WILMO (Web-based Interactive Learning Module), E-learning Design for Vocational School

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Abstract. Today, technology and learning have synergized with each other among educators. A learning media, specifically designed with the application of technology, can contribute to effective teaching for all students and can help them reach their highest potential. This study aims to design a learning module named WILMO (Web-based Interactive Learning Module) with ADDIE (Analysis Design Development Implementation and Evaluation) as the development model. This design comprises the depiction of Flowcharts, Data Flow Diagrams, and Deployment diagrams of WILMO.

Keywords: WILMO, ADDIE, Interactive learning, E-Module, E-Learning

1. Introduction
The growth of technology nowadays has changed the people’s mindset, to move from conventional to modern ways, especially at education field [1] [2]. There are several factors that affect learning process, including educators, students, the study material, teaching methods, facilities, and the learning tools [3] [4]. Media is anything that can distribute messages from sender to recipient, so it can stimulate the thoughts, feelings, concerns and interests and attention of students in such a way that the learning process occurs. Using media in the learning process is not just limited as a learning tool, but also has a specific goal of achieving effective learning. Using media in learning is a supporting tool that can improve the efficiency and effectiveness of learning success [4] [5]. A learning media, specifically designed with the application of technology, can contribute to effective teaching for all students and can help them reach their highest potential. This means that media and technology have a contribution to improve the quality of teaching and also can generate the best potential of students. With the use of technology, it's expected to change the learning patterns, from teacher-centred to student-centred, from transferring as much knowledge as possible to facilitating students to build knowledge by using the results of technology.

Today, technology and learning have synergized with each other among educators. Using technology can’t separate with the learning process in these days, because technology has penetrated human life in various fields [6]. Today, students have many choices of applications that can be used as the learning resources, depending on the learning style and subject needed. The utilization of technology by students can reform traditional teaching and education styles, so it can train many people to become high-quality human resources, including those who were once "allergic" to technology [7].
The total population of Indonesia reaches 268.2 million, while Mobile users (smart phones and tablets) reach 355.5 million, this means that the circulation of smart phones and tablets is more than the total population in Indonesia [8]. There are 150 million active internet users, it means that 56% of the total population of Indonesia has used the internet. Likewise, with social media, on average 50% more of Indonesia's population actively uses social media [8]. For young users (18-34 years) smartphone ownership increased from 39% to 66% from 2015 to 2018. Whereas for mobile users aged over 50 years, smartphone users also rose from 2% in 2015 to 13% in 2018 [8] [9]. But unfortunately the use of internet for education is lower than the use for social media [7] [8] [9].

Based on observations in several schools, especially in East Lombok district, West Nusa Tenggara Province, the use of media with the use of internet technology in learning is still lacking. One of schools that has not maximized the use of the media with internet technology in East Lombok district is the Vocational High School (SMK) Al-Madani. From interviews with the librarian at SMK Al-Madani, that the availability of learning resources is still lacking. Based on the results of interviews with several teachers at SMK Al-Madani, we found that the teacher still uses the teacher-centred learning model. The learning resources used by teachers are still in the form of worksheets, the teacher has not maximized the use of technology as a learning medium. We found from the result of interviews with several students that the use of electronic media in the learning process is very lack. The teacher just using a textbook, sometime using power-point but it is still not optimal because of lack of LCD availability, so teachers must take turns to using it. From the findings of the facts above, we developed a learning media named WILMO (Web-based Interactive Learning Module) as a solution to facilitate teachers and students in the learning process. This application use e-learning concept because it suitable with interactive learning [10]. Using web-based module as a medium for interactive learning can enhance the ability of creative thinking, conceptual understanding, and students’ character [11] [12].

2. Methods
This study uses research and development method, with ADDIE as a development model [13] [14] [15] [16] [17]. The phase in developing the ADDIE model are Analysis, Design, Development, Implementation, and Evaluation.

![Figure 1. The ADDIE phase circle](image)

3. Result and Discussion
Based on the results of previous studies at the analysis phase of the ADDIE model, this study then continues to the design phase. We divide the analysis phase into two parts: user needs and system requirement. In the analysis of user needs found several components that must be present in the learning media including learning materials, competencies, video tutorials, profile, students, evaluations and student management. While in the analysis of system requirements found usage requirement and design requirement. In this usage need, there are several software used to operate this learning media, like browser and XAMPP. As for the design requirements needed some software (Dream weaver and Photoshop) as a web editor and programming languages including PHP, CSS, JavaScript, SQL. In this study focuses on the design phase which comprises Flowcharts, Data Flow Diagrams, and Deployment diagrams [18] [19] [20].
3.1. Flowchart

On the figure 2 can show the design of how the process of WILMO’s flow will run. The process divided in 3 users: Teacher, Student, and Administrator. The flow process for the Teacher are: login, verification of username and password, learning material data management, competence data management, video management, test management, student data management, and log out. The flow process for the Student are: login, verification of username and password, profile management, test, and log out. Student also can show the test result, learning material, and competence. Meanwhile, the Administrator can do all the process on the flowchart.

3.2. Data Flow Diagram (DFD)

a. Context Diagram

On the figure 3 can show the context diagram of WILMO. The application has three actors or users. That three users are Administrator, Teacher, and Student. The Administrator can access
(input/output) all data from the database of WILMO. The teacher can input data: learning material, video, student, competence, and test, meanwhile the output data for the teacher are learning material, video, student, competence, test, and test result. The Student can input data: profile and test answer, and output data: profile, test result, competence, video, and learning material.

b. **DFD Level 0**

![Data Flow Diagram of WILMO](image)

Figure 4. Data Flow Diagram of WILMO

On figure 4 can show how data from database transferred to the application. This application has 7 tables: account, learning material, competence, video, test, student result, and student profile. The data for login process use the data from account able, for learning process use the data from learning material and competence table, for competence process use the data from competence table, for video process use the data from video table, for test process use the data from competence, test and student result table, for student data process use the data from student result and student profile table, and for student profile process use the data from student profile table.
3.3. Deployment Diagram

![Deployment Diagram of WILMO](image)

**Figure 5.** Deployment Diagram of WILMO

On figure 5 above show how the WILMO deployed into the hardware system to execute the complete functionality.

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