

## AERONAUTICAL INFORMATION SERVICES (AIS) E-MODULE BASED ON CANVA

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### Abstract

The author's goal in this final project is to design and create AIS e-modules as new interesting and innovative learning media that can help in AIS learning. For expert validation and media validation using PIECES method. This E-Module is designed using the Waterfall method; (1) Needs Analysis, (2) Design, (3) Preparation, (4) Testing, (5) Maintenance. The result of this research is an e-module that contains Aeronautical Information Service (AIS) course material that has been adapted to the academic syllabus, which contains teaching materials in the form of flipbooks and mastery tests on each topic, pictures and videos, midterm and final semester exam work questions in the form of multiple choices. The result from the expert validator and media validator is that the material and the display of the E-Module are valid and understandable. Aeronautical Information Service (AIS) E-Module also approved by the respondents with a test presentation of 93%, which means that the respondents strongly agreed with the E-Module.

**Keywords:** Learning Management System (LMS); Aeronautical Information Service (AIS); Aeronautical Information Service Learning; Electronic Modul.

### INTRODUCTION

Aeronautical Information Service (AIS) is one of the courses in the Aviation Communication and Air Traffic study program. Surabaya Aviation Polytechnic is a higher education institution under the Indonesian Ministry of Transportation, with the main task of implementing a professional education diploma program in the field of engineering expertise and aviation safety which is open to the public. Vision of the Surabaya Aviation Polytechnic:

"Become a superior vocational tertiary institution, produce graduates who are competent in the field of aviation, and are able to compete nationally and globally."

Surabaya Aviation Polytechnic Mission is to . Organizing vocational education in the field of aviation in accordance with competency standards both nationally and internationally, realizing vocational education facilities and infrastructure in accordance with developments in aviation science and technology; Creating excellent, professional and ethical human resources; Creating an academic climate capable of realizing the vision of the Surabaya Poltekbang;

Organizing and realizing the Tridharma of Higher Education;

And Organizing and realizing professionalism for transparent and accountable financial management. [1] Diploma Three Aeronautical Communication study program is a study program that organizes aviation communication learning to produce aviation communication personnel who focus on safety, operations, authentic material or other material in important situations for pilots and controllers [2]. In the Aeronautical Communication study program there are several subject, one of which is appointed as an E-Module is the Aeronautical Information Service (AIS) course. Aeronautical Information Service (AIS) is a service established in a defined area that is responsible for providing aeronautical data and aeronautical information necessary for the safety, regularity and efficiency of air navigation. AIS personnel have the function and responsibility of ensuring that aeronautical data and aeronautical information necessary for the safety, regularity and efficiency of air navigation are available in a form appropriate to operational requirements and then the Aeronautical Information Service (AIS) is a service established in a defined area that is responsible responsible for providing aeronautical data and aeronautical information necessary for the safety, regulation and efficiency of air navigation. AIS

personnel have the function and responsibility of ensuring that aeronautical data and aeronautical information necessary for the safety, regulation and efficiency of air navigation are available in a form appropriate to air traffic operational requirements [3]. The scope of this work is operational aeronautical communication, i.e., communication related to safety and regularity of flight, as well as for the business operation of the airline [4].

These AIS courses can be implemented through both face-to-face learning and E-Module learning. Learning is a process of interaction between students and educators and learning resources in a learning environment. Learning is assistance provided by educators so that the process of acquiring knowledge and knowledge can occur, mastering skills and character, as well as forming attitudes and beliefs in students. In other words, learning is a process to help students learn well. The learning process is experienced throughout the life of a human being and can apply anywhere and anytime [5]. In this learning system there are components of students or students, goals, materials to achieve goals, facilities and procedures as well as tools or media that must be prepared. Davis, 1974 revealed that the learning system involves the organization of a combination of people, learning experience, facilities, maintenance or control, and procedures that regulate the interaction of learning behavior to achieve goals whereas in a system teaching system, components of teaching planning, teaching materials, objectives, materials and methods, as well as assessment and teaching steps will relate to learning activities to achieve goals [6]. Concerning the National Education System states that learning is a process of interaction of students with educators and learning resources in a learning environment [7]

This AIS learning can also be done using e-learning through Electronic module media. Electronic modules can be defined as a presentation of self-learning materials that are arranged systematically into the smallest learning units to achieve certain learning goals, which are presented in an electronic format, where each learning activity in them is connected with a link as navigation which makes students more interactive with the electronic module used, the presentation of the electronic module is complemented by video tutorials, evaluation questions and illustrative images to enrich the learning experience [8]. Electronic modules are innovative media that can increase students' interest in learning. A learning process in order to be able to improve the achievement of learning outcomes needs to be supported by an appropriate learning guide. This is because the face-to-face time in front of the class is very limited when compared to the volume of material that must be completed. Therefore, a learning guide is needed that is able to activate students in learning. Among the learning guides that make it possible to increase student learning outcomes and prioritize student active independence are

electronic modules [9]. The electronic module (e-module) itself is almost the same as an e-book. The only difference is in the content of the two. The Encyclopedia Britannica Ultimate Reference Suite explains that an e-book is a digital file containing text and images suitable for electronic distribution and display on a monitor screen similar to a printed book. E-modules or electronic modules are modules in digital form, consisting of text, images, or both which contain digital electronic material accompanied by simulations that can and are appropriate for use in learning. E-Module is learning media that the process teaching and learning between educators and students becomes more optimal and fun as well increase enthusiastic and Spirit in learning [10].

The E-Module runs in a system, namely LMS. Learning management systems (LMS) are a subset of educational technology that is widely used in higher education to complement traditional classroom teaching. The incorporation of technology into the teaching and learning process is considered to increase the accuracy of teaching efforts, student performance, and learning effectiveness. LMS is an enhanced platform-system option that allows you to provide online materials and training programs to high school students while also tracking their progress. This systems program helps teachers achieve their goals by managing course content and assisting students [11]. LMS first appeared in the 1990s when it was known as a computer-based integrated learning system [12]. To serve its purposes, the LMS is composed of various groups of software and programs imbued with an extensive range of pedagogical and course administration tools to support traditional instructional activities in web-based educational systems [13]. In particular, its functions include providing platforms for announcing information, managing course materials, collecting and grading student outputs from the given assessments, giving assignments, saving and sending grades and feedback to students, submitting reports, and among others [14].

The process of creating E-Module content uses a Content Management System. CMS (Content Management System) is a system used to manage and facilitate the process of creating, updating, and publishing content together (collaboration content). Content refers to information in the form of text, graphics, images, or in other formats that need to be managed with the aim of facilitating, updating, distributing, and increasing the flexibility to be transformed into other forms [15]. Content Management System with strong capabilities, flexibility and extensibility is taken as one of the most important information and communication technologies in managing organizational information and knowledge. The CMS has been widely implemented for business, media, financial and social applications. CMS, especially Open Source CMS attracts many researchers to explore

its ability to manage knowledge and processes, especially information and unstructured knowledge [16]. CMSs are information technology systems that allow access, creation, modification and deletion of content based on established access roles. These systems also allow users to expand layout and functionality using plugin and theme architectures. A CMS has a more complex architecture than application frameworks that would allow non-programmers to design and build web applications without a solid background in coding. Applications built using CMSs, however, may not be that flexible, extensible or scalable than when using application frameworks [17].

To personalize the content and all designs use Moodle. Moodle is a versatile platform that allows its users, especially teachers, to personalize their content. In addition, system administrators can customize the LMS to suit the needs of institutions, students and teachers. Moodle allows teachers to create online courses and materials that can be used to determine each student's engagement needs for the learning process. Also, based on student activity, they can decide what approach is best for creating a better learning experience for students [18] Research on the development of e-learning using Moodle is limited to studying the development methods and feasibility of e-learning. Besides that, this study seeks to reveal the effectiveness of using e-learning for students who are carrying out internships in terms of improving learning outcomes [19]. Learning management system in this research work refers to Moodle Learning Platform. According to moodle.org, Moodle is an open source-learning platform for creating personalized learning environment. It provides flexible tools to support both blended and online learning [20].

The Moodle-based e-module was developed using the Waterfall research model. The waterfall model is the most widely used model for the development stage. This waterfall model is also known as the traditional model or classical model. The waterfall model is often also called the sequential linear model or the classic cycle. This waterfall model provides a sequential software lifeflow approach starting from analysis, design, coding, testing and support stages [21]. The Waterfall model is one of the most frequently used SDLC models development of information systems or software. This model uses a systematic approach and sequentially. The stages in this model start from the planning stage to the management stage (maintenance) and carried out in stages. Developers need to know more about what is the system development process if using the waterfall model and also the characteristics of the waterfall model [22].

Based on the background that has been described above, it is found that the formulation of the problem includes:

1. How to design an E-Module based on the Moodle LMS in the Aeronautical Information Service (AIS) learning course with the Waterfall method?
2. How to build an E-Module in the Aeronautical Information Service (AIS) course material?
3. How to install the E-Module in the Surabaya Aviation Polytechnic LMS?

## METHODS

### Requirement

At this stage the developer must know all the information about software requirements such as the usability of the software desired by the user and the limitations of the software. This information is usually obtained from interviews, surveys, or discussions.

### Design

The next stage is Design. It aims to provide a complete picture of what needs to be done and how the desired system should look. So that it helps specify hardware and system requirements, also defines the system architecture that will be made as a whole.

### Development

The code writing process is at this stage. Making the software will be broken down into small modules which will be combined in the next stage. In this stage a deeper examination will also be carried out on the module that has been made, whether it has fulfilled the desired function or not.

### Testing

In this fourth stage, the modules that have been made before will be combined. After that testing will be carried out which aims to find out whether the software is according to the desired design and whether there are still errors or not.

### Maintenance

Maintenance is the final stage of the waterfall development method. Here the finished software will be run or operated by its users. Besides that, maintenance is also carried out which includes: error repair, improvement of system unit implementation, improvement of system services according to new requirements.

### Participants

Researchers use quantitative methods to determine the results of the development of the E-Module. Data

collection was carried out using a questionnaire whose data was taken from 24 Aviation Communications cadets class VI, 10 Air Traffic cadets class XIII, and 10 Aviation Communications Alumni of the Surabaya Aviation Polytechnic.

## Instruments

### a) E-module Design

At this design stage the aim is to produce an E-Module design that will be implemented into the Surabaya Aviation Polytechnic LMS. The design process goes through several stages including media validation and material validation in the E-Module. After the validation process is carried out, these materials are compiled into an AIS learning E-Module. The material in the AIS E-Module consists of 8 topics, namely:

1. Topic 1 Recognizing and Understanding What is AIS
2. Topic 2 AIRAC
3. Topic 3 AIP
4. Topic 4 AIC
5. Topic of 5 NOTAM
6. Topic 6 En-route chart
7. Topic 7 Pre-Flight Information and Post-Flight Information.
8. Final Exam

The 8 topics were designed into an E-module using the Canva website and for compiling the E-Module into a flipbook using the Heyzine website.

### b) Procedures

How to access the e-learning website:

- 1) Open the link by click or search this link <https://courses.poltekbangsby.ac.id>
- 2) You will be direct to the login page. Enter username and password then click the login button.
- 3) After logging in you will be on the homepage of Surabaya Aviation Polytechnic e-learning. On the homepage there are several menus, to view the course click on my course menu.
- 4) After that several courses will be displayed. You can choose which course you will study.
- 5) After choosing a course, in that course there will be some material that you can learn.

## RESULT AND DISCUSSION

In this chapter the author will discuss the results of the E-Module design that has been carried out to find out based on Waterfall method

From the requirement stage the author conducted interviews with material expert lecturers and 5 fellow cadets from the Aviation Communications Study Program Batch 6. From the results of the interviews conducted, the authors knew several conditions that supported the authors to develop this E-Module. The results of interviews with lecturers are as follows:

- a. The learning process carried out is in accordance with the RPS for the Aeronautical Information Service course
- b. Learning so far has been carried out using the power point presentation method and practice via the Aim Indonesia website. Learning is carried out directly in class and via Zoom without any E-Modules to support the learning process.
- c. There are difficulties experienced by cadets and these can be identified when cadets carry out presentations or do assignments given.
- d. It has not occurred to the lecturer to provide material with the E-Module even though they have previously known about the E-Module.
- e. Development of E-Modules will greatly assist lecturers in delivering teaching materials.

For interviews with fellow cadets, I took 5 Aviation Communication cadet respondents and 5 Air Traffic cadet respondents regarding the need for the Aeronautical Information Service E-module product that I would make. From the results of the interviews it was found that the Aeronautical Information Service E-Module is needed in learning because so far the learning process has used documents and presentations so it is less interesting and there is no module that accommodates AIS material into 1

From the design process resulted an E-Module design made using Canva website and then all the design results are compiled into a flipbook using the Heyzine website. For the preparation of quizzes use the quizizz website.

The Development stage result :

#### a. Cover Page

The first page when accessing the E-Module is the cover which contains the title of the E-Module. This page contains an introduction to AIS courses, learning outcomes, content charts and definitions of the material in the E-Module.

### b. Material page

On the material page, at the beginning of each material page a topic title per material will be given according to the topic that has been determined. Inside there will be material in the form of text, video references and a QR code which will link to the specified website. The video will automatically play when clicked and the QR Code will automatically open reference material in the form of documents or flight websites.

### c. Quiz page

This page contains a quiz at the end of each topic. Quiz adapted to the material on the topic. This Quiz/Mastery Test functions to determine the extent of understanding of each cadet or person who accesses the Aeronautical Information Service E-Module.

### Testing

At this stage the authors compile and test the E-Module to match the expected results and then implement it into the Surabaya Aviation Polytechnic LMS. The result is that there are no significant obstacles when accessing the LMS and accessing the materials.

### Maintenance

At this stage the E-Module has been uploaded to the LMS of the Surabaya Aviation Polytechnic. The author also corrects errors in the material, be it writing, videos or images obtained from the results of the questionnaires that have been distributed. Among others are;

a. Topics uploaded to the LMS cannot be in full screen format, thereby limiting the clarity of the text that is read. The way to solve the problem above is to add a flip book link in the description section of the material. So that people who access the material can immediately see the E-Module for each material with a full screen display.

b. There is no material discussion forum for people who access the E-Module. The solution to this is to add a forum feature to the Surabaya Aviation Polytechnic LMS.

## CONCLUSION

Based on the results of the design and research of the AIS E-Module that have been determined, the following conclusions can be drawn:

1. The design of the Aeronautical Information Service E-Module was carried out using the Waterfall method, where validation was carried out at each stage of the design by subject matter expert lecturers and media experts. This AIS E-Module has learning features that can attract interest in reading and facilitate the understanding of cadets and people who access the AIS E-Module. Inside there are sources of information in the form of videos, images,

documents, and QR Code. Apart from that, there are also practice questions on each topic and also the final exam to measure the extent of understanding of cadets or people who access the AIS E-Module at the Surabaya Aviation Polytechnic LMS.

2. In building and compiling this E-Module the author uses various features and applications as well as websites. A collection of material that has been designed is arranged into an E-Module.
3. The installation process of the Aeronautical Information Service E-Module which has been compiled into the Surabaya Aviation Polytechnic LMS is carried out after going through several stages of testing. It can be seen from the results of tests conducted by 24 Aviation Communication VI cadets, XIII Air Traffic cadets, and 10 Surabaya Aviation Polytechnic Alumni which resulted in an index of 93%, which means that the respondents strongly agree that this E-Module is an innovative and interactive medium that can increase the demand for learning, especially through the Surabaya Aviation Polytechnic LMS. Therefore, it is necessary to introduce cadets to the Surabaya Aviation Polytechnic LMS so that the quality of teaching and learning is better and
4. Also introduces the use of technological advances in learning.

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