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Design Of Information Systems For Merdeka Belajar Kampus Merdeka Services In Higher Education In Indonesia

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Abstract

Merdeka Belajar Kampus Merdeka (MBKM) aims to provide opportunities for students to master various disciplines to prepare themselves for the world of work. One of the MBKM programs that students can take part in is an internship. Universitas Hayam Wuruk Perbanas (UHW Perbanas) is a university that is required to be able to design and implement innovative learning processes so that students can take part in internship programs. During the management of internships, problems were found, namely (1) the length of processing internship approvals, (2) data processing was less effective, efficient, fast and accurate, (3) the process of monitoring and preparing reports was not smooth, and (4) difficulties in scheduling exams. and assessment because it is done manually. This research aims to develop an internship management application using the waterfall method. In this research, the stages carried out only include conducting a needs analysis and designing a system that is used as a guide in developing web-based applications that are integrated between users. The finished application design is validated and confirmed by the user. The results show that the entire application design is in accordance with user needs..

Keywords : *MBKM, Internship, Internship Application, Waterfall, UML*

1. Introduction

Kementerian Pendidikan, Kebudayaan, Riset, dan Teknologi (Kemendikbudristek) has implemented Merdeka Belajar Kampus Merdeka (MBKM) policy which aims to provide opportunities for students to master a variety of knowledge that can be used to prepare themselves for the process in Higher Education before entering the world of work. In Minister of Education and Culture Regulation Number 3 of 2020, it has been explained that universities are obliged to give students the right to voluntarily take a number of credits outside the university for two semesters and also take courses in different study programs in the same university for one semester. (Kementerian Pendidikan, Kebudayaan, Riset 2020). There are 8 (eight) forms of MBKM offered, including: student exchange, internship/work practice, teaching assistance, research/research, humanitarian projects, entrepreneurial activities, independent studies/projects, and building thematic real work villages/colleges (Krisnanik, Saphira, and Indriana 2021).

The MBKM program was implemented in order to change the learning concept which initially focused on educators to now become a learning system that focuses on students (Maghfiroh et al. 2022). s a tertiary institution in Indonesia that is required to design and implement innovative learning processes so that students have the opportunity to take part in the MBKM program. Of the eight MBKM programs, one of the ones implemented is internship/work practice. Internship/Work Practicum is a form of student learning that provides experience for students to study outside campus and can solve various problems that exist in society according to their knowledge competencies. This internship program is attended by students who have completed or are currently taking their fifth semester by completing the administrative documents requested by the study program. Administrative files collected as supporting documents in the course conversion process given to students. Students who carry out the internship program are accompanied by a field supervisor. Students can consult with the lecturer if the student encounters problems during the internship and the lecturer guides students in preparing reports on internship activities.

Management of internship administration that does not yet utilize information technology raises various problems. Starting from the implementation process, to supporting facilities and infrastructure (Nugroho, Ahmad; Erba Lutfina 2023) . These obstacles are

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currently also being faced in the management of internship administration at the UHW Perbanas Information Systems Study Program. The problem that is often experienced is the long time it takes for internship processing. There are many processes that students and admins must go through before carrying out an internship. Students must schedule a face-to-face meeting and ask their supervisor to sign their internship agreement. Apart from that, students also have to repeatedly send proposal documents which are used as conditions for implementing the internship. Information regarding internship requirements, the registration process, approval, and the internship schedule are still provided by admin staff by contacting several related parties one by one. Another problem is the mentoring and assessment process with field supervisors. If students and lecturers do not have the right schedule to meet, then the mentoring process cannot run smoothly. Likewise, mentoring activities that are not recorded make the mentoring process not run smoothly. The assessment process is still carried out using manual calculations. Admin staff have difficulty recording student grades to convert them to courses. Apart from that, manual calculations also sometimes cause errors.

Previous research explains that there are benefits from using information technology in managing internships. The first research produced output in the form of a web-based internship information system. The results of the application trial show that the application is considered feasible and is able to simplify the internship application process, manage applicant data, save energy, time and costs (Lestari et al. 2019). Other research also produces applications that can process reports digitally, store all student data, and make it easier for students to complete internship programs (Anasari et al. 2015). Subsequent research also explains that managing student activities can use student smartphone devices connected to the internet. This has an impact on students easily providing the latest information about activities carried out by students even though they are in different locations (Danzen Hangga Permana; Aristoteles 2017). The latest research also produces a web-based internship data management application that makes it easier for admin staff to process and archive internship data, and students can easily get the latest developments in the certified internship administration process (Sopiah et al. 2022)

Based on the problems described above as well as a literature review from previous research, this research aims to design an application for managing the internship program for students of the UHW Perbanas Information Systems study program. The application developed has several functional systems, including: information on internship activities, internship administration documentation, data collection on internship students, monitoring internship activities, and the process of reporting internship activities. The report on the results of internship activities prepared by students together with lecturers will become a reference in the course conversion process. A web-based application is developed that can be used for data processing and can be accessed by several users anywhere with an internet connection (Hafidz and Effendi 2023).

2. Method

This research focuses on how to develop management applications for one of the MBKM programs, namely internships or practical work. The method used in this research is structured into two stages, namely data collection and system development. The following in Figure 1 illustrates the method in this research.

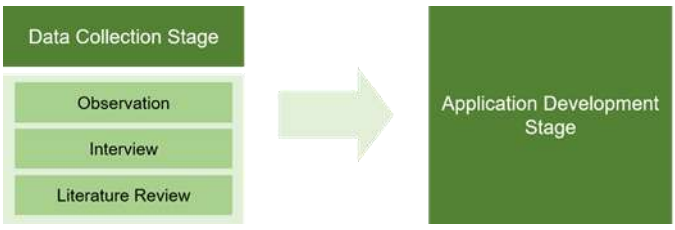

Figure 1. Research Methods
Source: Data Processing

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Data Collection Stage

The data collection process is the most important stage in this research so that the final results meet the expected targets. The data collection techniques used in this research include:

a. Observation. The type of observation carried out is unstructured, where observations of the course of the internship are carried out in accordance with the procedures currently established by the Information Systems study program. Apart from that, during this observation, an analysis of the existing process was carried out and a conclusion was formulated based on the results of the observations that had been made
b. Interviews. Interviews were carried out using a question and answer process with parties related to the implementation of the internship. This related party is an informant who has knowledge regarding internship procedures in the UHW Perbanas information systems study program. This question and answer is needed to obtain the information needed for research. Some of these questions were given to informants, including: students, admin, field supervisor, and also the head of the study program.
c. Literature Review. At this stage, information search activities are carried out through books, scientific articles, journals and previous research related to the research being carried out. The purpose of this search is to obtain relevant theories, which will then be used as a reference in this research.

. System Development Stage

The system development stage is a stage carried out after data collection is complete. The system development in this research uses the waterfall System Development Life Cycle (SDLC) model. The waterfall model is a structured model, where system developers must carry out the stages one by one. If a stage has not been completed, then the developer may not carry out the next stage either (Hafidz and Effendi 2023). This model is very simple and easy to understand because each stage is clearly defined, structured, and has complete documentation so that the maintenance process is easy to carry out. Although this model has the weakness of being dependent on previous stages, this model is considered suitable for use on small and large projects (Ramadhan, Haniva, and Suharso 2023). The waterfall model has five stages including: requirements analysis, design, implementation, testing, and maintenance. Figure 2 shows the waterfall application development method (Herlambang et al. 2023).

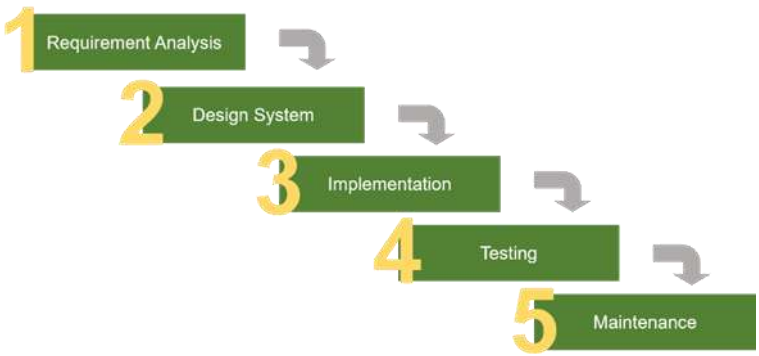

Figure 2. Waterfall Application Development Model
Source: Data Processing

a. Needs Analysis. At this stage, a needs analysis of system users is carried out. This stage explains the user's actions on the system, the data used in the system, and the output resulting from the user's actions on the system. This needs analysis stage refers to the process of interviewing users and producing a list of functionalities developed in the application.

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b. System Design. This design stage is the system design stage which explains the system flow, data flow, database structure and application interface design. At this stage, we also describe the system architecture design that will be implemented as a whole, including presenting the required hardware information
c. Implementation. At this stage, coding is carried out on the application design that has been created. Application coding can be divided into several modules based on functional requirements, which can then be combined into one application.
d. System Trial. After the coding is complete, each functional application is tested to see whether it meets the specified criteria or not. At the testing stage, possible failures and errors are also identified when the system is run.
e. Maintenance. The maintenance stage is carried out after the system has been tested and is used by the user. Maintenance is carried out by the development team by correcting errors found after user use. This maintenance also carries out adjustments and improvements based on user needs.

In previous research, problems could be solved in stages. The focus of the research focuses on system analysis and design to determine functional requirements and produce a design for the system used (Widyastuti and Sakmir 2020). In this research, the stages carried out were only up to system design. The design of this system includes an explanation of the user's functional requirements, the interaction between the user and the system is described in the form of a use case, the process flow is described in the form of an activity diagram, the database structure is described in the form of an Entity Relationship Diagram (ERD), and the interface design is described in the form of a wireframe.

3. Results and Discussion

. The problem faced by the UHW Perbanas information systems study program is that there is no application that is used to manage internships for students. The impacts are (1) the length of processing the internship approval, (2) the processing of data into information is felt to be less effective, efficient, fast and accurate, (3) the process of monitoring and preparing reports is not smooth, up to (4) difficulties in scheduling exams and assessment because it is done manually. Therefore, it is necessary to design an internship application that can support the need for conversion of course grades in the MBKM program within the UHW Perbanas Information Systems study program.

In the results and discussion section, this research explains how the data collection process was carried out and how the system development using the waterfall method up to the system design stage was carried out. At the system design stage, it is explained how to describe the user interacting with the system, system flow, data flow, database structure, and a description of the internship management application interface in the UHW Perbanas Information Systems study program.

1. Data collection results

At this stage, the data collection process is carried out by means of interviews with informants, observation through direct observation, and literature study. In this research, the interview process involved several informants, starting from students, admins, field supervisors, and study program heads to get a comprehensive picture of the business process and the obstacles faced when managing student internships. Meanwhile, observations are carried out by analyzing ongoing business processes while collecting related data. To support the process of solving existing problems, a literature study was carried out to obtain relevant theories to support research. The data obtained from interviews, observations and literature studies were then validated and verified by the informants involved. Below in table 1 are the discussion topics proposed to the informants as well as a collection of data obtained from the data collection stage.

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Table 1 Interview Topics and Data Obtained

No	Interview Topics	Problems Found	Data	Informant
1	Internship management business processes (registration, approval, implementation)	Students apply for internship activities, then the admin receives the internship request and submits approval to the head of the study program which takes a long time;	Data Student; Data Lecturer Data Intership	Lecturer; Student; Admin; Head of Study Program
2	Management of requests for internship activities	There is no information about internship offers to students; Data relating to internship activities is processed conventionally, so data processing is felt to be less effective, efficient, fast and accurate;	Data Student; Data Lecturer Data Intership; Data Periode; Data Level; Data Category; Data Topics; Data Interest;	Admin; Head of Study Program
3	Tutoring and Preparation of Internship Activity Reports	Do not have media used to record the progress of internship tutoring; student and lecturer supervision schedules are not yet structured; The head of the study program, admin, or lecturers have not been able to monitor the progress of student internship activities	Data Report; Data Logbook Data Mentoring; Lecturer Schedule Data	Lecturer; Student; Admin; Head of Study Program;
4	Scheduling internships, and processing internship grades	There are often problems with the schedule for internship student exams; Admin finds it difficult to process values and errors often occur because it is done using manual calculations	Data Score; Exam Schedule Data;	Lecturer; Student; Admin;

Source: Data Processing

2. Results of Needs Analysis

After gaining an understanding of the entire business process and obstacles in managing the management of the internship program, an analysis of the needs of the users is then carried out. At this stage, an analysis of the problems found is carried out and the user's needs for the system are identified. Users involved in the system consist of: study program admin, supervisor, students, and study program head. This stage produces a list of functional requirements. Below in table 2 are the results of functional requirements grouped based on system users.

Table 2 Functional Requirements based on System Users

No	Users	Functional Requirements
1	Admin	d. Main page that displays information on internship activities e. Management of Lecturer and Student master data, period data, levels, topic types, internship data and specialization programs f. Manage information on internship offers, internship registration, and internship program applications g. Manage a logbook of student internship activities

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		h. Manage internship exam schedules i. Manage student internship exam scores j. Manage student internship activity reports k. Manage application user access rights
2	Lecturer	a. Main page that displays information on internship activities b. Manage student internship program applications c. Manage a logbook of student internship activities d. Exam schedule information e. Manage student internship exam scores
3	Student	a. Main page that displays information on internship activities b. Register for the internship program c. Manage a logbook of student internship activities d. Exam schedule information e. Information on student internship exam scores
4	Head of Study Program	a. Main page that displays information on internship activities b. Manage approval of internship program activities c. Information on student internship activity reports

Source: Data Processing

After the functional requirements have been successfully prepared, the next stage is designing the application. The system design is described using the Unified Modeling Language (UML), including use case diagrams, activity diagrams, and class diagrams. Apart from that, in system design a wireframe is also created to describe the application display design

3. Use Case Diagram Design

Use case diagrams are the result of system design that explain how one user and another interact with the system. The use case diagram depiction refers to the functional requirements created previously. Figure 3 below shows the use case design of the internship management application in the UHW Perbanas Information Systems study program.

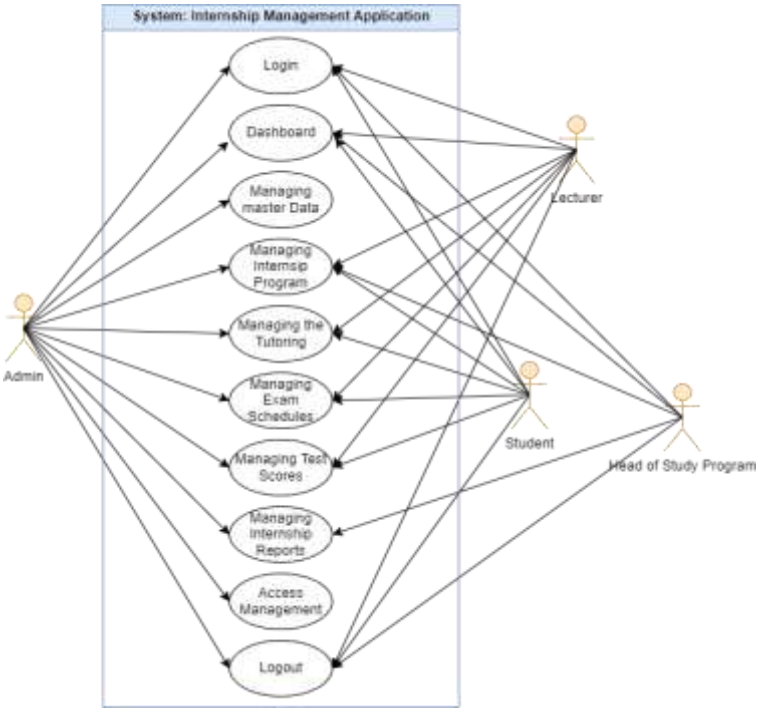

Figure 3. Diagram Use Case Aplikasi Pengelolaan Magang
Source: Data Processing

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4. Activity Diagram Design

To know the sequence of activities to make it easier to understand the process that occurs, the design is carried out in the form of an activity diagram. Based on the use case explained previously, there are 8 main functional systems that can be applied to the application, including: application main page, master data management, internship activity management, mentoring process, internship exam scheduling, internship assessment, internship activity reporting, and application user access management . Below in Figure 4 is an activity diagram for managing internship activities as well as details of the process of mentoring and reporting internship activities in the UHW Perbanas Information Systems study program.

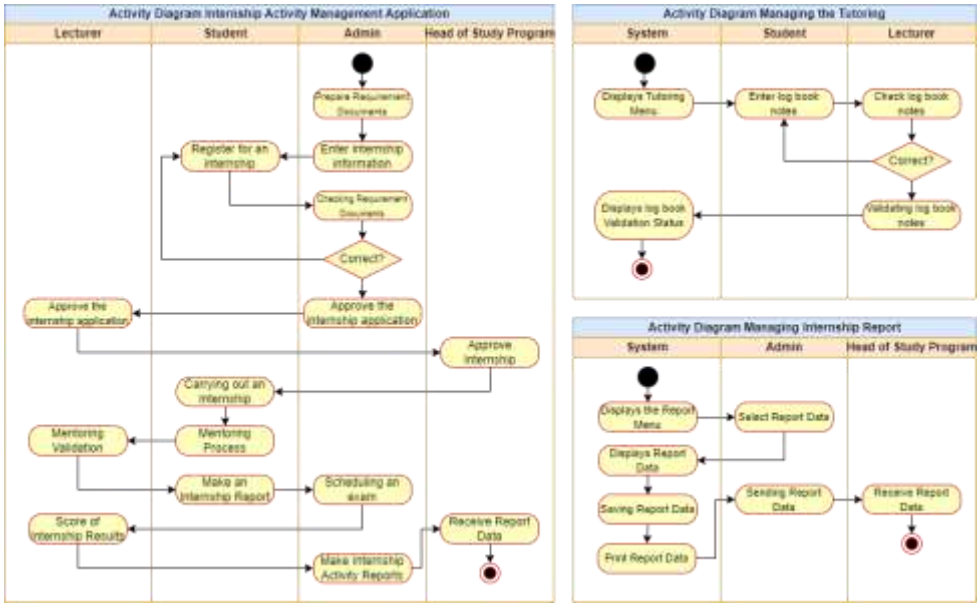

Figure 4. Activity Diagram Application for Internship Management, Internship Tutoring, and Reporting
Source: Data Processing

5. Database Structure Design

The next design is to describe the structure of each object, which consists of classes, attributes and their relationships. This design is made in the form of a class diagram with the aim of facilitating understanding of the schema and relationships in a system being developed. Below in Figure 5 is a class diagram for the internship management application in the UHW Perbanas Information Systems study program.

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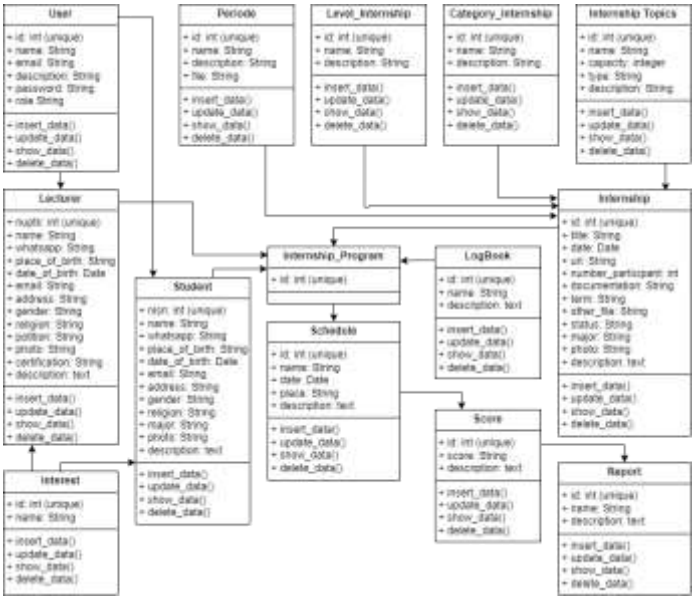

Figure 5. Class Diagram Aplikasi Pengelolaan Magang
Source: Data Processing

6. Interface Design

The final stage in system design is describing the design of the application interface. The user interface in this research is made in wireframe form. The wireframe describes how the application that will be created will look like. Below in Figure 6 is a wireframe for internship management, mentoring and internship reporting in the internship management application in the UHW Perbanas Information Systems study program..

Figure 6. Internship Management Application Wireframe
Source: Data Processing

The results of the needs analysis and design are then carried out in a confirmation and validation process for users. This process ensures that the design developed is submitted to users and asks for user feedback on the application being developed. Every feedback given by users is documented, then adjustments are made to the application design being developed. The following table 3 shows the results of confirmation and validation for users.

Table 3 Confirmation and Validation to Users

Functional Requirements	Status
User: Admin a. Main page that displays information on internship activities b. Management of Lecturer and Student master data, period data, levels, topic types, internship data and specialization programs c. Manage information on internship offers, internship registration, and	Valid

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internship program applications d. Manage a logbook of student internship activities e. Manage internship exam schedules f. Manage student internship exam scores g. Manage student internship activity reports h. Manage application user access rights	
User: Dosen a. Main page that displays information on internship activities b. Manage student internship program applications c. Manage a logbook of student internship activities d. Exam schedule information e. Manage student internship exam scores	Valid
User: Student a. Main page that displays information on internship activities b. Register for the internship program c. Manage a logbook of student internship activities d. Exam schedule information e. Information on student internship exam scores	Valid
User: Head of Study Program a. Main page that displays information on internship activities b. Manage approval of internship program activities c. Information on student internship activity reports	Valid

Source: Data Processing

4. Conclusions

This research aims to solve the problems currently faced by the UHW Perbanas information systems study program when managing internship activities. This research implements the waterfall method up to the system design stage. This research resulted in an analysis of user needs and system design for managing internship activities. The resulting needs analysis and system design can be used as a guide in developing web-based applications that are integrated between users. The results of the needs analysis obtained information that currently a system is needed that can perform several functions, including: managing internship activity information, internship registration, internship approval, internship guidance, internship scheduling, internship assessment, and reporting on internship activities. Meanwhile, system design is described using use case diagrams, activity diagrams, class diagrams, and wireframes. The validation and confirmation results of the designs created show that the entire application design is in accordance with user needs. The suggestion for this research is application development as well as testing the application. Apart from that, future research can also carry out designs using other methods to compare the effectiveness of application development with the two existing methods.

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