Design of Presence System as a Form of Monitoring Lecturer Attendance Data at UPT Labor PPNP

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Article Information

A B S T R A C T

Presence system is an important thing in a government institution. With this system, a lecturer or employee will be bound by the rules and responsibilities that must be carried out. Lecturer attendance activities that carry out laboratory practicum activities at UPT labor Payakumbuh State Agricultural Polytechnic or PPNP have been available, but it is done on paper or paper based. During the lecturer's attendance recap procedure, the manager or head of UPT Labor considers this circumstance to be challenging and problematic. Furthermore, non-computerized attendance lists slow down reporting to the academic division, causing reporting to become fragmented, less effective, and less efficient. This research used R&D or Research and Development to solve the problem. While the development stage used the waterfall model with stages including: communication, planning, modeling, construction and deployment. As a result of this research, the lecturer presence system at UPT Labor has been tested using three types of testing: valid, practical, and effective tests. The validity test obtains an average value of 0.88, which is classified as valid, the product practicality test receives an average value of 0.90, which is classified as very practical criteria, and the effectiveness test obtains an average value of 0.94, which is classified as high effectiveness criteria. The lecturer presence system used in this study provides synergy with accurate attendance data, automatic attendance recap for reporting reasons, and minimizes errors during the recap process. Furthermore, reporting may be completed quickly, effectively, and efficiently.

1. Introduction

The tremendous advancement of information technology that is taking place at this time is being felt by mankind and has an impact on many aspects of life, including education. Many technologies have been discovered in the field of education that can assist educators and educational personnel in carrying out their work tasks in the office every day. At the moment, the use of technology in the context of education is fairly widespread, with one example being the usage of attendance for both lecturers and workers.

Presence system is an important thing in a government institution. With this system, a lecturer or employee will be bound by the rules and responsibilities that must be carried out [1]. In essence, the presence system is created as a form of control over the duties and functions of a lecturer and employee in carrying out their duties. The presence system also serves to transform an employee or lecturer into someone

who can appropriately carry the mandate for the responsibilities assigned to them and is accountable to fellow human beings and especially to Allah SWT .

Recording employee attendance is one of the important factors in managing human resources. Information about the presence of an employee can determine a person's work performance, salary or wages, productivity, and the progress of the institution. Conventional recording of employee absences requires a lot of intervention by administrative staff as well as the honesty of the employee whose attendance is being recorded. This frequently creates an opportunity for attendance data manipulation if supervision is not carried out appropriately [2].

Initially, the attendance system was simply done manually, but this approach was deemed ineffective due to the discovery of various fraudulent loopholes in collecting attendance, such as leaving absences, improper time attendance, and so on. As time passed and many new things were learned in terms of knowledge and technology, attendance machines appeared that could provide more valid data for gathering attendance statistics. As an example of attendance machine technology, especially fingerprint or presence with fingerprints, which makes it simple to take attendance. In addition to other presence machine fingerprint machines, such as those that use eye retina sensor technologies, faces, and mobile devices, this one intends to prevent fraud in any profession that requires data on an employee's presence [3].

Lecturer attendance activities that carry out laboratory practicum activities in the Technical Implementation Unit or UPT labor of the Payakumbuh State Agricultural Polytechnic or PPNP have been around for a long time, but are carried out on paper-based or paper-based. This situation is considered difficult and complicated by the manager or the head of the UPT Labor during the lecturer attendance recap process. In addition, attendance lists that are not computerized also make reporting slow to the academic section, so that reporting becomes disrupted, less effective and efficient.

After knowing and finding the root of the existing problems, a creative idea or idea is formulated to solve the existing problems in a study entitled Design of Presence System as a Form of Monitoring Lecturer Attendance Data at UPT Labor. This research product is useful as a breakthrough in collecting data on lecturer attendance in teaching at UPT Labor and is also useful as supervision for institutional leaders.

2. Method

2.1. Type of Research

The method plays an important role in a research, so this research raises R&D or Research and Development to be applied in solving this research problem [4][5]. While the development stage uses the waterfall model with stages including: communication, planning, modeling, construction and deployment [6].

2.2. Research Procedure

Based on the system development methods and models described in the previous point, this research procedure combines the R&D research steps and the SDLC system development life cycle model waterfall model [7]. So that the stages of this research can be described as in Figure 1.
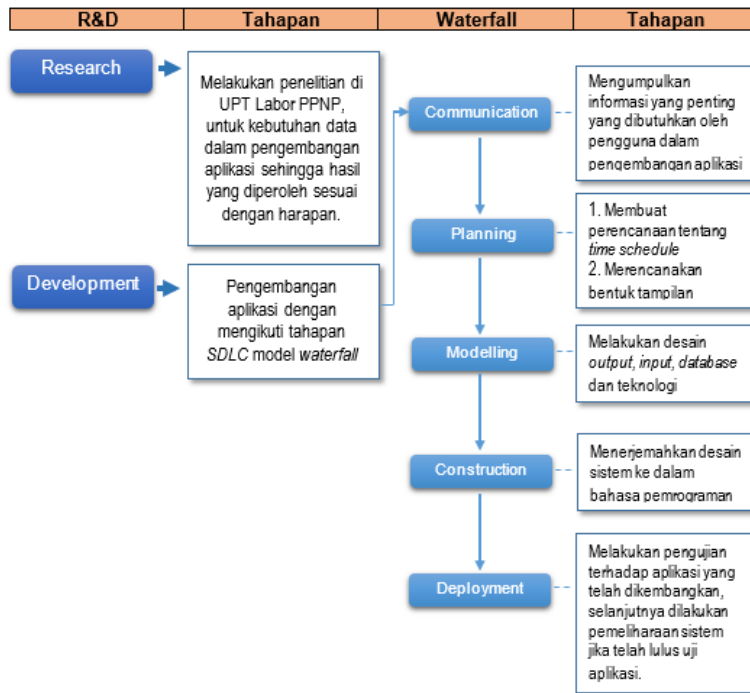
Figure 1. Research Stage

The description of the research stages based on Figure 1 above can be explained as follows :

Research stage, Preliminary research is conducted at this stage by several techniques such as interviews, analyzing problems, and identifying the emphasis and scope, and creating creative ideas or ideas as answers to these issues. Furthermore, research is conducted by gathering data that is deemed important, directly observe the system to be built, comprehend and grasp the theories and concepts that underpin the creation of the program and the technology to be employed. Following the successful creation of the system, the research is carried on by examining and creating the stages of testing the research product.

Development stage, this research's development stage was based on the waterfall development model (Pressman) in the system development life cycle, also known as SDLC, as follows: [8]:

Communication stage, the first stage is very important to note because it involves collecting data and information based on consumer or user needs. The process of communicating with consumers, users, or people directly relevant to the study object begins at this stage. The aim of this stage is to acquire more precise information based on the needs of system users. At this point, the research data was gathered through observation and interviews.

Planning stage, the planning stage describes the estimation of numerous activities, the risks that may arise, the estimated resources required to establish the system, the work products to be created, as well as the expected scheduling to be carried out, and tracking of the system's development process.

Modeling stage, Modeling is the stage of creating and modeling the system architecture, which includes both a general and a specific system design. The purpose is to have a better understanding of the system that will be designed.

Construction stage, This stage is a system development procedure that involves translating the design form from the modeling phase into the form of a programming language based on the findings of this study. Following the completion of the system construction or development phase, the system is tested as a unit and as a whole. The purpose is to discover errors in the system as a whole and as a unit.

The deployment stages, some of the activities carried out at the deployment stage include: System implementation in the field, in this context is UPT Labor, software evaluation, and software development based on the feedback provided so that the system can continue to run and develop according to its function [9].

2.3. Research Instruments

This instrument is used to collect process data, validity, practicality and effectiveness of digital library development, this instrument consists of : Observation sheet, this activity aims to observe the development process that will be carried out which aims to oversee each of the stages carried out in system development. Questionnaire, in this study, researchers will describe the design of a valid, practical and effective lecturer attendance system. So that a product test is carried out which includes a validity test aimed at experts in the field of programming or information system development; practicality and effectiveness tests aimed at practitioners and respondents in the field of attendance management [10].

2.4. Data Collection Technique

Data collection techniques consist of observation, documentation and questionnaires. Observation is a complex process, a process composed of various biological and psychological processes. The processes of observation and remembering are two of the most crucial. Direct observation of each development process was used to make observations. Documentation in this study consists of photographing each development activity carried out in order to determine each procedure carried out. Questionnaire, the instrument used to collect data in order to see the ease of use of the digital library is a questionnaire. Questionnaire according to Sugiyono [5] namely, data collection techniques carried out by giving a set of questions or written questions to respondents to answer. It was provided and designed according to the needs for the implementation of this product trial, and it was disseminated to responders.

2.5. Data Analysis Technique

The data analysis technique used is by conducting product tests including: valid, practical, and effective tests. The product test was carried out using a questionnaire instrument media.

Validity testing is carried out aiming to produce quality products and to determine the level of product validity, namely the lecturer attendance system at the UPT Labor. The validity questionnaire is then processed according to the validation formula rules, namely the Aiken's V formula [11]. Practicality testing questionnaires are addressed to practitioners who are involved in managing lecturer attendance at the UPT Labor. Practitioners' assessments through practicality questionnaires were then analyzed according to the rules of the Kappa moment formula [12]. Effectiveness testing analysis uses the G-Score formula or Richard R. Hake's statistics [13].

3. Results and Discussion

Research, based on the preliminary research conducted, a variety of problem information was obtained, including the difficulty and complexity of the lecturer attendance recap process and the slow reporting of lecturer attendance from UPT Labor to the academic department. System development refers to the following waterfall stages :

Development, The stages of development are carried out with reference to the stages of the system development life cycle or the waterfall model System Development Life Cycle (SDLC). Communication Stage, this stage includes: project initiation and ghatering requirements. Planning stage (Estimating, Scheduling, Tracking), Estimating, distributing tasks to each user and their respective roles. Scheduling, This study consisted of ten activities over two months. Tracking, making the system in the form of a web and then packaging or hosting it online, so that a URL address is obtained and then the researcher packages the system in the form of a mobile version or APK.

Modeling stage, the modeling stage consists of several stages including: general and specific design. Unified Modeling Language or UML is a system design tool used in this study which consists of several diagrams, namely: use case design, activity, sequence and class diagrams. The general description of the system or application in this study is briefly illustrated through the following use case diagram design.
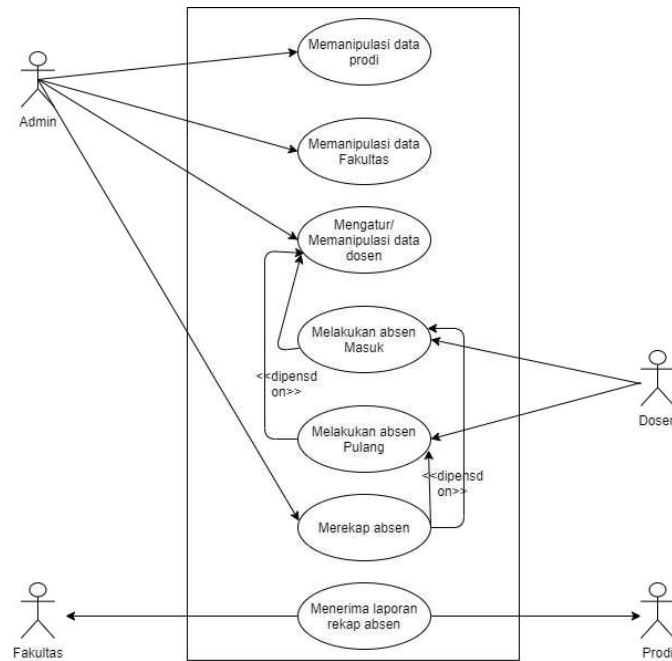

Figure 2. Design Use Case Diagram

In this system, the activity diagram design is divided into two parts: the activity administrator design and the lecturer activity design. Figure 3 depicts the two designs of activity diagrams.
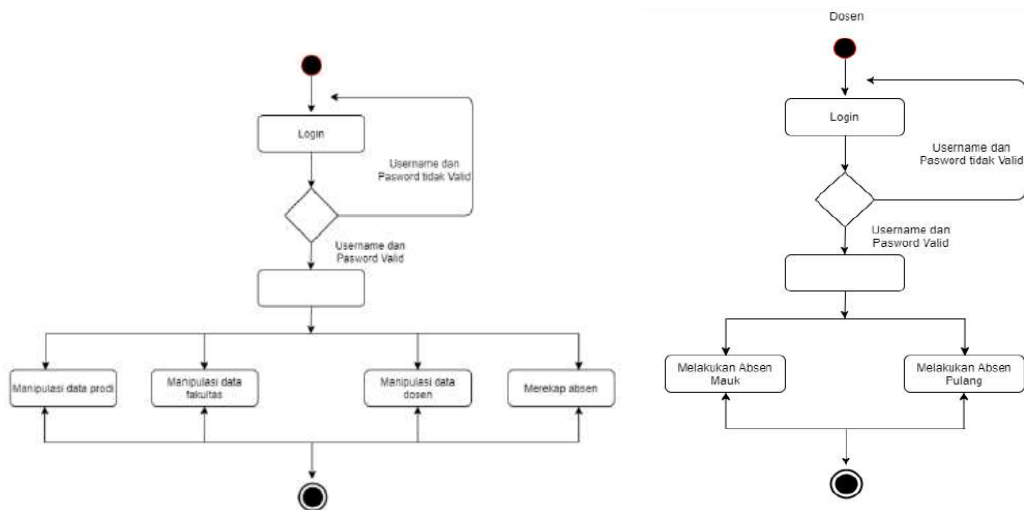

Figure 3. Activity Diagram Design

The next general system design is to describe the relationship between classes in the system being built. The class diagram design in general is depicted in Figure 4 below.
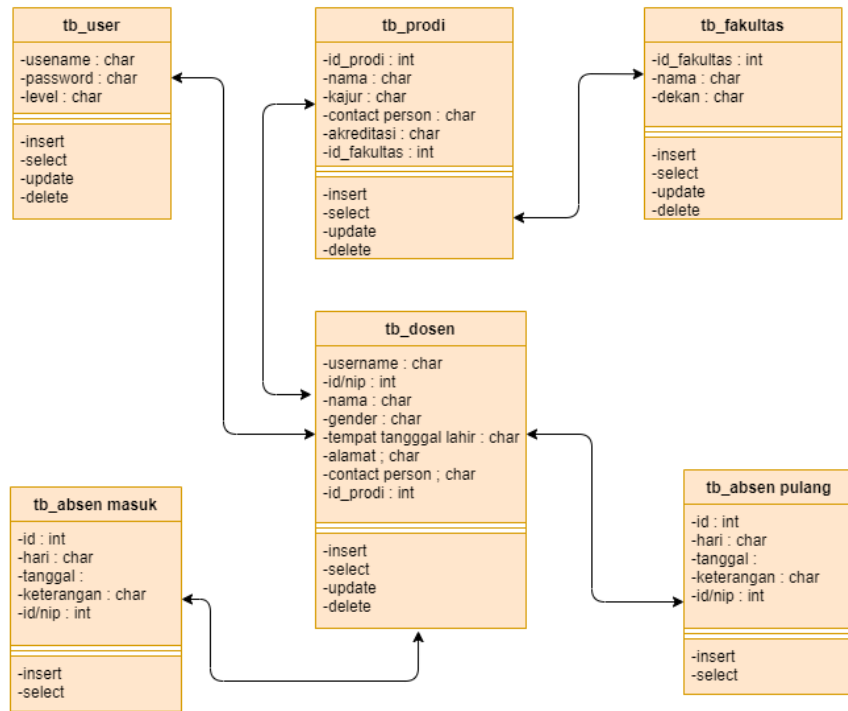
Figure 4. Class Diagram Design

The system design includes several design stages, including the output design of six report designs, input design of seven form input designs, and control design for the hardware and software of this lecturer attendance system. Construction Phase The construction phase of this system follows several stages as illustrated in the following figure.
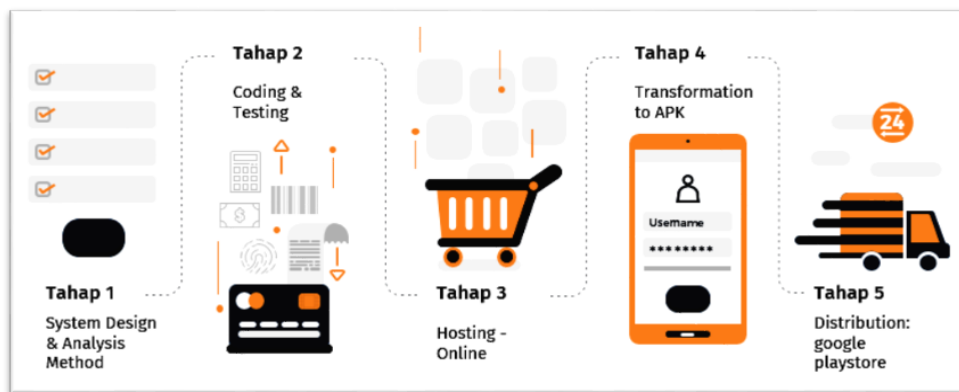

Figure 5. Stages of Construction of The Lecturer Attendance System at UPT Labor

Based on Figure 5, it can be described that the stages of system construction in this study include : (a) the initial stage is the stage to see the system or application has been analyzed and designed according to the System Analysis and Design stage; (b) the system is developed in a web-based way, where the system is created with web-based programming and then packaged, and it is supported by a database management system, particularly MySQL; (c) web hosting, customize applications online on the cpanel that has been provided, where previously a domain and hosting package was ordered. Figure 6 depicts the system or application customization process on the c-panel provided by the web hosting service provider; (d) Figure 7 depicts the transformation of the lecturer attendance system in the form of a web into the Android Package Kit in the form of an Android application with the idea of webviews using the MIT Appinventor software;

and (e) android applications that have been transformed into APK form are then distributed, such as through the Google Play Store.
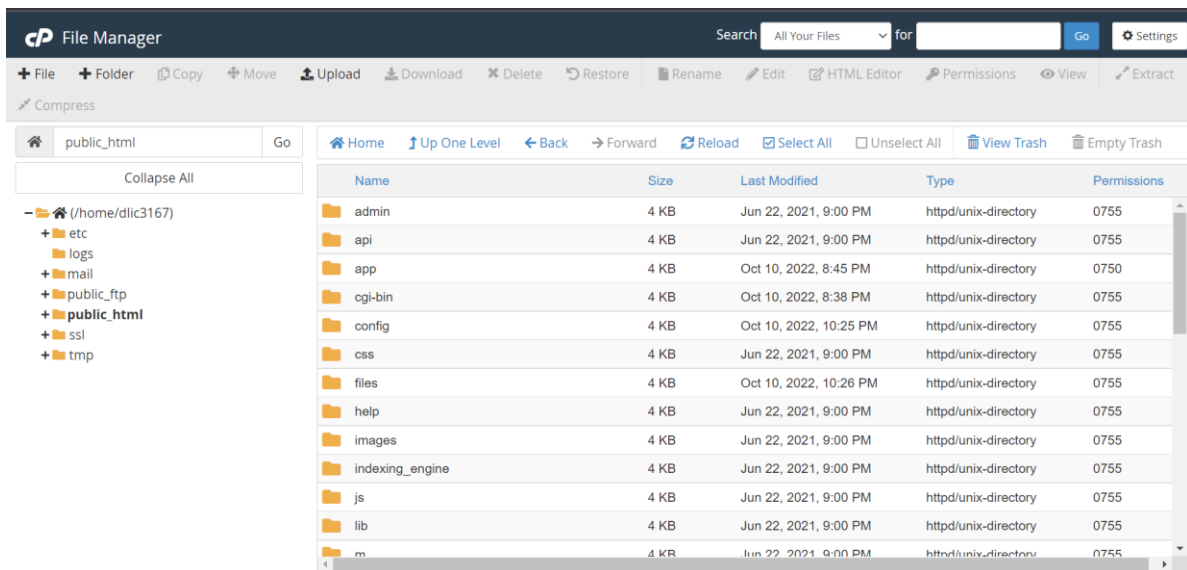
Figure 6. An Overview of The Lecturer Attendance System Customization Process at UPT Labor
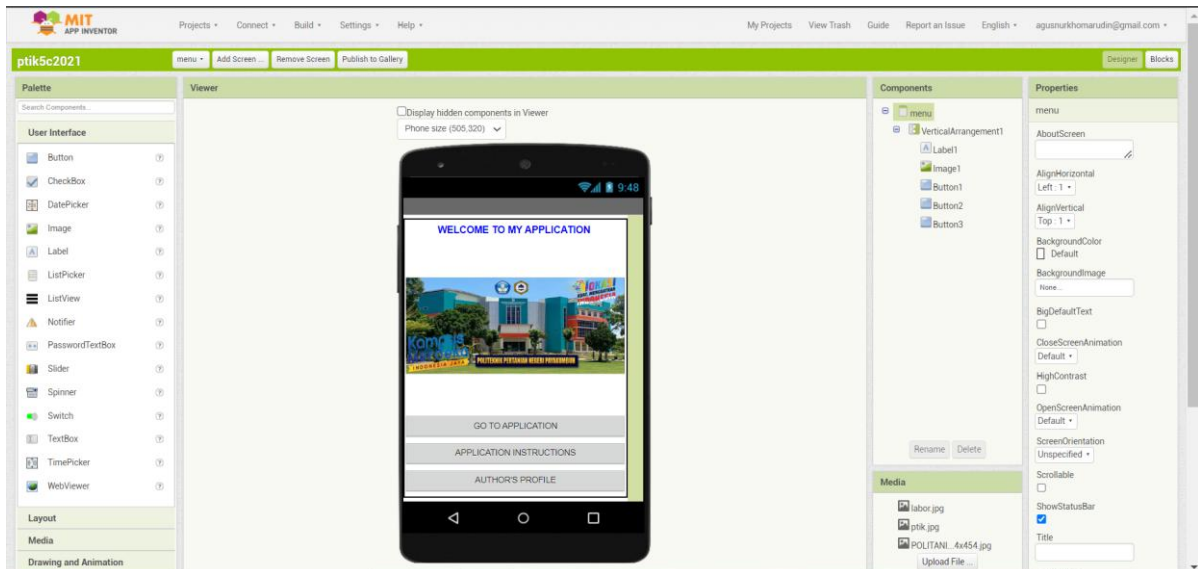
Figure 7. An Overview of The Process Of Transforming The Lecturer Presence System into APK Form

The deployment stage, consists of implementation of the system in the field, followed by product testing activities. Validity test, assessed by 3 experts in the IT field, such as: programming, computer systems, and others. Furthermore, the questionnaire completed by experts is processed using Aiken's V formula, which yields an average value of 0.88, classifying it as a valid category, as shown in Table 1 below.

Table 1. Product Validity Test Processing Results

Validator	Validator 1		Validator 2		Validator 3		∑s	n(c-1)	Score V	Average Score V
	r	S	r	S	R	S				
Aspects of Content Validity	4	3	5	4	4	3	10	12	0.83	0,90
	5	4	5	4	4	3	11	12	0.92	
	4	3	5	4	4	3	10	12	0.83	
	5	4	5	4	4	3	11	12	0.92	
	5	4	5	4	5	4	12	12	1	
Aspects of Instructional	4	3	4	3	4	3	9	12	0.75	0,90
	4	3	4	3	5	4	10	12	0.83	
	5	4	5	4	5	4	12	12	1	
	5	4	5	4	5	4	12	12	1	
Aspects of Display	4	3	5	4	3	2	9	12	0.75	0.78
	4	3	5	4	2	1	8	12	0.67	
	4	3	5	4	3	2	9	12	0.75	
	4	3	5	4	5	4	11	12	0.92	
	5	4	5	4	3	2	10	12	0.83	
Aspects of Programming	4	3	4	3	5	4	10	12	0.83	0.92
	5	4	5	4	4	3	11	12	0.92	
	5	4	5	4	5	4	12	12	1	
Average overall V score										0.88
Description										Valid

Practicality test, tested on practitioners related to lecturer attendance managers at UPT Labor. The product practicality test questionnaire consists of 5 aspects of assessment and has been filled in by 3 testers. The results of the evaluation of the product practicality test are then processed according to the Kappa moment formula. Practicality test results get an average value of 0.90 which can be included in the very practical criteria, as described in Table 2 below.

Table 2. Product Practicality Test Processing Results

No	Evaluated aspects	Tester		
		Tester 1	Tester 2	Tester 3
1	Clarity of instructions for using the system	5	5	4
2	The system can be used easily without the help of experts	5	5	4
3	Easy to access the system	5	5	5
4	The system can work repeatedly	5	5	4
5	Each component or form is compatible with each other starting from: input, process and output forms, as well as reports that can be printed easily	4	4	4
	Total	**24**	**24**	**21**
	Avergae	0,95	0,95	0,81
	Practical Results	0,90		
	Description	**Very Practical**		

Test for efficacy. The efficacy test of the lecturer attendance system is evaluated by reviewing a questionnaire of ten surveys. The efficacy test findings were analyzed using Richard R.'s statistical formula principles. Rights that get an average score of 0.94 are included in the high effectiveness criteria, as described in Table 3 below.

Table 3. Product Effectiveness Test Processing Results

No	Respondents	G-Score
1	R 1	0,85
2	R 2	1,00
3	R 3	0,73
4	R 4	1,00
5	R 5	0,93
6	R 6	0,93
7	R 7	1,00
8	R 8	1,00
9	R 9	0,67
10	R 10	1,00
	Average	**0,91**
	Category	**High Effectiveness**

This research has produced a research product in the form of a lecturer attendance system or application at UPT Labor. The attendance system or online attendance application is a modern type of program that assists users and administrators in this context in documenting and reporting on the presence of educators and education staff. The online presence application has been integrated with the payroll system in certain agencies, which means that online presence will be immediately linked to an employee's paycheck slip application [14]. In addition, the development of attendance applications is currently directed at the effectiveness of mobile devices or smartphones, as previously developed by Ely Mulyadi, et al with the title Application of a Mobile Presence System Using GPS Sensors [15].

The lecturer attendance system at UPT Labor as a product of this research has been tested by covering 3 types of tests, namely: valid, practical, and effective tests. The validity test gets an average value of 0.88 which is included in the valid category, the product practicality test results get an average result of 0.90 which is classified as very practical criteria and the effectiveness test results get an average value of 0.94 which is included in the effectiveness criteria tall. Based on the product test results, the product of this research takes the shape of a system or application for lecturer presence that is applicable at UPT Labor.

The lecturer attendance system used in this study provides synergy with accurate attendance data, automatic attendance recaps for reporting reasons, and minimizes errors during the recap process. Furthermore, reporting may be completed quickly, effectively, and efficiently. Although the research was successful in developing a research product in the form of a valid, practical, and effective lecturer attendance system or application at UPT Labor, researchers encountered various challenges during the design and development process. Among the obstacles encountered were the initial design process, especially system design in general or as a whole, which was caused by having to make adjustments to policies related to lecturer attendance at UPT Labor. Furthermore, there are obstacles in implementing or implementing the system, because there are several users and practitioners who are invited in the implementation process so that there are opinions and input that not all of them can be answered by the system.

4. Conclusion

The attendance system is an important thing in a government institution. With this system, a lecturer or employee will be bound by the rules and responsibilities that must be carried out. This research was successful in producing a research product, which was a lecturer attendance system or application at UPT Labor. As a result of this research, the lecturer attendance system at UPT Labor has been tested using three types of testing: valid, practical, and effective tests. The validity test receives an average value of 0.88, which is classified as valid, the product practicality test receives an average value of 0.90, which is classified as very practical criteria, and the effectiveness test receives an average value of 0.94, which is classified as effectiveness criteria tallThe lecturer attendance system used in this study provides synergy with accurate attendance data, automatic attendance recaps for reporting reasons, and minimizes errors during the recap process. Furthermore, reporting may be completed quickly, effectively, and efficiently.

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