, the application creation process uses six stages, namely: concept, design, material collecting, assembly, testing, and distribution.

Based on the description above, the research made interactive learning media in basic programming subjects based on the Learning Management System (LMS) using the Multimedia Development Life Cycle (MDLC) research method.

MATERIALS AND METHODS

The development of this multimedia method is carried out based on six stages, namely concept, design, material collecting, assembly, testing, and distribution. According to Luther in Binanto (Binanto, 2010), these six stages do not have to be sequential in practice, they can exchange positions with each other. Even so, the concept stage should indeed be the first thing to do. Figure 1 is a stage drawing of the MDLC method.
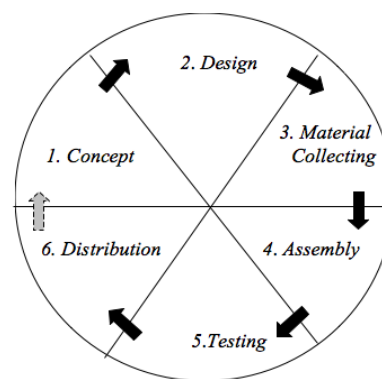

Figure 1. Stages of the MDLC method

1. Concept (Pengonsepan)

This stage is the stage for determining the purpose and who the users of the program are (audience identification). The purpose and end use of the program affects the nuances of multimedia as a reflection of the identity of the organization that wants the information to reach the end user.

At this stage, researchers conceptualize, among others, to:

a. Determine the objectives and benefits of project management methodology learning media applications.
b. Determine who the users of the project management methodology learning media application
c. Describes the concept of the IT Project Management Interactive Learning Media application to be built.

2. Design

At this stage the creation of specifications regarding the program architecture, style, appearance, and material/material requirements for the program. The design that will be made uses the interface design of the application menu display. The software used to design the interface is Microsoft Visio.

3. Material Collecting (Pengumpulan Bahan)

This stage is the stage of collecting materials that correspond to the needs worked out. These materials include clip art, photos, animations, videos, audio, and others that can be obtained for free or by ordering from other parties according to their designs. This stage can be done in parallel with the assembly stage. However, in some cases, the material collecting stage and assembly stage will be done linearly and not parallel.

4. Assembly

The assembly stage is the stage of making all multimedia objects or materials. App creation is based on design stages, such as storyboards, flowcharts, and/or navigation structures.

5. Testing

The testing stage is carried out after completing the assembly stage by running the application/program and seeing if there are any errors or not. The first stage at this stage is also known as the alpha test stage whose testing is carried out by the maker or the maker's environment. After passing alpha testing, beta testing involving end use will be performed.

6. Distribution

At this stage, the application will be stored in a storage medium. If the storage medium is not sufficient to hold the application, compression to the application, compression to the application will be performed. This stage can also be called the evaluation stage for the development of a finished product to be better.

RESULTS AND DISCUSSION

The use of the MDLC method produces research results with the following steps:

1. Concept (Pengonsepan)

This stage produces a formulation of the concept, namely:

a. The purpose of the application is an interactive learning media based on the Learning Management System (LMS). The benefits of the

application are to make it easier to learn Basic Programming material so that students can be more motivated to learn and easily understand the learning material.

b. The user of the application is a student of SMKN 1 Cibinong.

c. Description of Interactive Learning Media Application Basic Programming Subjects, based on LMS, so that it can be operated on various devices anywhere and anytime.

2. Design

In this design stage, the author analyzes and designs interactive media data as reference material in the process of making interactive media.

a. Site Map Basic Programming Learning

The Site Map of this komjardas subject illustrates a diagram in the division of the order of material that is entered into interactive learning media and used in teaching and learning activities.
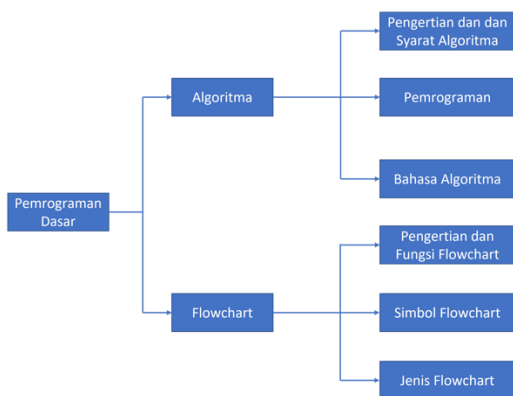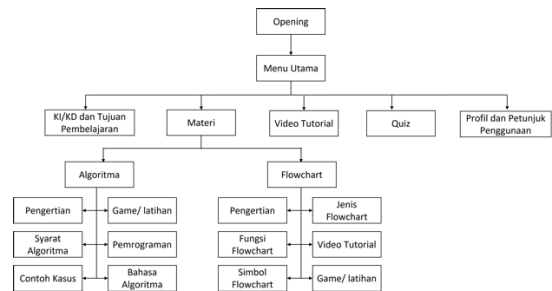

Figure 2. Site Map Mapel Basic Programming

b. Learning Media Menu Structure

The structure of learning media in each development is needed to create a flow or arrangement of the media display to be built. This media structure is made in the form of images or charts that are used as a reference in the development of learning media.


Figure 3. Learning Media Menu Structure

c. Designing the interface display

The interface is used to describe each display contained in the learning media before the implementation stage is carried out. The results of the interface design that has been made can be described as follows:
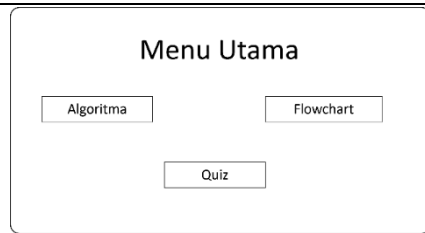
1) Title and Opening Page
This view is designed to display the title of the media application.
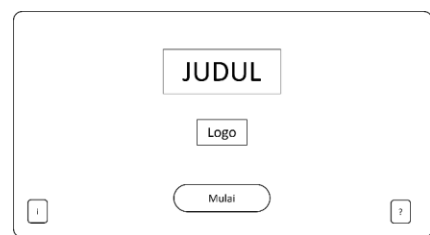
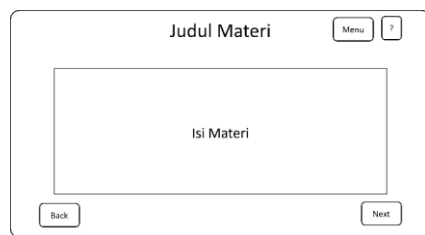**Figure 4.** Opening page design

2) Main Menu Page
The main page is a page in which there are main buttons that function as navigators to go to the desired page.

Figure 5. Main page design

3) Material Page

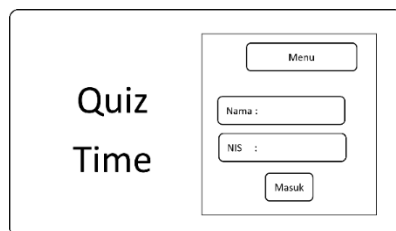This page is for displaying learning materials.

Figure 6. Material page design

4) Evaluation Page

This page is an evaluation page for students as evaluation material for the teaching material that has been studied.

Figure 7. Valuation page design

3. Material Collecting (Pengumpulan Bahan)

At this stage, material related to teaching materials/learning materials is obtained from interviews with teachers who teach basic programming subjects, read books, and search for other resources from the internet. As for interactive multimedia-related materials, authors get material from reference books and the internet. Assets or materials for making interactive media are images or images such as images that will be used as backgrounds and buttons, animations for the opening, and sounds that will be used as backgrounds or sound effects.

To build an application, hardware, and software are needed. The hardware used is a set of computers with specifications: Intel Inside Core i5 Processor, 4 GB Memory, and 12.0" Monitor. The software needed is Windows 10 Home as an Operating System, Articulate Storyline 3.0 is used to create and process applications, Adobe Illustrator is used to process images, Adobe After Effects to process animations, and Adobe audition to process sound.

4. Assembly

At this stage, the creation of the application uses Articulate Storyline Software, for a design using Adobe Illustrator Software. The process of creating interactive media for basic programming subjects based on the design process is as follows:

a. Opening Page

This page was created as an opening for an interactive media application by displaying a title. This page is designed using the adobe after effect application and then entered into the articulate storyline application so that it becomes a moving text animation

Figure 8. Opening Page View

b. Main Menu Page

On this page, there are 3 main buttons about the material to be studied and quizzes. Then above there is a button with a question mark, which serves as a hint for using the program
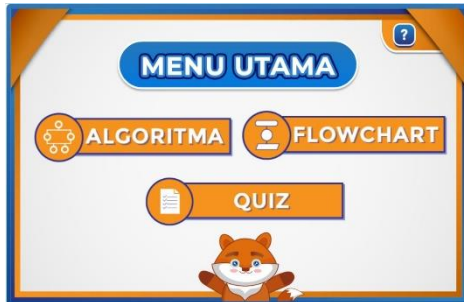

Figure 9. Main Menu Page View

c. Material Page

On this page, there is a material title in the top center, the content of the material in the middle of the page, and the sub-material are in the bottom left. Then above the right, there is a menu button from the material and instructions. On the left and right sides of the material, there are the next and back buttons.

Figure 10. Material Page View

d. Quiz Page

On this page, there is a quiz title on the left side of the page and the username input is in a box on the right side of the page and a login button. Then there is a login button under the username.

Figure 11. Quiz Page View

After the student finishes doing the quiz, a results page will appear with a tail and cartoon image displayed on the right and left sides of the page. Below the page, there is a repeat button and below it again there is a description of the quiz results. Above the kana, there is an x button to exit the quiz.

Figure 12. Quiz Results Page View

5. **Testing**

The testing stage is carried out after completing the assembly stage by running the application/program can be seen whether there are errors or not. At this stage, testing is carried out using black-box testing. This black box method is a program test based on the function of the program. The purpose of this black box testing method is to find function errors in the program. Blackbox testing focuses on the functional requirements of the software. This test allows the analysis of the system to obtain input conditions that work on the entire functional needs of the application.

The last test scenario that is carried out repeatedly can be to obtain test results. The test results can be seen in table 1.

Table 1. Test Results

No.		Kegiatan Testing	Hasil Pengujian
1.	*Image/* Gambar	Pengujian pada gambar *background* aplikasi.	Ok
		Pengujian gambar pada *button* aplikasi.	Ok
		Pengujian pada *Image* pendukung aplikasi.	Ok
2.	*Button/* Tombol	pengujian pada *Button* Materi	Ok
		pengujian pada *Button* Soal	Ok
		pengujian pada *Button* Home	Ok
		pengujian pada *Button* Back	Ok
		pengujian pada *Button* Exit	Ok
3.	Animasi	pengujian pada animasi *loading*.	Ok
4.	Suara	pengujian pada suara latar aplikasi.	Ok
		pengujian suara pada *button* aplikasi.	Ok

6. Distribution

The distribution stage is the stage where the application is stored in LMS or online learning media. This is the final stage where interactive learning media is ready to be used by students in the learning process. This basic programming interactive learning medium was created using Articulate Storyline 3.0, where project files are stored in the form of *.ls files. story (articulate document). After the media has been created, it is then exported into a file *. score, so that the application can be run easily in the LMS.

CONCLUSIONS

The development of interactive media learning media for basic programming subjects was created using Adobe Illustrator, Adobe After Effect, Adobe Audition, and Articulate Storyline 3.0 software. The MDLC method is used in the development of this interactive learning media, which produces interactive multimedia learning media in the form of interactive media that can be integrated into the LMS page which aims to facilitate the teaching and learning process between teachers and students. The learning media created has been tested with blackbox testing techniques with good results.

The next suggestion for researchers is to be able to develop even more interesting interactive learning media, by combining 3-dimensional objects and learning simulation animations. Applying learning media using dynamic learning models. It is necessary to add material so that this interactive multimedia application can be fully used on Basic Programming Subjects.

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