

Student Attendance Information System Using QR Code (Quick Response) At ITSNU Kalimantan

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ABSTRACT

In this increasingly advanced era, Information Technology (IT) is unavoidable. Everyone is competing to find innovations that can improve their performance. Private Universities (PTS) in Indonesia are no exception. An educational institution's attendance list is the primary reference in monitoring student activities. Although this sector is critical, traditional data collection is still taking place. As a result, many problems arise, such as data loss, long charging times, long queues, overcrowding, and even affects student concentration. ITS NU Kalimantan is one of several private universities in Central Kalimantan and is still relatively new. Student attendance applications are designed and developed for more mature data collection to avoid problems that arise later. This study offers the use of web android-based technology equipped with a QR code feature. Based on the questionnaire results conducted on 45 respondents who used the UAT model, the perceived usefulness aspect was 82%, the perceived ease of use aspect was 84%, the perceived user acceptance aspect was 82%, and the average rating produced was 83%. This percentage shows that users respond positively to this attendance system.

1. Introduction

The use of Information Technology (IT) in various sectors is proven to improve the quality of work [1]. Information Technology services give us some benefits, but in recent years, we have been "encouraged" to adapt more quickly to rapidly changing technology due to the pandemic. Attendance or attendance list is one of several activities that began to build using IT.

An attendance list is a data collection used to control members' activities. In private universities in Indonesia, some still use data collection on student attendance lists using the traditional method. Several problems often arise due to the use of this method, such as easy data loss, long charging time [2], long queues, overcrowding, and even affecting the concentration level of students [3].

The Institute of Technology and Science (ITS-NUK) of Nahdlatul Ulama Kalimantan is a private university built approximately two years ago. As a new private university, ITS-NUK is ideal for starting digitization from scratch, especially in the attendance section. In addition to catching up with other PTS,

ITS-NUK still has a relatively small amount of data, making it easier to migrate.

Based on the above background, the authors designed a web-based application that can integrate with mobile applications. The QR Code will be an information storage medium for students to fill out the attendance list in class [4]. This study aims to maintain a guaranteed performance quality, provide facilities to facilitate student data collection, control student attendance, and report on target [5].

2. Literature Review

Previously, several similar studies to create attendance lists at an agency had been carried out, such as creating attendance applications using RFID or Near Field Communication technology and desktop-based systems to monitor and evaluate attendance [2][5].

Chrystin R. Napitu et al. examined the design of an attendance system that can minimize data loss and errors in recording the attendance process and preparing attendance reports. This system was developed using the waterfall model and the Likert Scale method. The test results of this product get a good score. The conclusion is that this website is

worth using. However, this website can be said to be ineffective because the admin still enters student data based on the courses taken, which causes the input process to take a long time. After all, one student can take more than one subject. In addition, there is an edit and delete menu where this menu is less effective because the attendance list data collection must be done in real-time without being edited or deleted. Therefore, proposing a real-time system that records student attendance lists is necessary. One effective way is to use barcodes and the android system.

A quick response code (QR) offers a solution so that no manipulation occurs in the system [6] and makes it easier for the person in charge to recap attendance. QR codes can contain a lot of data in a relatively small size [7], and are usually used in marketing applications or to track things. However, this is not a limitation of the QR code system because it can be implemented to manage student attendance and get data in real-time. This is a solution to avoid manipulation because students cannot fill in attendance if they do not have an active QR code. Research on attendance systems using barcodes has also been carried out before and has been proven to verify student identities to minimize false attendance [8]. Another analysis concerns employee attendance in the new-normal period after the Covid-19 pandemic, requiring employees or users to maintain health protocols using non-touch attendance technology. Implementing a QR Code system scan is the most effective way to register attendance by minimizing direct interaction between users and attendance devices such as fingerprints or ballpoint pens. Therefore, QR code technology is appropriate to be applied to the ITS-NUK campus, which is starting to digitize.

Good research is research that has gone through a testing process. The test aims to produce high-quality software products [9]. However, in previous studies about attendance students [10], the system has not been tested based on specific methods, so it cannot be measured scientifically whether the system is running effectively. Research on attendance systems made using an Android-based QR Code [11] has also been carried out using the waterfall model. However, making this program only involves analyzing software requirements and designing and creating program code without testing. Whereas after the study, it is stated that the system can make it easier and faster for users to do attendance, there has been no further testing that supports this statement.

Research on student attendance at ITS-NUK will use the UAT (User Acceptance Test) testing method. UAT testing is used to measure stakeholder acceptance of the functional system that has been implemented [12]. There is a questionnaire containing questions and answers to the assessment.

Testing using the UAT method can increase user confidence when trying the software [13]. The UAT method is an independent testing scheme, meaning there are stages of planning, structure, and achievement [14]. A study by Siswanto et al. [15] explained that the UAT method proved that the best employee selection system could be appropriately used, with a total of 91.2% of respondents agreeing. Recent research on digital signature applications was also tested using the UAT method. The digital signature application was created to support the "work from home" program because of Covid-19 [16]. System testing was conducted on 52 potential users, including questions about the system's usability. The assessment is seen from accessibility (feasibility of the system), benefits of navigation (design), and content aspects (information obtained from the system). The test showed satisfactory results, which resulted in 82.07% of respondents' satisfaction level. Based on the results of this study, the UAT method is considered suitable for testing the feasibility of the student attendance system at ITS-NUK.

3. Methods

The research starts with system planning that comes from the problems in ITS-NUK, as described in the background. The student attendance information system is expected to facilitate student data collection, control attendance, and targeted reporting. First, it will start with requirements analysis, then System and Software Design, implementation, and Unit Testing.

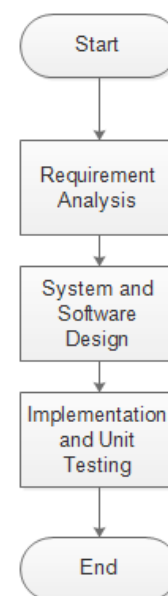


Figure 1. Research Method

Based on Figure 1, the first thing to do is to determine the Requirements Analysis.

3.1 Requirement Analysis

Requirement Analysis covers various needs and conditions to meet the goals of a new product or product change that considers different needs in "Student Attendance Information System Using QR Code (Quick Response) At ITSNU Kalimantan," which includes.

1. User Level

The user level in the product has three groups: students, lecturers, and admins.

2. Main needs

The primary needs in this product include attendance, attendance recap, and being able to distinguish each course.

3. Technology

We use the PHP 7.4 programming language with Mysql as the database and Android for student attendance.

3.2 System and Software Design

We are using UML as Software Design to facilitate existing product design.

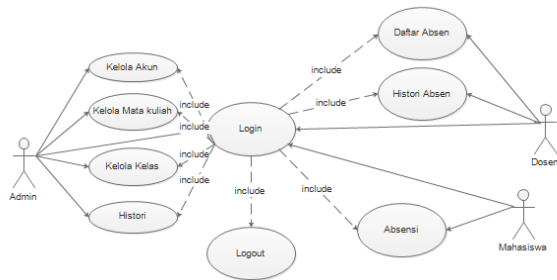


Figure 2. UML Application Model

3.3 Implementation and Unit Testing

Implementation and unit Testing uses PHP 7.4 as the core programming language and MYSQL as the database. QR code as encryption of existing attendance recording and User Acceptance Test for testing.

4. Results and Discussion

The following is the result of "Student Attendance Information System Using QR Code (Quick Response) at ITSNU Kalimantan," where this is a screenshot of an already running product.

a. Login page

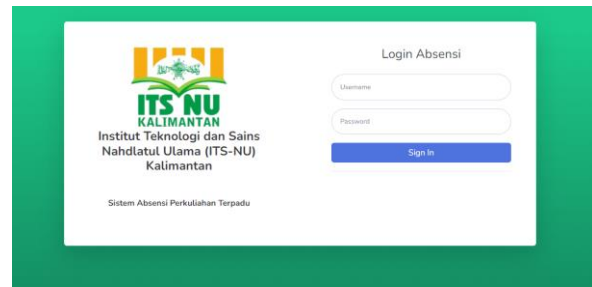


Figure 3. Login Page

b. Admin Level: Dashboard Page

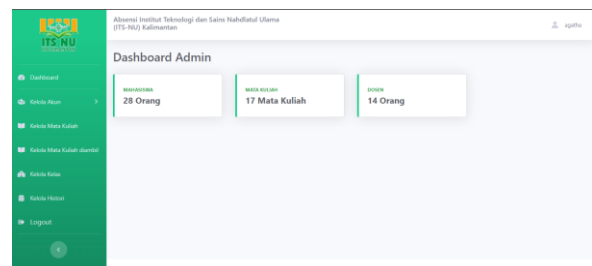


Figure 4. Admin Level: Dashboard Page

c. Admin Level: Manage Student Page

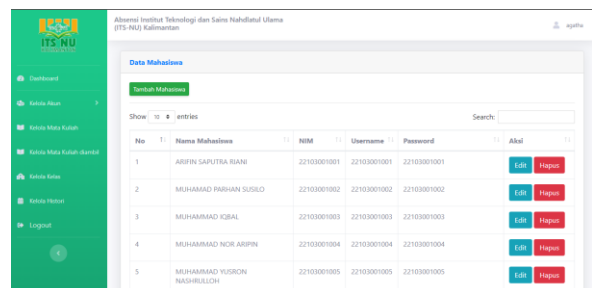


Figure 5. Admin Level: Manage Student Page

d. Admin Level: Manage Course Data

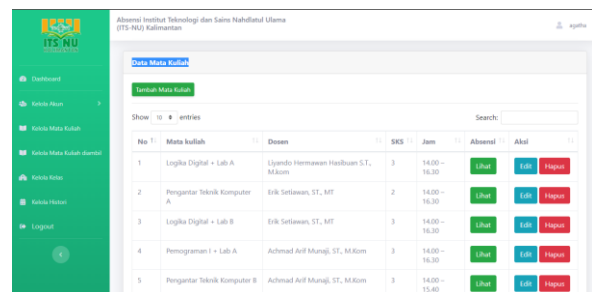


Figure 6. Admin Level: Manage Course Data

e. Admin Level: Manage Class Data

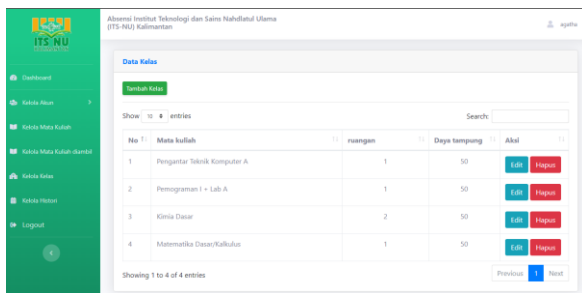


Figure 7. Admin Level: Manage Class Data

i. Lecturer Level: Barcode page

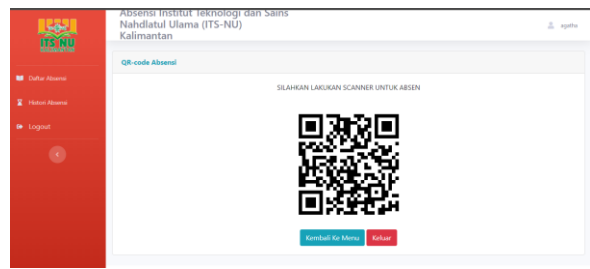


Figure 11. Lecturer Level: Barcode page

f. Admin Level: History Page

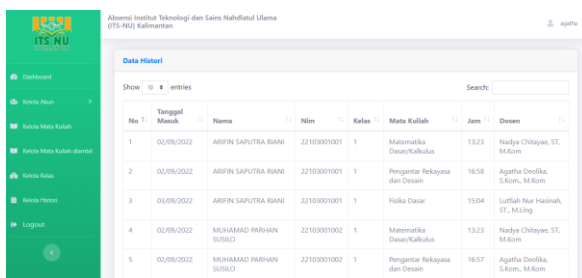


Figure 8. Admin Level History Page

j. Lecturer Level: History Page

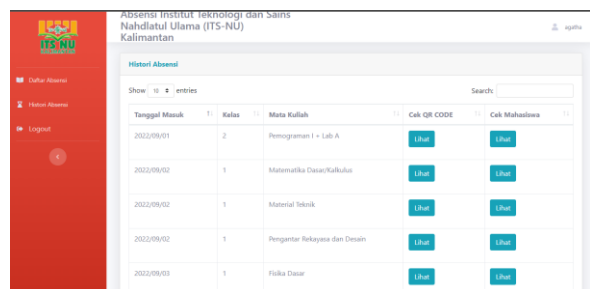


Figure 12. Lecturer Level History Page

g. Lecturer Level: Dashboard Page

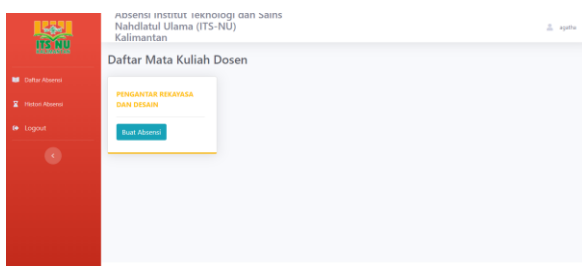


Figure 9. Lecturer Level: Dashboard Page

k. Student Login Page



Figure 13. Student Login Page

h. Lecturer Level: Create Attendance Page

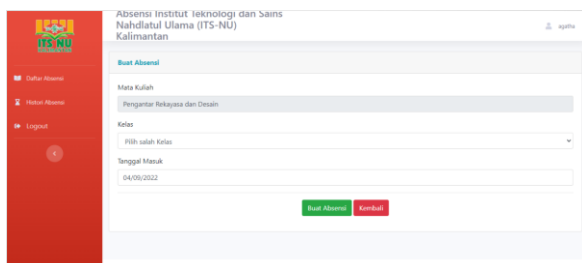


Figure 10. Lecturer Level: Create Attendance Page

1. Student Scan Page

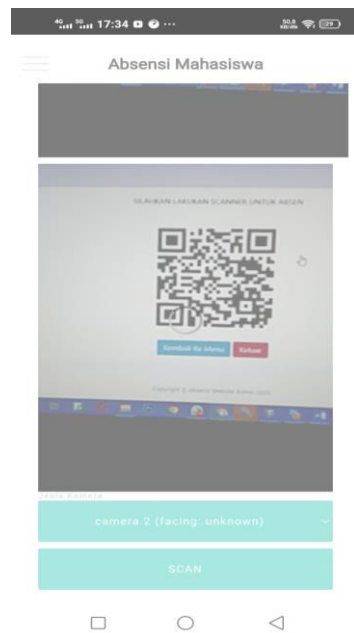


Figure 14. Student Scan Page

m. Student Level: Status Presence



Figure 15. Student Level: Status Presence

4.1 User Acceptance Test

The test was conducted on 45 respondents using a questionnaire that refers to the UAT (User Acceptance Test) model. UAT testing using a Likert scale is the most widely used method in research using questionnaires. The value of the Likert Scale is interpreted using intervals which can be seen in Figure 14.

Table 1. UAT Questionnaire for App users

Nama	Jenis kelamin	Pertanyaan							
		1	2	3	4	5	6	7	8
Tan Ciang	Laki - Laki	5	4	5	4	4	5	5	4
Muhammad Rafni	Laki - Laki	4	4	4	4	5	5	5	4
Jeky saputra	Laki - Laki	1	4	4	4	4	4	4	4
Handi Ti W	Laki - Laki	4	4	4	3	4	4	4	4
SEPRIANTO.S.Kom	Laki - Laki	4	4	4	4	4	4	4	4
David Yohanes	Laki - Laki	4	4	5	3	4	4	4	5
Oktavia Trya Hidayah	Perempuan	4	4	4	4	4	4	4	4
paniel	Laki - Laki	4	4	4	4	5	4	4	4
Daniel	Laki - Laki	5	5	5	4	4	5	4	4
Fajar Setyawan	Laki - Laki	5	5	5	4	4	5	5	5
Iren	Laki - Laki	4	3	3	4	4	4	3	4
Qarantul Ain	Perempuan	2	2	2	2	2	1	1	1
Rafik Perdana Putra	Laki - Laki	3	3	4	3	3	3	3	3
Shayro setyawan	Laki - Laki	5	2	4	4	4	5	5	4
Menni	Perempuan	3	3	4	3	3	3	3	3
Agus Triani	Perempuan	5	5	5	5	5	5	5	4
Resta Bimo Adji, ST	Laki - Laki	5	4	4	4	5	4	4	4
Rahmad Wahyudi	Laki - Laki	4	4	4	4	4	4	4	4
Dila Ayu Dwipitaloka	Perempuan	4	4	5	4	3	4	4	4

Based on the results of the UAT test with 3 (three) testing aspects, the results obtained that the percentage of the model score on the element of perceived usefulness was 82%, the rate of perceived ease of use was 84%, and aspects of user acceptance were 82%. The average test result using the UAT method is 83.04%. So, it is concluded that the user strongly agrees with the proposed system.

5. Conclusions

Planning and developing applications for student attendance using QR code technology combined with web android-based applications have many positive impacts for ITS-NUK. Almost all activities related to students, such as student data collection, controlling student attendance, and even attendance reports, can be carried out properly by the proposed application.

In this application, the admin will have an essential role in managing all data on the website, such as classes, lecturers, and students. Lecturers only have a role in making attendance based on courses provided by the admin, which automatically generates a QR code and monitors student attendance through the application. On the other hand, students can only scan a QR code that the lecturer has provided through an android-based application on their respective smartphones.

Testing using a questionnaire with 45 respondents was carried out as the last step of this research. The model used in this test is UAT. The Likert scale is used in the UAT test. Based on the tests carried out on three aspects of the trial, it is known:

1. The perceived usability aspect is worth 82%.
2. The perceived ease of use aspect is 84%.
3. The user acceptance perception aspect is 82%.

The average rating generated is 83%. Based on these percentages, it can be concluded that users give a positive response to the application design offered.

6. Acknowledgment

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