



Design and Build a Web-Based E-Learning Application System at Paramarta Vocational High School

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ABSTRACT

The conventional learning system is still being implemented at SMK Paramarta, which includes direct contact between teachers and students. However, with the advancement of technology, there is a need for an e-learning system that can facilitate the teaching and learning process and provide more varied learning activities for students. Therefore, this research aims to design and develop a web-based e-learning application system at SMK Paramarta. As a result, when a teacher is unable to attend, the teaching and learning process will be disrupted because there is no other media to deliver learning materials from the teacher to the students. The design of the Web-based E-learning Application System is built using HTML, JavaScript, PHP, MySQL, and CSS to beautify the e-learning pages that will be created. The web-based e-learning application system designed in this research can be an alternative modern and varied learning activity for students at SMK Paramarta. Additionally, this system can also assist teachers in providing learning materials and testing student understanding in a more effective and efficient manner. Therefore, it is hoped that the use of this system can improve the quality of education at SMK Paramarta. To ensure that the application runs smoothly, two testing phases are conducted: white-box testing and black-box testing on the data transfer process that runs within the e-learning application

INTRODUCTION

Education is a very important factor in preparing young people for the future. In an era that is increasingly digitized, it is very important for students and teachers to have easy and efficient access to innovative and all-encompassing learning. One level of education that is very important in preparing students to enter the world of work or continue their studies to a higher level is Vocational High School (SMK).

SMK plays an important role in preparing students to enter the world of work by equipping them with the necessary skills and knowledge. In an era that is increasingly digitized, SMK must ensure that their students have the skills and knowledge necessary to compete in the future world of work. However, implementing effective and innovative learning in SMK raises new challenges in creating new ways of learning.

Yesterday's COVID-19 pandemic forced schools and teachers to find ways to ensure that students could still learn and interact with teachers even though they couldn't gather physically. This fueled the growth and popularity of e-learning as a flexible and efficient learning solution. Even though the pandemic situation is no longer around, the urgency to provide efficient, flexible and innovative learning solutions is still important.

E-learning offers a solution that allows students and teachers to continue to interact and learn even though they can't get together physically. It also assists schools in meeting educational standards that must still be met without being hampered by factors such as bad weather or health issues. In addition, e-learning allows flexibility in time and place of learning for students, helps reduce costs and workload for producing and distributing physical learning materials, and allows schools to increase the efficiency and effectiveness of learning.

Paramarta Vocational School has a website but does not yet have its own academic learning application that can be accessed online, the application of teaching and learning activities is still conventional, namely face to face with the teaching staff, so that this becomes a limitation for students in obtaining learning material if students are hindered in attending conventional teaching and learning activities.

Reflecting on the time the COVID-19 pandemic took place yesterday, Paramarta Vocational High School used applications from 3rd parties such as Google Form, Whatsapp, and Schoology which of course if you use these applications, Paramarta Vocational School has limitations in using features because there are a number of costs that must be incurred to obtain access the desired features.

In the context of learning at Paramarta Vocational High School, e-learning tools can help ensure that students have the skills and information required to enter the workforce or further their education, E-learning applications can also help Paramarta Vocational High School meet educational standards and face future challenges, such as global competition and digital transformation.

In this case, the design of an e-learning application for Paramarta Vocational High School is an important thing to do. Through this application, it is hoped that it can help ensure that Paramarta Vocational High School students have easy

and efficient access to innovative and thorough learning, preparing students to face challenges and opportunities in the future

LITERATURE REVIEW

Running System Analysis

The current system is still conventional by carrying out teaching and learning activities face-to-face only and the lack of use of technology. The media that is often used is books as a source for students to learn or get information other than the teacher, and rarely use technology in teaching and learning activities. Paramarta Vocational School has a computer laboratory for students in carrying out teaching and learning activities, but as a school that has private school status, of course the teachers do not only teach at Paramarta Vocational school but also teach at other schools.

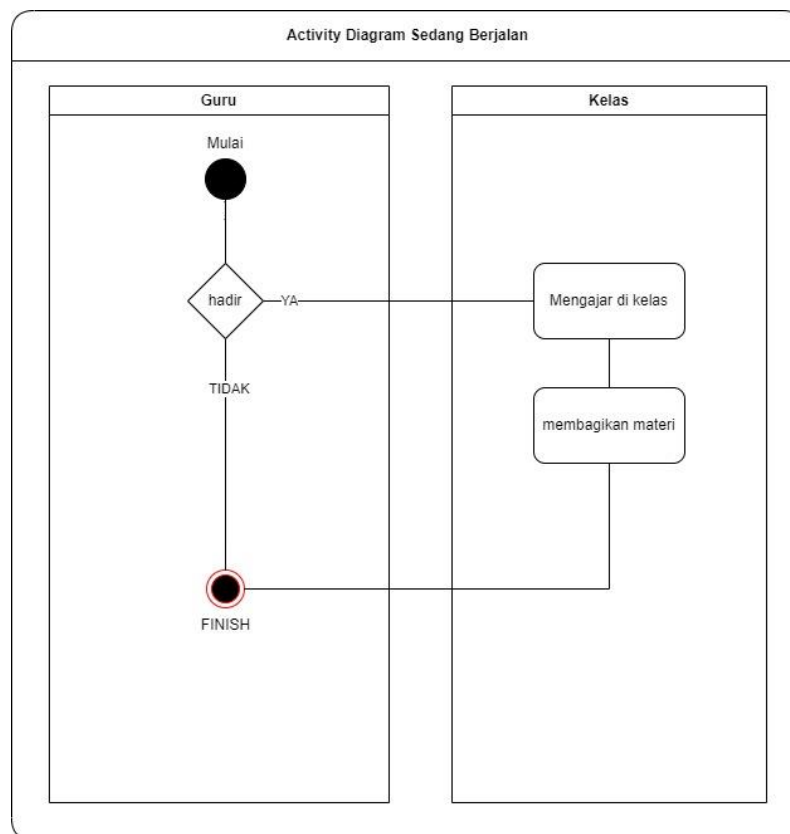


Figure 1. Activity Diagram Running system

Proposed System Analysis

This stage is the stage carried out by researchers to design the proposed system to create a new system, so that the problems that exist in the old system can be resolved.

From the results of the analysis of the running system, a system was designed to make it easier for the teaching staff to provide material online through this system and also as one of the uses of technology in the world of education, so that students will not miss the ongoing material and of course interactions. Between teachers and students is not interrupted. This system is equipped with a database that allows teaching staff to provide material online

and likewise students who are unable to attend can get learning material, the teaching staff can provide material online through this system.

Use Case Diagrams

Use Case Diagrams are used to analyze the needs of the web-based e-learning application system to be built. Use Case Diagram shows the function of a system and how actors interact with the system.

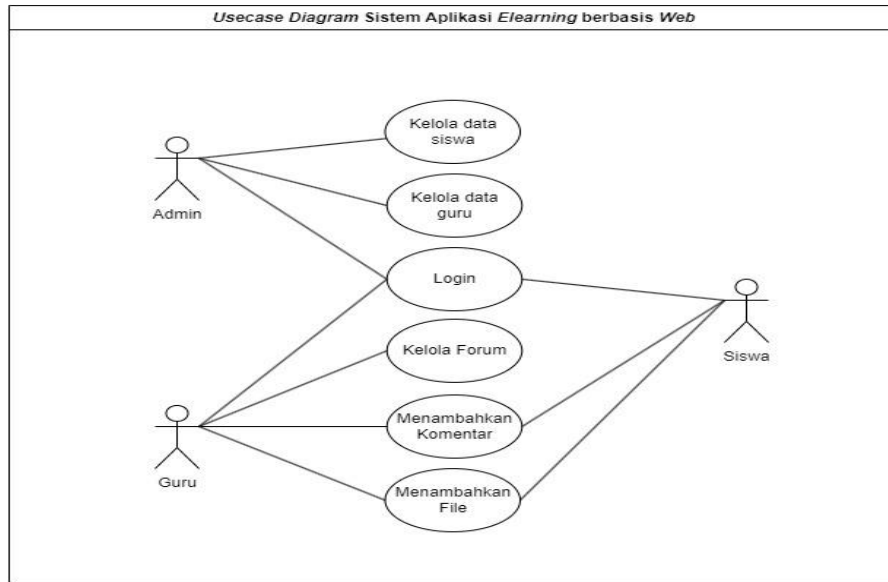


Figure 2. Use Case Diagram of E-learning Application Web Based

Database Tables

The tables needed to accommodate the data needed for the design and build of an E-Learning Application System at Web-Based Paramarta Vocational High School.

Table 1. Student Table

Number	Name of Field	Size and Type
1	userid	Int(16)
2	nama_user	var(30)
3	kode_jurusan	var(15)
4	u_pass	int(16)
5	roles	int(2)
6	statuses	var(10)

Table 2. Teacher Table

Number	Name of Field	Size and Type
1	userid	Int(16)
2	nama_user	var(30)
3	kode_jurusan	var(15)
4	u_pass	int(16)
5	roles	int(2)
6	statuses	var(10)

Table 3. Subjects Table

Number	Name of Field	Size and Type
1	id_mapel	Int(10)
2	id_guru	Int(16)
3	nama_mapel	var(30)
4	nama_guru	var(30)
5	kode_jurusan	var(16)

Table 4. Forum Table

Number	Name of Field	Size and Type
1	id_forum	Int(10)
2	id_guru	Int(16)
3	id_quiz	Int(6)
4	judul_forum	var(50)
5	deskripsi_forum	var(100)
6	nama_mapel	var(30)
7	nama_guru	var(30)
8	kode_jurusan	var(16)
9	status_forum	var(16)

Table 5. Question Table

Number	Name of Field	Size and Type
1	id_pertanyaan	Int(16)
2	pertanyaan	var(255)
3	jawaban_a	var(255)
4	jawaban_b	var(255)
5	jawaban_c	var(255)
6	jawaban_d	var(255)
7	jawaban_benar	var(2)
8	id_quiz	Int(16)

Table 6. Forum Quiz Table

Number	Name of Field	Size and Type
1	id_quiz	int(16)
2	id_guru	int(16)
3	nama_guru	var(30)

Table 7. Posting Table

Number	Name of Field	Size and Type
1	id_postingan	Int(16)
2	id_parent	Int (16)
3	id_forum	Int (16)
4	userid	Int (16)
5	nama_user	var(30)
6	pesan	var(250)
7	file_dir	var(250)
8	timestamp	int(20)

Table 8. Quiz Answer Table

Number	Name of Field	Size and Type
1	id_jawaban	int(16)
2	id_pertanyaan	int(16)
3	userid	var(250)
4	jawaban_user	var(2)
5	is_correct	var(250)

METHODOLOGY

Method of Collecting Data

In this study, the researcher applied several methods to solve the problem being studied, as follows:

1. Observation

The author collects data by direct observation to the place where the research is carried out on the elements studied systematically. In this case the observation was carried out at SMK Paramarta Jombang Ciputat, South Tangerang.

2. Interview

The author collects data by conducting question and answer questions to the relevant Paramarta Vocational Schools.

3. Library Studies

In writing this thesis, a library study was carried out to collect data and information through books and scientific journals related to the application system being studied.

System Development Method

The system development method approach used by researchers is the waterfall model, the waterfall model provides a sequential or sequential software life-flow approach starting from analysis, design, coding, testing, and implementation.

RESULTS

Black Box System Testing

Black box testing is the process of testing software from functional specifications without testing the design or program code. The goal of testing is to determine whether the software's functionalities, input, and output meet the required criteria.

Based on the test plan that has been prepared, the following tests can be carried out:

Table 9. Blackbox Testing Login Form

No	Testing Scenario	Expected results	Result	Conclusion
1	Input username, password	<i>The field can be filled with input and if the input is correct, it will enter each user's page.</i>	<i>Fields can be filled as expected</i>	<i>Passed</i>
2	Pressing the login button	When the button is pressed and the input data is valid, it will then be entered into the dashboard.	The login button is clickable and as expected	<i>Passed</i>
3	Log in to each user page	When the login data is valid, it will go to the page of each user	Successfully logged in to each user page	<i>Passed</i>

4	Pressing the logout button	When the logout button is clicked, it will immediately exit the current page, and return to the login page.	The Logout button works as expected.	<i>Passed</i>
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White Box System Testing

In this test, the control structure of the test case program will be researched to guarantee that all statements in the program have been run at least once during the test, and that all logical conditions have been evaluated

Table 10. Whitebox Testing Login Form

No	Testing Scenario	Description	Conclusion
1	<code><?php header("location:pages/home"); ?></code>	Displays the start/login page when the elearning domain is accessed	<i>Passed</i>
2	<code>if(isset(\$_POST['login'])) //QUERY {if(mysqli_num_rows(\$get)== 1){Login();}</code>	The system validates and redirects users according to the page.	<i>Passed</i>
3	<code>else{ Alert('username/password salah!');}}</code>	If there is an error then an alert will be displayed and returned to the original login page	<i>Passed</i>

DISCUSSION

Implementation Program

Implementation is a stage of implementing the system to be used by, at this stage it will be explained about the system that has been built and the user how to use it. The design of a web-based e-learning application system is a system that is ready to use or operate, to determine the user's comfort level in using the application. Before the implementation of a program is carried out, the first thing to ensure is that the program must be free from the term error, which occurs due to errors in writing the programming language during development. If the submission of the system has no errors, then the next stage is the trial or trial stage.

Login

On this page the user (Admin, Teacher, Student) will enter their username and password to log into the application. This login page is Multi User Level.

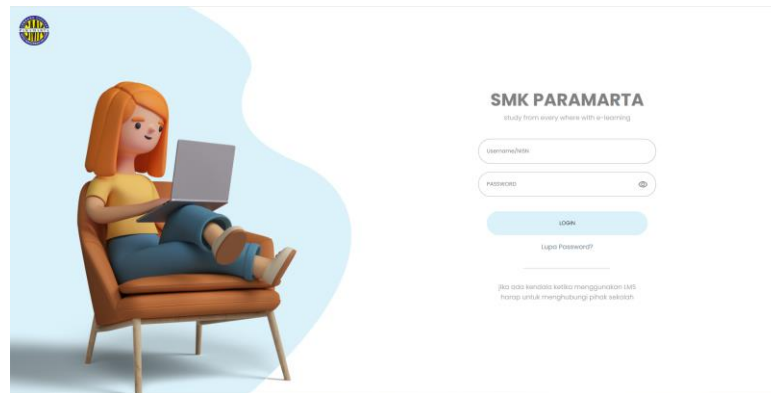


Figure 3. User Login Pages

Discussion Forum Page

On this page, teachers and students can interact in it. Teachers can make questions during the process of creating a forum, then these questions will be answered by students in the forum.



Figure 4. Test Forum

CONCLUSIONS AND RECOMMENDATIONS

Conclusion

Based on the results of the discussion on the design of a web-based e-learning application system at Paramarta Vocational High School along with the descriptions listed in the previous chapter, the following conclusions can be drawn:

1. By making this application, teachers and students can have teaching and learning activities that are more varied and can be accessed anytime and anywhere.
2. By utilizing this application, it is hoped that it will make it easier for teachers and students to obtain or provide learning material.
3. With the use of this application, it will increase the credibility of the school in the eyes of the community.

Recommendations

The suggestions that can be put forward are as follows:

1. This e-learning application is still only a teacher, and students can post something in the forum that has been created by the teacher in question, it is hoped that further development will be done to include additional functions such as grade recap and others, or to develop more complete features.
2. Maintaining security and backing up data - data that has been stored in the database so that data that has been stored will not be lost in the future.

FURTHER STUDY

I hope that there will be further developments on this topic, because as a writer I know that the research I have conducted still has many shortcomings and further development is needed. The author hopes that future researchers will develop a better system than what I have done. Greetings from the author.

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