Development *Presensi PTI* based on android with Quick Response code

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**Abstract.** *Presensi PTI* (PTI Presence) is an android-based application with the use of QR Code which can be used as a record of the attendance list of students in each lecture that is carried out by the schedule and contract of college and student lectures. The purpose of developing this application is to provide a more effective, efficient, and accurate presence system according to the facts. The process of making this application uses the waterfall method which starts from the analysis, design, coding, and testing of functional suitability, performance efficiency, portability, and usability. The results of application testing on the characteristics of Functional Suitability, Performance Efficiency, and Portability with a percentage of 100% which means the application is good. As for Usability, it can be said that the application is feasible to use with a percentage of more than 70%.

1. **Introduction**

Computer-based information systems are a collection of hardware and software designed to convert data into useful information [1]. The benefits of computer-based information systems are to obtain quality, accurate, and effective information [2,3].

A lecture attendance system that can cause fraud among students, there is often a difference in attendance data that is questioned by the facts of student attendance, and additional employees are needed to improve all student data needed to strengthen each result [4].

The Information Technology Education Study Program (PTI) has available an Academic Information System that provides student data in each lecture that he participates in. In this system, attendance list that must be filled out by students is added first in the form of hard files to be filled manually in each lecture meeting as proof of student recipients, then administrative staff input data on the system to update student lecture attendance data. A system like this becomes more complicated because of the many steps in its implementation and causes inaccurate student attendance data. Referring to the development and use of information technology, completing processes like this can be made easier, safer, effective, and efficient [5].

The teaching and learning process is a systematic process, meaning that the process carried out by the teacher and students in the learning place involves sub-sections, parts, components, or elements that influence each other [6]. Meanwhile, the integration of educational institutions in producing quality learning conducted by lecturers and students is a complete form of this approach [4,7]. Presence is a data collection of attendance, part of the reporting activities of an institution, or...
components of the institution itself which contains attendance data arranged and arranged so that it is easy to find and use if at any time required by interested parties [8]. There are several common types of presentations. What distinguishes it is the way it is used and its usefulness level and can be grouped into two parts, namely the Presence of manuals, is a way of absorbing attendance by using a pen (signature); and Non-manual presence (using a device), is a way of attendance using a computerized system, can use cards with barcodes, fingerprints or by identifying identity numbers and so on.

The system is a network of interrelated procedures, gathered together to carry out an activity or for a particular purpose [9-11]. QR Code is one type of barcode that can be read using a mobile camera and able to store all types of data, such as numeric/alphanumeric data, binary, kanji/kana [10,12]. Each version of the QR Code symbol has a data capacity that matches the amount of data, the type of character, and the level of error correction. For checking data with a maximum capacity determined in each version. For version and maximum data capacity, the amount of data and modules will increase so that the QR Code symbol will increase [13]. Android is a mobile device in the operating system for cellular phones based on Linux [14], and Android is an OS (Operating System) Mobile that is growing amid other OS's that are developing today such as Windows Mobile, iPhone OS, Symbian, and many more [14,15]. Android provides an open platform for developers to create their applications for use by a variety of mobile devices. The programming language needed to build applications on the Android platform is the Java programming language. An important part of developing Android applications is the Android Software Development Kit (SDK) and Android Emulator. The results of this study are in the form of two types, namely the web for configuration and for accessing pages to start an absence, and based on Android for use by students for the absence process. Based on this background, the authors are interested in developing an Android-based 'PTI Presence' using the QR Code.

2. Methods
The method used in this research is the method of developing a waterfall system, while the waterfall model provides a sequential or sequential software life cycle approach starting from analysis, design, coding, testing, implementation, and maintenance [16,17]. This method was chosen by the authors because it is the most suitable method in the scope of research or writing systems. In making this information system waterfall technique is used, the following stages in the Waterfall method: Analysis, Design, Coding, Testing, and Application of the Program [18,19].

The analysis is the initial stage where the process of collecting data, identifying problems, and analysing system requirements to system defining activities. This stage aims to determine the solutions obtained from these activities. Systems analysis, including a general description of the school, analysis of current academic information systems, problems with the academic system, and problem-solving proposed by the author. At the design stage, software modelling is done. The purpose of making this model is to obtain a better understanding of data flow and control, functional processes, operating behaviour, and the information contained therein [20,21]. Consists of the main activities modelling the design process include database design, display design, and system design based on the results of the analysis in the first stage. At the coding stage, the writer starts writing the system code using a programming language following the proposed specifications. This stage is the actual stage of working on a system. After the coding is complete the system testing will be done. The purpose of testing is to find errors in the system and then it can be fixed and to ensure that with certain inputs a function will produce the output as desired. At the stage of implementing the program, it can be said that it is final in making a system. After analysing, designing, and coding the ready-made system can be applied or used and feedback from the school is needed to develop a better system.

3. Result and study
Presensi PTI is software that was built to help the absence process by using QR code based on Android as well as web-based to start the process of the abscess and use the webcam as a Qr code scanner. The process of developing this application has gone through several stages including, the analysis phase, the design phase, the coding stage, and the testing phase.
The results of the analysis based on observations found that software and hardware requirements are Windows 10 Professional Operating System, XAMPP version 1.4.6, and Google Chrome / Mozilla Firefox, Macromedia Dream Weaver, Anti-virus to find out the damage to the system, Android Studio, and a PC that supports its operations.

Design user experience. This design is a design of how interactions in an application can work. Making this user experience design using visual applications. The diagram used is a use case diagram, activity diagram, and sequence diagram. Figure 1 shows the admin use case diagram and Table 1 explains the definition of the admin use case diagram as shown in Figure 1.

Table 1. Definition of the admin use case diagram.

| No | Use case               | Definition                                                                 |
|----|------------------------|-----------------------------------------------------------------------------|
| 1  | Login                  | This use-case serves as a condition for accessing the main admin page       |
| 2  | Academic data processing | This use-case serves for processing academic data such as institute, faculty, study programs, lecture room, and course data |
| 3  | Application data processing | this Use-case functions for processing data applications such as dynamic pages, app configuration, backup, and restore |
| 4  | Presence data processing | This Use-case functions for processing attendance data such as lecture schedule data, student attendance, student attendance manually, and reports |
| 5  | User data processing   | This Use-case functions for processing user data such as data from leaders, operators, lecturers, and students. |
| 6  | Logout                 | This use-case serves as a condition for returning to the login form page    |

Figure 1. Admin use case diagram.

Figure 2. Actor use case diagram.

Figure 3. Lecturer use case diagram.

Figure 4. Student use case diagram.
The activity diagram is a description of the activities of a system or process that is in the software. The activities contained in the Presensi PTI application can be seen in the following figure 5 & 6.

**Figure 5.** Login activity.

**Figure 6.** Sequence diagram (sequence login).

The User Interface Design in this study was conducted by creating a Storyboard using the Balsamiq application. The storyboard can be seen in the table 2:
The third step is coding. In this coding phase, the researcher uses the programming language Personal Home Page (PHP), as well as using the My SQL database as shown in the following figure below:

**Table 2. Storyboard of Presensi PTI**

| No | Design | Description |
|----|--------|-------------|
| 1  | ![Image](image1.png) | Initial display when accessing the absensipti.com URL, for admin, operators, and lecturers |
| 2  | ![Image](image2.png) | Initial display when opening the application, to login |
| 3  | ![Image](image3.png) | Display the main admin page that is composed of application data, master data, user data, attendance, and report data |
| 4  | ![Image](image4.png) | Display the contents of the application data menu which is a dynamic page submenu, app configuration, backup & restore. Following is the display for app configuration |
The fourth stage is testing. In this testing phase, the researchers used 8 ISO characteristics. In this study, the testing phase was only carried out on the functional characteristics of suitability, performance efficiency, portability, and usability. Suitability Functional Testing is done by testing Black Box by testing all buttons and menus contained in the application. The results of this test are all the buttons and menus are all running according to their function in the application. Performance testing is done with software on cloudy's website. The results of the test are the average time needed for the application is around 10-20 seconds, the activity of the device using the CPU when running the application on average is 15MB - 25MB. It can be concluded that the PresensiPTI application as an application that does not consume too many resources, from the results of testing there is no warning or error so that the PresensiPTI application can be classified as a good application in terms of Performance Efficiency. Portability testing is done with software on the cloudy side. The results of this test state that the PresensiPTI application can be installed, uninstalled on various devices and OS
versions, and can adjust the appearance of the application on various screen sizes. Usability testing is done by testing the application directly to the user. This test is conducted on 20 students of IPI Garut in the Education and Information Technology Study Program. This test was conducted with a questionnaire through Google Form. The average yield of 80% with the classification "Eligible".

Implementation Stage. At this stage, for the operation of the application carried out by the operator to input student data and to record attendance data by accessing the web page https://absensipti.com. While for the lecturer to start the presentation, this application can only read the QR code using a webcam so lecturers are expected to bring a laptop as a tool to read the QR code. For operation by students can only display QR code to be directed to a reader or webcam, and also to download material that has been given by lecturers.

4. Conclusion
The advantages of integrating the QR Code with a smartphone, if there is an update of the data it will automatically update by itself, and can be accessed anywhere and anytime and does not take up memory space. Android-based attendance system uses the waterfall method, to help the application design flow and the research process flow using UML diagrams. The system is built in the form of a web and is also based on Android which can be accessed by lecturers and students wherever and whenever through smartphones that are connected to the internet. To read the QR code on this system using a webcam, and can help simplify the attendance process and minimize fraud. The system built is in the form of a web and an android application that is Presensi PTI, as an alternative in recording and documenting the presence of lectures, and this Presensi PTI Application can make students more disciplined.

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