Digitalize Training Administration Application to Support Aviation Polytechnic towards Smart Vocational Training Centre

Ayub Wimatra[1], Hadi Prayitno[2], Sukarwoto[3], Ahnis Zulkarnain[4]
[1,3,4]Politeknik Penerbangan Medan, Indonesia
[2]Akademi Penerbang Indonesia Banyuwangi, Indonesia
Email: hadi.stpi@gmail.com

Abstract

This research aims to develop a "Digitalize Training Administration" application to support Medan Aviation Polytechnic in realizing the vision of "Smart Vocational Training Centre". This application is designed to replace the conventional education administration system with an integrated system that is easy to use. The research method used is a qualitative approach with a case study as the research design. Data were collected through observation, interview, and documentation. As part of the Medan Aviation Polytechnic, the Aircraft Maintenance Technology Study Program (TPPU) plays an important role in vocational education and has been certified as an Approved Aircraft Maintenance Training Organization (AMTO) by DKPPU. However, the management of AMTO currently faces various challenges that need to be addressed, including issues in administration and accessibility. The implementation of this application has proven to be able to improve the quality of AMTO management in a systematic and organized manner, achieving the expected efficiency. This application simplifies the management of schedules, registration, and monitoring and evaluation of education administration. It is hoped that this application can assist Medan Aviation Polytechnic in improving the efficiency and effectiveness of education implementation, and encourage the formation of a modern and innovative "Smart Vocational Training Centre".

Keywords: Training Management; Digitalization; Smart Vocational.

－－－－－－－－ ◆ －－－－－－－－－

A.   INTRODUCTION

In order to support the industrial revolution 4.0 in the aviation sector, especially in the education and training of the Aircraft Maintenance Training Organization (AMTO) at the Medan Aviation Polytechnic (Poltekbang Medan). One of the most important elements that cannot be ignored, whether in an institution or company, is human resources. The progress of a business is also largely determined by the management of its human resources (Larasati, 2018). All forms of educational activities at AMTO Poltekbang Medan have started in a virtual or online form, this is evidenced by the existence of training using online methods in order to prevent the transmission of the Covid-19 virus that occurred in 2020. This era disrupts various fields of human activity including politics, social, economics, education, health and many others. The magnitude of the impact we feel from the current industrial revolution 4.0 is very difficult to resist even by all human beings in the world, especially in Indonesia (Abdullah, 2019).

Technological advances allow for automation in almost all fields. New technologies and approaches that combine the physical, digital, and biological worlds

will fundamentally change patterns of human life and interaction (Tjandrawina, 2016). Ability to use digital technologies such as big data, the internet of things, robots, and artificial intelligence are needed in the digital era or industrial revolution 4.0 (Rohida, 2018). Several online trainings that are currently conducted using applications such as Zoom, Google Meet, Zoom, Skype, E-learning, etc. require supporting administration that is also digital-based. Administrative staff find it difficult when running attendance that is used in normal conditions, because students do not physically attend class. Teachers are not present in the classroom to provide training and the teaching materials used are very different from those that have been carried out in the classroom.

This Digitalize Training Administration application is used as a RESEARCH and an answer to this. An administration and documentation system that can be used from a computer or mobile phone can facilitate cadets, instructors and administrative staff in carrying out learning and teaching activities. This application has supported all forms and process flows contained in the Training Procedure Manual owned by AMTO Poltekbang Medan. A system is something that has parts that interact with each other to achieve certain goals through three stages namely input, process and output (Wiyanto, 2008). While other opinions define system in the field of information systems as a group of components that are interconnected related, work together, to achieve a common goal by receiving process input and produces input in the process of transformation process (Mulyanto, 2009).

Digitalize Training Administration is a simple and relevant application for implementing training quickly, comfortably, safely, legally and at low cost. The principle used in developing this application is to keep referring to the regulations set by the Directorate General of Civil Aviation without reducing the essence of the implementation of education and training administration activities. By running this application, we indirectly make students more disciplined and digital friendly so that they are able to compete in the industrial revolution 4.0.

B. METHOD

This research methodology consists of several stages. Firstly, field observations were made to collect and synchronize data on education implementation procedures related to cadet/instructor/lecturer attendance lists, learning activities, instructor qualifications, and so on. This data became the basis for building the system. Then, a system flow chart was created based on the results of field observations. This flow will be a guide in designing the system to be built. The next stage is script and database creation using technologies such as MySQL, PHP, Java, and Bootstrap. After that, the admin and user databases sourced from field observations are managed as a means of testing the system at a later stage. Researchers will input data into the database with the help of data input officers. The next stage is system testing, where the team conducts system trials to all lecturers and cadets of the Aircraft Engineering Study Program who will be users of this web-based system.

Furthermore, an evaluation was carried out to find out how much impact the Digitalized Training Administration system has on the existing problems in the Medan Aviation Polytechnic environment. The evaluation helped the team in improving the system. Finally, training on the use of the Digitalized Training Administration system was conducted for all lecturers and cadets of Medan Aviation Polytechnic. The training was conducted by selecting several people who can represent, with the aim that the training process can run optimally.

C. RESULT AND DISCUSSION

1. Preparation of Application Requirements Specifications

In this stage, interviews were conducted with administrative staffs at the Aircraft Maintenance Technology study programme. The input of this process is a collection of interview questions aimed at understanding what needs are desired by the existence of this online-based management application. As a result of this stage, the answers from the interview will be processed and analysed to become a guideline in preparing the application requirement specification document. Another opinion states that system design is the process of developing new system applications based on the results of system analysis recommendations (Koniyo, 2007). Meanwhile, based on another opinion, system is a network of procedures that are interconnected, gathered together to perform an activity or complete a certain goals (Kristanto, 2008).

a. Form

A form can be viewed as a contract between the user and the system. In this contract, the user is asked to provide the information required by the system through appropriate fields at designated places. By viewing a form as a contract, it is important for designers to create forms that make it easy for users to provide the requested information clearly and intuitively. Good form design will ensure that users feel comfortable and easy to fill out the form, thus creating a positive user experience (Trenery, 2008).

The AMTO management application of Medan Aviation Polytechnic will present several features in accordance with the applicable training procedure manual, including: a) Attendance List of Cadets; b) Attendance List of Instructor; c) Learning Activity; d) Test Result; e) Student Comment; f) Test Answer Sheet; g) Certificate Distribution List; h) Meeting Attendance List; i) Instructor Assessment; j) Curriculum Vitae Instructor; k) Personnel Experience Logbook; l) Curriculum Vitae Student; m) Internal Audit; and n) Practical Assessment

b. Website

The Web is a global information system that allows users to access documents linked together via the Internet. It is a way to share information among individuals and communities around the world. Berners-Lee sees the web as an open information space that enables collaboration and knowledge exchange without geographical or time constraints. His contributions in developing web concepts and technologies have paved the way for rapid and widespread developments in information exchange in the digital age (Berners-Lee, 1992).

c. PHP

PHP (Hypertext Preprocessor) is a scripting programming language specifically designed for web application development. PHP functions as a server-side processor that generates dynamic content and interacts with databases, and can be integrated with HTML easily (Lerdorf, 2002).

PHP has various functions that make it a popular programming language in web application development. Some of the main functions of PHP are:

Generating dynamic content: PHP allows web developers to generate dynamic web pages easily. Using PHP, users can combine PHP code with HTML to generate content that changes based on certain data or logic. For example, PHP can display data from a database, calculate values, or modify content based on certain conditions.

Interacting with databases: PHP has many features and functions that allow web developers to interact with databases. This allows the creation of web applications that can store, retrieve, and manipulate data from and into databases.

Form processing: PHP has the ability to process data submitted through forms on web pages. Using PHP, we can retrieve the data filled in by the user, validate the input, and perform appropriate actions based on the data. This enables the development of web applications that interact with users through forms.

File management: PHP provides functions to manage files on the server. We can read, write, delete, or modify files using the functions provided by PHP. This is useful for managing file uploads, processing file data, or performing other file-related operations in web applications.

With the combination of these functions, PHP is ideal for developing dynamic and interactive web applications.

d. XAMPP

XAMPP is a complete solution that makes it easy for web developers to build and test web applications locally. XAMPP provides all the necessary components, including Apache as a web server, MySQL as a database management system, PHP as a server-side programming language, and Perl as a scripting language. XAMPP becomes a very useful tool for web developers to develop and test web applications locally before deploying to an actual server (Riggs, 2014).

e. Unified Modeling Language

UML or Unified Modeling Language is a standard language used in software modelling. UML is a powerful and effective tool in describing and visualizing the structure, behavior, and interactions of complex software systems. UML provides a number of diagrams that can be used to represent important aspects of software, such as use case diagrams to describe system functionality, class diagrams to describe object structure, activity diagrams to describe process flow, and sequence diagrams to describe interactions between objects. Through UML, software developers can communicate more clearly and effectively with stakeholders, as well as improve understanding of the system to be developed (Pender, 2003).

2. Application Development

In this stage, the required input is the application requirement specification document which is the result of the software requirement definition stage (inception stage). At this stage, software design is carried out which includes database, interface, and system design. Software requirements specifications will be translated into designs, which will facilitate software development and communication with scientific publication managers. The output of this stage will be an interface design, Use case diagram, activity diagram, sequence diagram, and class diagram. Furthermore, the design will be compiled into an application planning document.

This stage is the system construction stage which is carried out based on input in the form of designs that have been made at the elaboration stage. At this stage, the implementation of the diagram design into programming code is carried out. During the system construction process, the output of this stage is the release of the beta version of the application.

3. Testing the Application

During this stage, the software has been launched with a beta version and tested using the Black-box method to verify the performance of existing functions, in accordance with the design that has been made at the elaboration stage. The output of this stage is software that is in accordance with the design that has been set before.

From the user requirements analysis described earlier, it can be concluded that there are six users who have a role in achieving a clear division of labor.
1) Master: Is a user who has the right to assign certain roles.
2) Head of Training: Is a user who has the right to propose and authorize certain documents.
3) Quality Manager: Is a user who has the right to verify and issue certain documents.
4) Lecturer: Is a user who has the right to fill in or make assessments on certain documents.
5) Cadets: Is a user who has the right to fill in certain documents.
6) Administrator: A user who has the right to fill, revise and distribute certain documents.

4. Application Main Design Feature

Design is the stage of development cycle which follow analysis: definition of functional requirement and preparation of implementation specifications, describing how a system is to constructed (Ruetter, 1982).

The design of the main features of this application includes diagrams related to the AMTO Management feature consisting of Use Case Diagram, Activity Diagram, Robustness Diagram, and Sequence Diagram. In addition, an explanation of the user interface description related to the AMTO Management feature is also given.

a. Testing

This step of application testing determines the reliability of the available features. Before testing the main features. First, additional testing of several features related to the main feature will be carried out, namely form creation by the AMTO Manager and CV filling and attendance by cadets. The following is an example of a scenario that will be tested:

1) Opening the webpage
   a) Open the DTA application through a web browser (Google Chrome or Firefox) with the following URL address: https://www.amto147d-16.id/
   b) Then press the "Enter" button or click "Go"
   c) The initial display will appear as shown in figure X.X

Figure 1. Login Webpage

Registering Account

a) To register, press the "Register" button as shown in Figure 2.
b) Then select "Sign up with Google"
c) Enter your e-mail address or phone number
d) Press the "Next" button
e) Enter the email password
f) Press the "Next" button
g) Enter Name / NIP / NIK / NIDN / NIT, select according to the data that has been registered in the TPPU study programme as shown in Figure 3.
h) Enter the date of birth with the format YYYY-MM-DD
i) Then select the "Save" button
j) If the data is not available, contact the study programme admin!

Figure 2. Registering Process

Entering Courses

a) Click on the "Master" menu then "Courses"
b) Click the "Add Course" icon
c) Input the data of the course to be added: programme, code, name, Semester, number of credits of theory and practice, number of hours per credit, number of hours in AMTO (Theory and Practice)
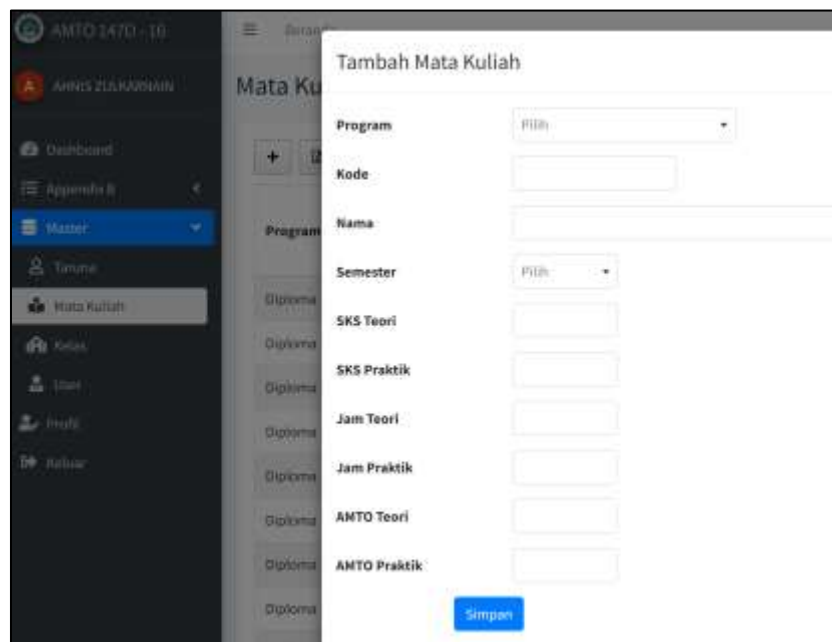d) Press the "Save" button

Figure 3. Entering Courses Process

Practical assessment scoring

a) Click on "Appendix B" menu then "Form QC-14"
b) Click the "Folder" icon on the intended course
c) Select the cadets who will be given grades
d) Select the "Edit" icon
e) Enter the desired grade
f) Sign the box below

g) Press the "Save" button

Figure 4. Practical Assessment Process

D. CONCLUSION

The conclusions that can be drawn from this research work are as follows. Firstly, the application has been designed by taking into account the user's needs through the translation of functional requirements which are then expressed in use cases. Second, the features of the application have been checked and verified through interfaces that represent each feature. The test results show that the application has fulfilled the functional needs of the system well.

There are several advantages gained from the development of this application. Firstly, there is a clearer division of tasks in the management of AMTO (Aircraft Maintenance Training Organisation) making it easier for personnel to carry out their duties. Secondly, with the adoption of this application, data coverage becomes wider because it can be accessed and presented online. This allows for easier accessibility and minimizes physical limitations in managing and accessing data.

Thus, it can be concluded that the development of this application provides tangible benefits in improving the efficiency and effectiveness of AMTO management. This application helps to simplify administrative tasks, improve data transparency and accessibility, and expand the scope of data that can be managed.

REFERENCES

1. Amrullah, F., Andarwati, M., Swalaganata, G., & Rosyadi, H. E. (2021). MVTE Android Application Development with the RAD Method. *Journal of Information Technology and Management, 7*(2), 122-130.

2. Abdullah, F. (2019). Fenoma Digital Era Revolusi Industri 4.0. *Jurnal Dimensi DKV Seni Rupa dan Desain*, 47-58.

3. Berners-Lee, T. (1992). World-Wide Web: The Information Universe. *Computer Networks and ISDN Systems 25*, 454 - 459.

4. Koniyo, K. a. (2007). *Tuntunan Praktis Membangun Sistem Informasi Akuntansi.* Jakarta: Elex Media Komputindo.

5. Kristanto, A. (2008). *Perancangan Sistem Informasi dan Aplikasinya.* Yogyakarta: Gava Media.

6. Larasati, S. (2018). Manajemen Sumber Daya Manusia. *Deepublish*.

7. Lerdorf, R. (2002). Personal Home Page Tools (PHP Tools). *The Internet Society*.

8. Mulyanto, A. (2009). *Sistem Informasi Konsep dan Aplikasi.* Yogyakarta: Pustaka Pelajar.

9. Pender, T. (2003). *UML Bible.* Indianapolis: Wiley Publishing.

10. Prayitno, H. Wicaksono, P. Kurniawan, I.E. Efendi.(2023). Innovation in Aviation Education : Development of a Web-Based Flight Simulator Management System (FSMS) at the Banyuwangi Pilot Academy, Indonesia. *Al-Ishlah : Jurnal Pendidikan.*

11. Prayitno, H. Supardan, D. Idyaningsih, N. (2023) *Metodologi Penelitian Penerbangan*. Samudra Biru

12. Riggs, E. (2014). *Learning XAMPP.* Packt Publishing.

13. Rohida, L. (2018). Pengaruh Era Revolusi Industri 4.0 terahadap kompetensi sumber daya manusia. *Jurnal Manajemen dan Bisnis Indonesia*, 114-136.

14. Ruetter, J. R. (1982). *Data Processing: Systems and Concepts.* Tokyo: McGraw-Hill Book Company.

15. Tjandrawina, R. (2016). Industri 4.0: Revolusi Industry Abad Ini dan Pengaruhnya pada Bidang Kesehatan dan Bioteknologi. *Jurnal Medicinus Vol 19 Nomor 1 Edisi April*.

16. Trenery, B. S. (2008). *Forms That Work: Designing Web Forms for Usability.*

17. Wahyuni, S., Suarman, S., & Kartikowati, R. S. (2023). Development of Android-based Learning Media for Economics Learning. *AL-ISHLAH: Jurnal Pendidikan, 15*(2), 1181-1193. DOI: https://doi.org/10.35445/alishlah.v15i2.2816.

18. Wahyudin, Y., & Rahayu, D. N. (2020). Analysis of Website-Based Information System Development Methods: A Literature Review. *Journal of Intercom: Journal of Scientific Publications in the Field of Information and Communication Technology, 15*(3), 119-133. DOI: https://doi.org/10.35969/interkom.v15i3.74.

19. Wiyanto, N. (2008). *Sistem Informasi Akuntansi.* Jakarta: Erlangga.