

MOBILE ATTENDANCE SYSTEM USING QR CODES TECHNOLOGY

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Quick Response (QR) codes technology has widely been used by many industries. QR codes technology has been selected in determining the best approach of taking students attendance compared to RFID because of the development cost is cheaper and easy to use. This paper discussed the influences of QR codes technology in education. Mobile attendance system using QR codes technology has enhanced academic management system as it allows the users to automate the attendance process. This study has developed mobile attendance system using QR codes technology. The outcomes of this study have demonstrated that the combination of web-based and mobile technology can improve taking student process in the university.

I. INTRODUCTION

Nowadays, the technology is becoming a part of our life. Technology has transformed the way people communicate and share information. Accessibility and availability of information make people get connected. It also make our daily activities much easier and faster. The use of technology has helped organisation to improve and provide better service to their end users. This scenario is similar to educational fields, which the advancement of the technology has a significant impact on teaching and learning in institute higher learning.

Teaching and learning is a learning process for students to understand their course and to ensure the learning objectives are achieved. There are many aspects that can influence on the effectiveness of teaching and learning other than teaching itself. Taking attendance is one of the process that occurs before or after the lecture, which time consuming activity. Taking student attendance is essential for the educators, yet the process is taking a lot of time that can impact on teaching and learning process.

To date, taking attendance is not automatically conducted, which it requires the educator adopt an old process in taking the student attendance. For example, the educator has to call out the student name or by passing out the attending paper for the students to sign the attendance sheet. Both techniques are time consuming and it vulnerable to the fraud – student sign on behalf of others. This situation occurs because too many students in the class, which may lead to complication. This study aims to solve this problem by implementing automated mobile

attendance system using Quick Response (QR) codes. The development of QR attendance system can reduce the time for taking attendance and vulnerability issues.

II. BACKGROUND OF THE STUDY

A. Problem Statement

Taking student attendance is time consuming that has a significant impact on the teaching and learning process. Taking student attendance is also wasting the lecture time and vulnerable to fake attendance – student sign the attendance on behalf of their friend. This study aims to automate the attendance system using QR codes. QR codes allow the researcher to implement the automated student attendance system on mobile technology. Moreover, the cost of implementation of mobile application using QR codes technology is much cheaper compared to Radio-frequency identification (RFID) or other technology. This study focuses on the development of a fully functional mobile application with effective security element using QR codes. The main research question is how mobile attendance system using QR codes can improve taking student attendance.

III. LITERATURE REVIEW

Previous research related to the current investigation has focused on three areas: mobile application in education, threats to mobile technology, and QR codes technology.

A. Mobile Application in Education

Nowadays, mobile technology is important in supporting and improving education and its delivery. Mobile technology enables the user to extend their access from web based online environment to mobile devices. This extension enables the educational institutions develop mobile education as it allows the users to access to the information at anytime and anywhere [1]. Mobile education can be defined as the use of mobile technology to provide service or facilitate teaching and learning activity regardless of location and time [2].

The use of mobile technology for disseminating educational materials can eliminate time and space restriction and provide more freedom for learners. According to [1] mobile education acts as a bridge to connect the gap between mobile and desktop computing. It allows teaching and learning to take place anytime and anywhere. Mobile technology is not only a tool to support not support communication, collaboration, and knowledge exchange [3] but it also provides a place for the users to create their own community of practice. Mobile education enables the users to share their knowledge and information to a wider audience. It evident that mobile education has a significant impact on teaching and learning process, yet, limited research investigate the vulnerability issues on using mobile technology in education. This study aims to fill this research gap.

B. Threats to Mobile Technology

Threats occur in a mobile environment is similar to a desktop computing but multiple threats in a mobile application can impact on functionality of the devices [4]. It is because mobile technology is vulnerable to privacy and confidential issues as individual personal information can be easily retrieved online. Authors [4] emphasised that mobile data is stored on a device or on the cloud which left unprotected that lead to exposure of sensitive of information, privacy violation and noncompliance.

Moreover, malware is one of the threats in mobile application that makes the application failed to function and personal data is leaked on the Internet [5]. According to [6] mobile attacks are expecting to increase to 94 percent and 79 percent acknowledge that it is difficult to secure mobile devices. Existing research showed that vulnerability in mobile technology has raised an alarm among mobile users and it is essential for the mobile application developer to focus on this matter in developing new application. Therefore, this project aims to create an application that can reduce security issues especially the disclosure of personal information.

C. QR codes Technology

The QR codes technology has widely been used in many industries, including but not limited to, business, health, marketing and education. Existing research has shown that QR codes have helped the organisation to enhance their service delivery. QR codes are interactive technologies that enables online social sharing and entertainment [7]. For example, website or You Tube videos can be hyperlinked to QR codes for the user to share with their network. QR codes have a significant impact on the intention to use, which is not only perceived for promotional purposes, but also as virtual social hangout that allows the user to interact [8].

User intention towards technology acceptance and adoption is of particular importance in understanding QR codes success in education. Any new technology needs to be perceived as being useful and easy to use in order for it to be accepted. Authors [9] have found the use of QR codes in classroom management system has transformed the way teaching and

learning has been conducted. They have demonstrated that 20 students and three instructors discovered that QR code is easy to use and make the teaching and learning process faster. Yet, awareness and exposure of QR codes is essential to the students and instructors to make them familiar with the technology. This study aims to develop mobile attendance system using QR codes to reduce the time in taking students attendance.

IV. IMPLEMENTATION OF MOBILE ATTENDANCE SYSTEM USING QR CODES TECHNOLOGY

For the purpose of this study, QR codes technology was chosen because its versatility and fast readability process compare to the standard Universal Product Code (UPC) barcodes. QR codes technology can reduce the time for taking students attendance and automate the taking students' attendance process using mobile technology.

A. Mobile Attendance System Architecture

The system architecture of the mobile attendance system focuses on mobile technology, as shown in Figure 1. This study proposed a strategy to improve the attendance system in institute higher learning. The application contains two main users who perform these main activities:

- a. User - able register/login and generate QR codes.
- d. Administrator – manage/view the student attendance, and scan the student QR codes.

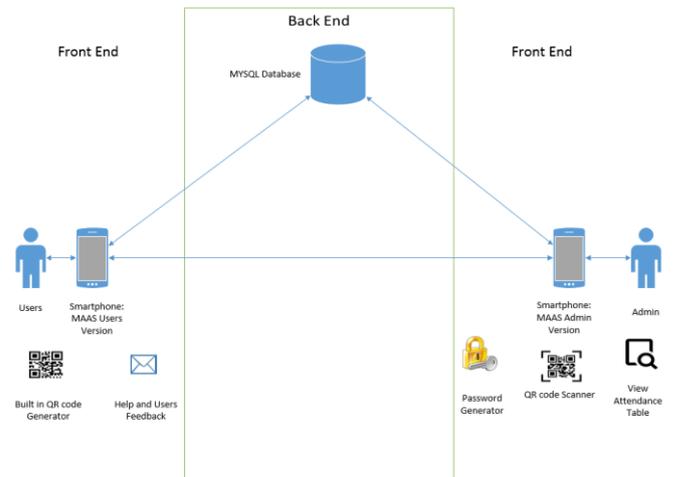


Figure 1 System Architecture

This propose mobile attendance system enables the institute higher learning to automate attendance process, which make the taking student attendance activity much easier and faster.

B. User Activities

Figure 1 demonstrates the user activities on mobile attendance system. It is essential for the student and lecturer to understand their role as a user or administrator in order to use the mobile attendance system. The details on the user activities as follows:

1. User (student) would be able to generate the QR codes but the student unable to manage or update their information.
2. Administrator (lecturer) will manage, update, and monitor the student profile and attendance. The admin can scan the QR codes of the student when they attend the class.

Table 1 shows the summary of the activities:

Table 1 Summary of User Activities

User	Activity
Student	<ol style="list-style-type: none"> 1. Login/Registration. 2. Generate QR codes. 3. View the attendance status.
Lecturer	<ol style="list-style-type: none"> 1. Login/Registration. 2. Manage, monitor, and update the student attendance and profile. 3. Scan the student QR codes.

These activities can be managed through both web technology and mobile technology. However, only the administrator (lecturer) can access the system on website.

V. DISCUSSION AND CONCLUSION

The objective of this study was to develop mobile attendance system using QR codes for university. This study has yield an interesting finding which the use of QR codes technology has enhanced the process in taking student attendance. The use of this mobile application has significantly reduced the time in taking the students attendance. In addition, the cost of developing mobile attendance system using QR codes technology was cheaper compared to using RFID technology. Thus, it enables any university around the world to use mobile attendance system using QR codes.

This study has shown that the use of mobile technology has influenced on teaching and learning process. It also enables the university to improve the academic management system, which can eliminates the fraud and cheating issues among the students. Moreover, mobile attendance system using QR codes has made the process in taking students attendanace much easier and faster. This research has successfully developed the mobile attendace system that positively impact on the academic management system. However, this study did not investigate

the experience of using this mobile application. Therefore, futher research in this area is important to provide better service delivery.

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