Analysis of Integrated Lecture Minutes Recording System Analysis Based on RFID

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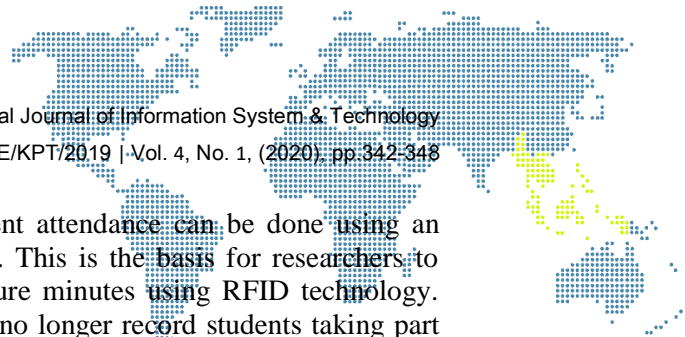[1]irfandamanik@gmail.com, [2]ekairawan@gmail.com

Abstract

RFID (Radio Frequency Identification) is an identification technology for wireless data retrieval using radio waves. RFID is part of the development of semiconductor technology that is integrated with informatics systems. In the college environment, especially in the academic sector, there is often a problem with the process of recapitulation of attendance notes for lectures which is not effective and efficient. Therefore this research aims to build an information system that utilizes semiconductor RFID technology. The RFID tag used is a card that will be used as a substitute for a student ID card (KTM) in which there is a unique code that is used as the ID number of each student. This RFID tag data will be integrated with the database system, so that the attendance process for lecture minutes becomes more effective and efficient. This is because the attendance process is carried out by students by attaching the KTM to the RFID reader which will read the RFID tag on the KTM and store it in the database. So that the process of attendance attendance recapitulation of lecture events becomes easier because the data is automatically stored in the database.

Keywords: RFID, Information Systems, Lecture Minutes, Academi

1. Introduction

The activity of making minutes is a data collection activity and part of the activity reporting of an institution which contains attendance data and reports on the results of other activities. Making minutes must be applied in the lecture process in every college. In the lecture minutes, the lecturer will write down the attendance of students, the date of the lecture, the lecture syllabus, which is carried out every week. The importance of this process in lectures is related to education to present correctly the number of students present, the date of the lecture and the course material syllabus presented by the lecturer. The process of making lecture minutes can be done conventionally and non-conventional. Conventional is done by entering data using stationery into a sheet of paper while non-conventional input data using a computerized system. Making lecture attendance minutes is conventionally ineffective in the implementation process; an error occurs in the process of entering human error data. Another disadvantage of conventional paper loss and damage is the use of a long time to recapitulate each semester. To avoid this, researchers designed a computerized attendance information system recording lecture minutes using database storage.

Making lecture attendance minutes is an identification process in identifying the presence of students in teaching and learning activities with lecturers in universities. Identification is a data retrieval process; the easiest data identification is the auto-ID (automatic identification). There are several auto-id technologies to collect data automatically, one of which is using RFID (Radio Frequency Identification). RFID is an automatic identification technology that utilizes radio waves. However, this system cannot stand alone without a database for data processing and storage. In this research, RFID is used to record student attendance data, where the data sent is in a unique hexadecimal form which is stored in an RFID tag. Where this unique data will be integrated with the

database so that the identification process of student attendance can be done using an RFID tag in the form of a student ID card (KTM). This is the basis for researchers to research the attendance information system of lecture minutes using RFID technology. With this technology, it is hoped that lecturers will no longer record students taking part in lectures because their attendance will be identified automatically by the RFID reader integrated with the database. The benefits of this research will also help the academic department in recapitulating lecture attendance reports more effectively and efficiently. Therefore, direct research to obtain the correct design model for filling Teaching Minutes can be used by lecturers in a class at any public or private university in our pluralistic society. The objectives to be achieved from the research are:

a) Analyzing the Existing Lecture Minutes System on AMIK Campus - STIKOM Tunas Bangsa Pematangsiantar.
b) Finding and Designing an RFID Integrated Classroom Minutes Recording System Model.
c) The process of monitoring learning and teaching activities through the available Web servers.
d) Filling in lecture minutes can only be done in the classroom.
e) Produce a model design for an integrated RFID lecture recording system

So that the results can be done:

a) Lecturers can carry out the process of recording lecture minutes and verification through the web service available in the classroom.
b) The process of verifying lecture minutes by students in the classroom can be done using the attendance process provided in the application.
c) The process of monitoring and verifying lecture minutes, both by the head of the study program and by quality control, can be done quickly and on time.
d) The process of making Teaching and Learning Activity reports or lectures can be done quickly and on time.

2. Research Methodology

2.1. System

Basically the word system comes from the Greek "Systema" which means unity, namely the whole of the parts that have a relationship with one another. The system is a collection of elements both physical and non-physical which shows a relationship between them and interacts together towards a goal [1-2]. A system can consist of several subsystems that are interconnected to form a unit so that the objectives of the system can be achieved [3].
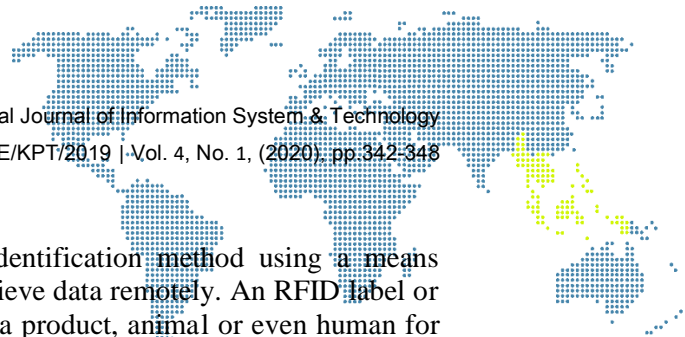
2.2. Information

Information is basically a set of data that has been processed into something that has broader meaning and use. In his journals, in general, information is the result of data processing obtained from each element of the system into a form that is easily understood and constitutes relevant and useful knowledge [4]. Information is data that has been managed in such a way that it has added value and is used in decision making [6]. According to Edhy Sutanta [5-6]: "Information is the result of data processing so that it becomes an important form for the recipient and has a use as a basis for decision making that can be felt directly at that time or indirectly in the future."

2.3. Database

According to Indrajani (2011)[7], "Database is: a collection of logically interconnected data, and is an explanation of the data, which is designed to find the data needed by the organization".

According to McLeod (Pearson)[8], George P. Schell (2008)[9], "The general definition of a database is a database which is a collection of all computer-based data.".

2.4. Radio Frequency Identification (RFID)

Radio Frequency Identification (RFID) is an identification method using a means called an RFID label or transponder to store and retrieve data remotely. An RFID label or card is an object that can be installed or inserted in a product, animal or even human for identification using radio waves [10]. RFID labels contain information that is stored electronically and can be read up to several meters away. RFID reader systems do not require direct contact like barcode readers. The RFID label consists of a silicon microchip and antenna. Some sizes of RFID labels can be close to the size of a rice grain. Passive labels do not require a power source, while active labels need a power source to function [11-13].

This study aims to produce a design and prototype of an information system. The results of this study are the design and prototype of the attendance information system for lecture minutes with RFID integrated with a database [14-17]. So in its development using the SDLC (System Development Life Cycle) process.
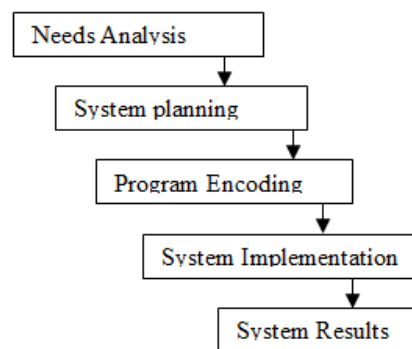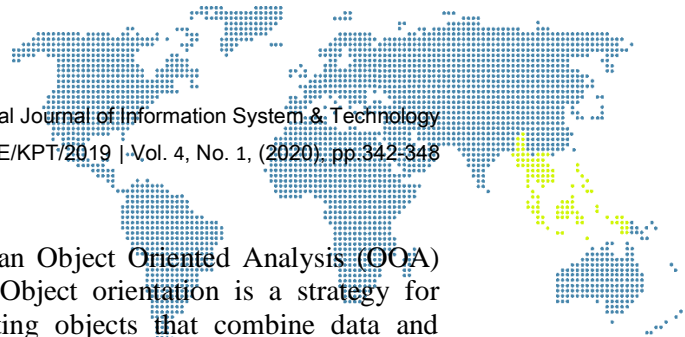

Figure 1. System Development Cycle

Requirement Definition in this first stage, what is done is to find and collect the complete needs then analyzed and defined which is part of the requirements analysis and definition in the model. At this stage, the researcher conducts information searches and analyzes needs. In designing and building this system requires some hardware and software that must be met. System & Software Design, in this stage a general system design will be carried out with a context diagram design tool and a detailed system design with a data flow diagram design tool illustrated with easy case software so that you can find out the rule check and balancing system to avoid system design errors between black hole and miracle. The database design will be designed with the Entity Realization Diagram tool and then it will be transformed into a physical table and table normalization tests will be carried out. Applications will be designed and built using the CodeIgneter framework and MySQL DBMS as localhost and Google Chrome to run the application. System Testing, the system that has been created will be tested using the white box and black box methods to determine the validity of the input and the system's cyclomatic complexity.

Respondents or samples were taken from the academic community. The respondents are as follows lecturer, students, head of study program and quality assurance agency. Research conducted to produce data and information needed and related to what will be written. To collect the necessary data and information, the authors use the following methods:

a. Primary Data Collection
b. Interview
c. Secondary Data Collection

2.5. Analysis, Design and Testing Techniques

The analysis technique used in this study uses an Object Oriented Analysis (OOA) approach or object-oriented analysis with UML. Object orientation is a strategy for organizing the system as a collection of interacting objects that combine data and behavior. The use of object-oriented models is widely applied because it has many advantages, such as improving quality, accelerating development time, improving communication between developers and users, being easy to develop, easy to detect flaws, and increasing careful selection of software.

The analysis process is carried out based on the results of the data collection stages by means of interviews, observation and literature study to obtain specifications for the system requirements to be developed. In the analysis process, the analysis techniques used are:

a) Analysis of the Current System Business process. Analysis is carried out on procedures, documents, files and printouts of an existing system.
b) Analysis of the developed System Overview. Analysis is carried out to provide an overview of the system to be developed.
c) Analysis of User Functional and Non-Functional Needs. Modeling needs to describe the system functions and the users involved and what functions each user can obtain is modeled using a Use Case Diagram.
d) Analysis of System Behavior. At this stage, analysis of system behavior is carried out and is modeled with Activity Diagrams and Sequence Diagrams. Activity Diagrams are used to model use case processes that run in the system, while Sequence Diagrams are used to model message delivery between objects and their chronology.

3. Results and Discussion

3.1. Analysis Results

The system analysis process describes what the system must do to meet the user's information needs. System analysis will answer the question of what the system will do, who will use the system, and where and when the system will be used. System analysis activities that are running are carried out with an object-oriented analysis approach for the system being designed, intended to focus on the functionality of the running system. Furthermore, the results of the analysis will be visualized and documented with the Unified Modeling Language (UML) through Use Case Diagrams, Activity Diagrams and Sequence Diagrams with the consideration that these diagrams are considered to represent the entire running system that can be understood by users.

3.2. Data Analysis and Information Systems

Analysis of the business process of the ongoing lecture minutes system is carried out to obtain information about how academics carry out Lecture Minutes management activities that support application development. Based on the results of interviews and observations, data and information were obtained related to the information system process for Lecture Minutes at state or private universities to be developed. Data and information relating to the system to be developed along with its availability. The results of interviews and observations indicate that respondents want a web-based and RFID information system application to be developed as a tool to facilitate the management of Lecture Minutes in monitoring Teaching and Learning Activities and can improve speed ..
The process of monitoring Lecture Minutes is related to the process of filling in Lecture Minutes by Lecturers, verification of Students and Lecturers, Collecting Lecture Minutes by the Receptionist, verification by the Head of the Department.

3.3. Lecture Minutes File Collection Process

Lecture Minutes are collected by the receptionist to be submitted to the Head of the Department / Head of the Study Program for verification.

3.4. Display of Information System for Lecture Minutes

Figure 2. RFID Scan Pages (KTM)

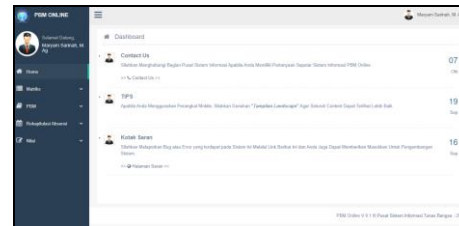Figure 3. RFID Attendance Result Page

Figure 4. Login page
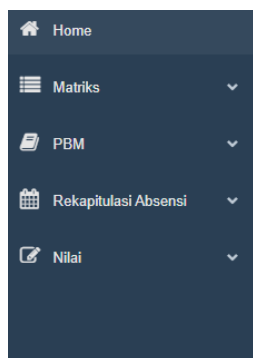

Figure 5. Lecturer Dashboard Page
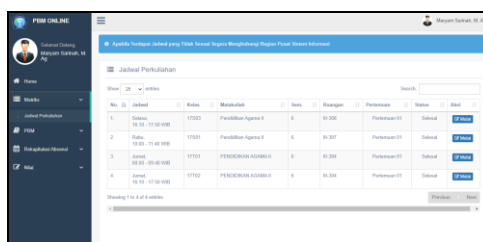

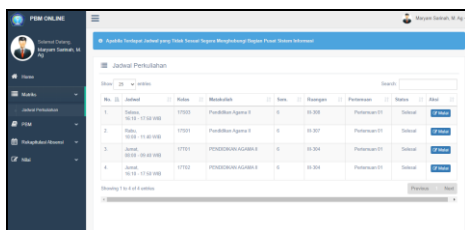Figure 6. Lecturer Dashboard Menu

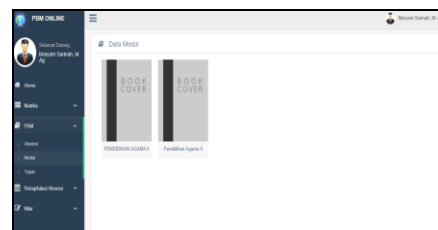Figure 7. Lecture Schedule Menu

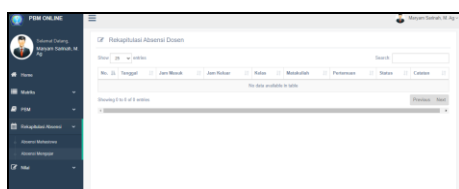Figure 8. Lecture Attendance Menu

Figure 9. Lecture Module
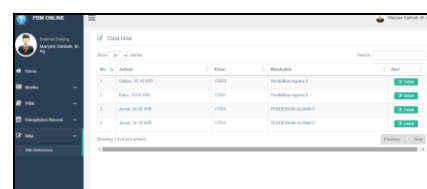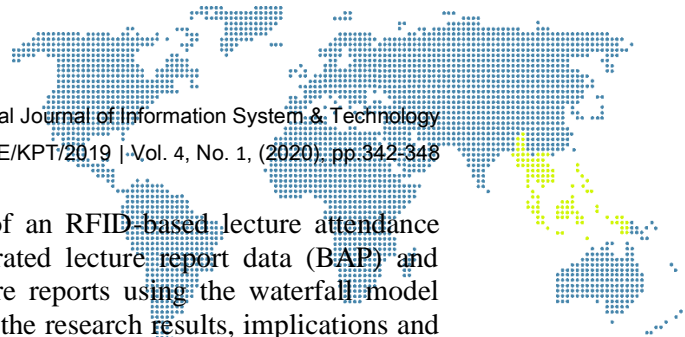

Figure 10. Teaching Attendance

Figure 11. Student Value

4. Conclusion

In this research, an RFID-based lecture information system has been designed using Web programming and MySQL as the DBMS. Model analysis, design and

implementation of software for the development of an RFID-based lecture attendance information system can function to provide integrated lecture report data (BAP) and support the speed of information in making lecture reports using the waterfall model information system development method. Based on the research results, implications and conclusions, then the researcher can provide some suggestions that are relevant to the research results. This suggestion is in the form of inputs aimed at the organization / research object and for further research.

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