Design of Learning Management System for Air Navigation Engineering

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Abstract

With its vast potential, information technology has revolutionized education through various innovations. The quality of the teaching and learning process has significantly improved with the aid of information technology. Face-to-face learning is no longer the sole option as the presence of an LMS eases the process of teaching and learning. In the course of developing an Air Navigation Engineering Learning Management System using the ADDIE method (Analysis, Design, Development, Implementation, and Evaluation), the design was implemented on WordPress due to its flexibility in integrating plugins. This LMS website for Air Navigation Engineering prioritizes material, material delivery, quizzes, assessments, and certificates. The website's data validation yielded an overall feasibility rate of 96.6%, as confirmed by objective validators. Multiple respondents attested to an overall usability rate of 96.2%. Efficient material delivery is facilitated through the use of instructional videos. Additionally, the website offers a payment system for accessing necessary materials.

Keywords: Learning Management System, WordPress, Website

INTRODUCTION

Nowadays, it is undeniable that technology plays a vital role in everyday life. One such role is information technology in the education sector, which significantly improves the quality of teaching and learning. Face-to-face learning is no longer the only option available; now, an LMS exists that simplifies teaching and learning activities.

LMS, or Learning Management System, is a platform created to support users in conducting the teaching and learning process through information technology and the internet. LMS offers numerous advantages to users, including flexible learning opportunities and time management assistance, as users can access learning materials at their convenience from anywhere. Users do not need to spend a lot of money on transportation; they simply need an internet connection to access all necessary information for their learning process.

WordPress is a platform commonly used for creating a Learning Management System (LMS). Its abundant features make it a popular choice for LMS creation and management. One of the benefits of utilizing WordPress as an aspect of an LMS is its adaptability. As an open-source system, users have the ability to tailor the look and functionality to suit their needs. WordPress permits LMS users to construct an efficacious and eye-catching learning platform at a reasonable cost.

In the Diploma 3 Air Navigation Engineering Study Program at Surabaya Aviation Polytechnic, there is not a Learning Management System site accessible to the public. With the Learning Management System (LMS) website, members of the general public can access materials they need. Integration with the Bureau of Labor and Statistics or the Public Service Agency will facilitate services in direct contact with the community. From this, a research idea titled "Designing an AIR NAVIGATION ENGINEERING LEARNING MANAGEMENT SYSTEM" was generated.

The problems, based on the aforementioned background, can be formulated as follows:

1. How to design the website for the Air Navigation Engineering Learning Management System?

2. How can a Learning Management System website for Air Navigation Engineering be created?

3. How to implement a payment system for the Air Navigation Engineering Learning Management System website?

Website

Websites are multimedia pages or elements that can display text, data, images (static or moving), animation, audio, video, or a combination thereof, to anyone with an Internet connection. are accessible, regardless of location. [1] A website is made up of a collection of linked web pages. The front page of a website is called the homepage, while its standalone pages are called the website. In simpler terms, a website is accessible and visible to internet users around the world [2].

LMS

LMS is a web-based learning management application that supports virtual learning. It is a way to develop online learning or E-Learning. Learners can participate in online courses . [3] According to [4] learning management system (LMS) is a support system for managing and distributing e-learning content. The LMS must include a catalog function that displays the learning materials provided. Categories can sort documents by type and adjust the schedule accordingly. Registration and approval are available for learners who wish to apply online. Online learning can be managed and tracked through this feature. Learning Management System (LMS) is necessary for effective management of the e-learning system and accurate monitoring of learners' activities. In addition, the LMS should conduct systematic before and after school assessments. Clear communication is also essential. Learning Management System (LMS) serves as a means of communication, facilitating communication and other interactions between learners and the school. In addition, LMS generates reports containing student activity data to provide to teachers and school administrators. In addition, teachers can use LMS to present lesson plans. Integration: Learning Management System (LMS) can act as a bridge of communication between different school systems, including the financial and media systems, among others.

Media

According to [5] media is defined as anything that can be used to convey educational messages or content to stimulate students' thoughts, feelings, attention, and abilities in order to promote the teaching process. and study. From the different definitions above, it can be concluded that a learning medium is any object that can convey educational messages or content to stimulate students to learn.

Computer Based Training

According to D. Daryanto [6], Computer-based training (CBT) is an effective self-study strategy. CBT allows learners to search for material and practice using CBT apps. Furthermore, we can benefit from many aspects of our research. This software is intentionally designed to enhance learning.

Key Components of a WordPress-based Learning Management System

In a Learning Management System (LMS) based on WordPress, there are numerous vital components that simplify the process of creating and administering online courses, including:

a) Theme

A WordPress theme is an installable file that defines the look and feel of your website. The best thing about WordPress themes is that there are so many free options to choose from. . [7].

b) Security

Secure Sockets Layer (SSL) is the protocol used for secure browsing. In this case, SSL acts as a protocol that provides communication between the client and the server. This protocol facilitates the use of encryption of sensitive data and ensures the integrity of information exchanged between the website and the Internet browser. [8]

c) Plugin

A WordPress plugin is a collection of additional applications that users can install or add as needed [9]. A WordPress plugin is a collection of additional applications that users can install or add as needed [9]. Plugins are required for WordPress. The Google Privacy Policy plugin is a necessary addition as it is both user-friendly and explains how to easily add processed information. The Google XML Sitemaps plugin allows owners to create custom XML sitemaps to facilitate indexing by Google, Bing, Yahoo or Ask.com search engines. Sitemap acts as a sitemap, allowing to create a list (index) of articles on a page [10]

WordPress

WordPress is a very popular open source web application that is often used as a blogging system or foundation for other types of websites. WordPress.org is a developer domain where one can download the app as well as all the WordPress CMS files. [11]. WordPress users can also get free updates to the latest software, which is even a requirement for WordPress users, as these updates ensure the latest software usage and security protection. most recent security inside WordPress [12]. In general, WordPress is mainly used to create blogs. However, as this application grows, it becomes more flexible and can be modified to meet specific needs. Besides serving as a blog, WordPress can also function as a portfolio, business, news, e-commerce, forum, or school website [13]

The Payment System

According to [14], E Electronic commerce (e-commerce) can be defined as commercial activity using digital or online/internet technologies, such as online purchasing and payment systems. Online businesses can use the web, email, and social media. Web devices include web server software and web browsers. The easiest way to sell online is through popular e-commerce marketplaces. You can also build your own ecommerce website by renting a dedicated ecommerce web host or web host and using web builder apps like WordPress. The WordPress web builder also supports small screens or is responsive to mobile devices.

Wireframe

Wireframes are frames for organizing an element on a website or application page. Wireframes are simply defined as frames for images [15]. During the wireframe development phase, the focus is on functional features rather than visual elements. Wireframes are used to connect concepts and present them in a visual form. During the wireframe development phase, the focus is on functional features rather than visual elements. During the wireframe development phase, the focus is on functional features rather than visual elements. Commonly used colors are black, white and gray. The website design was chosen because it was considered easier to develop and accessible on a variety of devices and operating systems [16].

Hosting and Domain

Hosting is the physical location where all the content of a website is stored. The hosting provider owns the hard drive that contains the website. The website owner can access and utilize the hosting [1]. A domain name is the name or address used to access a website. If we compare it with a house, the domain name and hosting are the same as an address and an actual house, respectively. If we compare it with a house, the domain name and hosting are the same as an address and an actual house, respectively. In other words, the domain is the website address while the hosting is the physical home. If we compare it with a house, the domain name and hosting are the same as an address and an actual house, respectively [11].

RESEARCH METHOD

According to [17] one of the hallmarks of precision product development is its ability to effectively apply and benefit users. The process of researching and developing LMS documents by ADDIE method is as follows: :

a. Analysis.

The first stage is the analysis stage. This stage is conducted using observation and interview methods.

b. Design

This stage is commonly referred to as product design (blueprint). It involves developing the user interface of the product design. Researchers determine media elements by gathering supporting materials such as images, animations, sounds, and even videos. This collection can be obtained by searching the internet or by creating media if they possess the necessary skills.

c. Development

The stage where the design made in the previous phase is realized and brought to life. The product created is arranged accordingly with the established design from the earlier stage, meaning that this phase involves the creation of the product.

d. Implementation

The fourth stage involves implementation. At this stage, the product is tested for its appearance or functionality.

e. Evaluation

Evaluation is the process by which a developed product is deemed successful and meets the expected requirements. If improvements are necessary, they must be identified and subsequently refined to produce a high-quality product. The ultimate goal is to produce a quality product.

RESULT AND DISCUSSION

Learning Management System Technical Navigation Air prioritizes several aspects including materials, material delivery, quizzes, assessment, and certification. This study covers various stages, and to facilitate discussion, the research findings will be presented at each stage of development. The following is the interface of the Technical Navigation Air LMS website designed using WordPress:

Figure 1 Home Page

The Learning Management System website for Air Navigation Technology consists of five menus located on the homepage:

1. *Home*
2. *About Us*
3. *Contact Us*
4. Material
5. *Login*

Potential and Issues

Therefore, a suggestion has emerged regarding the creation of an Air Navigation Technique Learning Management System website. However, the Air Navigation Technique program at Surabaya Flight Polytechnic does not yet have such a website available for the general public. This research was conducted based on the potential to design an Air Navigation Technique Learning Management System website that can be accessed anywhere by anyone. Therefore, a suggestion has emerged regarding the creation of an Air Navigation Technique Learning Management System website. Therefore, a suggestion has emerged regarding the creation of an Air Navigation Technique Learning Management System website.

Analysis

Aim: To determine potential research topics within the scope of the Air Navigation Engineering program. In this stage, an interview was conducted with one of our faculty members. The discussion revealed the opportunity to create an LMS website to provide knowledge insights to the general public. Based on the interview results, the development of an Air Navigation Engineering Learning Management System website is highly recommended.

Design

At this stage, a concept for creating a Learning Management System for Air Navigation Techniques website is being designed, which will be visualized in the form of a flowchart, as follows:
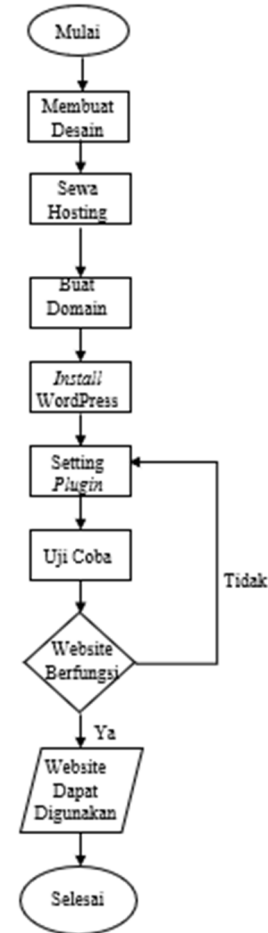

Figure 2 FlowChart of website creation

The flowchart begins with designing the website, followed by renting hosting services. Afterwards, selecting a user-friendly domain name to ensure easy accessibility on various browsers. Then, installing WordPress and configuring necessary plugins. If not, troubleshooting and plugin checks are conducted. The website is then tested and if functioning properly, can be used. The website can now be utilized if functioning correctly.

Development

At the development stage, the aim is to assess the feasibility of the designed Air Navigation Technique Learning Management System website. SiT, M. M., M. T. The website validator is the Supervising Lecturer, Bambang Bagus H., S.

a) Validation Results

The purpose of website validation is to ensure that it is fit for use before publishing. The website validation results indicate that the website's suitability percentage is 96.6% and falls under the category of highly appropriate.

No	Aspek Penilaian	Penilaian Validator			
		STS	TS	S	SS
1.	Cara penggunaan website mudah				V
2.	Fitur pada website mudah digunakan				V
3.	Memberikan informasi dengan mudah mengenai menu pada website				V
4.	Penempatan tata letak			V	
5.	Tampilan sesuai			V	
6.	Penggunaan warna pada website sudah cukup bagus				V
7.	Website menggunakan bahasa yang mudah dipahami				V
8.	*Button* pada website dapat diakses semua				V
9.	Website dapat diakses dengan cepat				V
10.	Halaman *Login* dapat beroperasi dengan baik				V
11.	Halaman pembelian dapat diakses				V
12.	Fitur chat WhatsApp dapat digunakan				V
13.	Mendapat notifikasi setelah melakukan *order*				V
14.	Mendapat notifikasi setelah melakukan *checkout*				V
15.	Dapat *input* kupon				V
Total Skor				6	52
		58			
Persentanse Kelayakan Guna		96.6 %			

Figure 3 Assessment Aspect

b) Validator Critique and Suggestions

In providing an assessment by validators, also provide criticism and suggestions as follows:

a. Icon changes were made to the teaching module to make it more interesting.

b. The layout of the image is also made balanced.

Data Collection

The data collection results were obtained through observations conducted within the Diploma 3 Air Navigation Engineering Study Program at Surabaya Aviation Polytechnic. As the institution does not currently possess a Learning Management System website, there is no platform for obtaining aviation navigation information for the public.

Implementation

Figure 4 website usage trials are performed to assess website performance. The trial simulated the Air Navigation Engineering Learning Management System website and was conducted on July 24, 2023.

Tanggal Uji Coba	Keterangan
24 Juli 2023	Uji coba website pada Taruna Program Studi D3 Teknik Navigasi Udara di Politeknik Penerbangan Surabaya

Figure 4 Test Run

No	Responden	Pendapat dan Saran
1	Antoni Mouzinho De Deus Pinto	Jangan sampai ada kendala
2	Aswandi	Mohon izin tetap berikan yang terbaik
3	Aditya Alam Firmansyah	Kerenn
4	Alan Maulana Adams	-
5	Alexander Tambunan	Jangan ada kendala
6	Amelia Putri Kartikasari	Selalu berikan yang terbaik
7	Danandaru Saktyasidi	Tetap berikan yang terbaik
8	Deny Kurniawan Prasetyo	Untuk kedepannya semoga aplikasi ini dapat berkembang dengan lebih banyak fitur dan materi lain
9	Dimas Anung	-
10	Danandaru S	Semangat
11	Dyah Ayu Sri Wulandari	Mohon izin tetap usahakan yang terbaik
12	Erdiyansyah Rafif Falah	Overall sudah baik dan bagus
13	Fahim Rahma	Semoga aplikasi ini dapat mengembangkan materi-materi yang baru
14	Fahmi Jalaluddin	Masukan dari saya supaya di kasih lagu biar lebih enjoy
15	Fiel Salvador	Upload video yang lainnya
16	Amel	Pertahankan kenyamanannya
17	Gesti Putri Aulia	Cukup
18	Khalidiya Ameyra	Semoga kedepannya aplikasi ini dapat berkembang dengan

		fitur dan materi yang lebih banyak
19	Lydia Cascadia	Semoga aplikasi ini dapat memberikan bantuan materi dan fitur yang lebih banyak lagi bagi penggunanya
20	M. Roim	Optimalkan dalam penggunaan website
21.	Mahfud Fatur Zulfa	Selalu berikan kenyamanan yang optimal
22.	Melani Arinda	Tetap optimalkan kemudahan dalam mengakses website
23.	Muhammad Fajri	Sudah sangat jelas dan dipertahankan
24.	Muhammad Luqman Hakim	Sangat baguss
25.	Niken Ayu Dwi Andini	Sudah sangat jelas dan dipertahankan
26.	Niken Ayu Dwi	Selalu berikan kemudahan yang terbaik dalam mengakses website
27.	Nikolas Reza Putra	Sangat bagus, solutif, dan efisiensi
28.	Renata Salma Ramadhanty	Selalu berikan kenyamanan yang terbaik dalam mengakses website
29.	Safira Calvinda	Mohon izin untuk mempertahankan kinerja websitenya
30.	Safira Whinar	Materi sudah bagus, dipertahankan
31.	Sari Nastiti	Sangat baguss
32.	Sony	Aplikasi ini mudah dipahami dan dimengerti oleh pembaca
33.	Tiara Sekarjati	Tetap berikan yang terbaik
34.	Wina	Pemberian warna perlu sedikit di match kan
35.	Yoga Dwi	.
36.	Agostinho Da Costa	Aplikasi mudah dipahami dan digunakan
37.	Archisiang Rahartris Diva Prameswari	Cukup
38.	Amel Putri	-
39.	Lisa Salasa	Usahakan tidak ada kendala
40.	Rifalfaisal	Selalu berikan kenyamanan yang optimal
41.	Rifqi Zazwan	Selalu berikan yang terbaik

42.	Shafira Whinar Prameswari	Usahakan tidak ada kendala
43.	Zainul Muttaqin	Berikan kinerja yang optimal dalam menggunakan website
44.	Dessy Adzani Putri	Berikan kenyamanan yang optimal dalam mengakses website
45.	Annisa	Sangat bagus, solutif, dan efisiensi
46.	Daffa AP	Sudah
47.	Wildhan Azmi Naufal Pratama	Sudah bagus, semoga bisa diterapkan
48.	Muhammad Rizqi Prayogo	Kelayakan penggunaan website LMS Prodi TNU sudah cukup baik

Figure 5 Respondents' Feedback

Figure 5 displays feedback from 48 respondents. The table reveals a range of responses and suggestions, which are quite interesting. There are some useful suggestions, such as displaying more features and materials in the future. The use of dominance can be seen as quite feasible.

No	Aspek Penilaian	Penilaian Responden			
		STS	TS	S	SS
1.	Cara penggunaan website mudah			10	38
2.	Fitur pada website mudah digunakan			7	41
3.	Memberikan informasi dengan mudah mengenai menu pada website			6	42
4.	Penempatan tata letak			5	43
5.	Tampilan sesuai			5	43
6.	Penggunaan warna pada website sudah cukup bagus			5	43
7.	Website menggunakan bahasa yang mudah dipahami			7	41
8.	Button pada website dapat diakses semua			5	43
9.	Website dapat diakses dengan cepat			5	43
10.	Halaman Login dapat beroperasi dengan baik		1	6	41

11.	Halaman pembelian dapat diakses			7	41
12.	Fitur chat WhatsApp dapat digunakan			6	42
13.	Mendapat notifikasi setelah melakukan *order*			6	42
14.	Mendapat notifikasi setelah melakukan *checkout*			8	40
15.	Dapat *input* kupon			7	41
Total Skor			2	273	2496
			2771		
Persentase Kelayakan Guna			**96.2 %**		

Figure 6 Assesment Aspect

Figure 6 the assessment aspect presents data regarding respondents' evaluation with a sample of 48 colleagues and siblings from TNU. The percentage of suitability to achieve 96.2% represents the average of each evaluation from 15 questionnaire data, with 4 aspects namely disagree, somewhat disagree, agree, and strongly agree.

Evaluation

Below is the respondent satisfaction data on a scale of 1-4, ranging from disagree to strongly agree, regarding the Air Navigation Engineering Learning Management System website.

Figure 7 Diagram "Features on the website are user-friendly."

Figure 7 is a diagram of all respondents' feedback regarding the "ease of use" questionnaire on the website's features. As indicated by the percentage, the majority of respondents agreed that the website's features are easy to use.

Figure 8 Diagram "Receiving notifications after placing an order"

Figure 8 shows a diagram of the overall respondents' evaluation of "Receiving notifications after placing an order". It can be seen that green and yellow dominate among the four color indicators. Based on the dominant colors, it can be stated that the respondents agree on "Receiving notifications after placing an order".

CONCLUSION

Based on the results of research conducted by the authors on the design of the Air Navigation Engineering Learning Management System website, several conclusions were drawn. Firstly, the website's appearance was designed using the Canva application. Secondly, the design process included page layout.After designing the Air Navigation Engineering Learning Management System website, the initial step is to rent hosting, followed by creating a domain. Then, install WordPress and the required plugins. Additionally, it is necessary to rent or purchase plugins for implementing a payment system on the Air Navigation Engineering Learning Management System website. In setting up the payment system for this LMS website, we utilized the "Sejoli" plugin. This plugin not only includes the payment system but also integrates with the learnpress system.

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