

***The Features of Quick Response (QR) Code as an Attendance Monitoring System:  
Its Acceptability and Implication to Classroom***

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**Abstract**

The study was conducted to determine the features and acceptability of Quick Response (QR) Code innovative platform as an attendance monitoring system. Purposive sampling was used in the study involving 20 teachers who adapted the QR code and 36 students who were exposed to the attendance monitoring system during the first quarter of the academic year 2018-2019. Descriptive data analysis was used in the study using the adapted standardized survey questionnaire intended for evaluating database interface. The digital application was available and free on Android smartphones that can be exported to Microsoft Excel, while the system doesn't require an internet connection and ideal for a big class. With the combined evaluations of the teachers-user and students, data revealed that QR Code as attendance monitoring system was generally very highly acceptable in terms of reliability, efficiency, accuracy, usability, while highly acceptable in terms of security and confidentiality. The views of the participants imply that QR code as attendance checker was environment-friendly, cost-effective, user-friendly, innovative, very fast and readable codes. Hence, this study is geared towards evidence-based practice using this type of innovation that will serve as a preference towards continuous improvement and successful adaptation of the QR code that is essential in modifying and simplifying the checking of attendance of students in the classroom.

Keywords: Quick Response Code, Attendance Monitoring System, Environment-friendly, Cost-effective, User-friendly, Environment friendly

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## Introduction

The development of smartphones proliferates the use of QR code obtaining features of scanning and decoding barcodes are becoming a popular tool in modern education (Lamey, 2018 and Santisteban, 2017). The advantage of checking the daily attendance in class can influence the performance of the school. Studies believed that academic performance thus improved if students are regularly present to the class. Checking the attendance is one routine that teachers always go through every day in every class student goes to. This is where normally a teacher will individually call the names of the students and wait for them to raise their hands. Though this may seem effective, perhaps this takes a lot of time and repetitive which may lose the interest or motivation of the students to come to class (Rizal et al., 2016). Indeed, the traditional means of checking the attendance in the classroom takes time and consume a lot of papers and money.

QR codes are being widely used for linking to companies' website, advertising products, price, online menus and contest sign-up pages (Singh, 2016). With the technology we have available now, making QR codes are so easy to generate and can be read even if you use a downloadable barcode reader in your smartphones. The emergence of smartphones increases the use of QR code because a smartphone has features of scanning and decoding a QR code (Singh, 2016). Perceived benefits or value after scanning a QR code is a huge driver for continuous use (Asare and Asare, 2015). In this perspective, the use of QR Codes would increase in line with the increase in related technologies like smartphones and tablets (Durak et al., 2016).

In the educational world, teachers and administrators also found out the potential of utilizing this type of technology in education. Technological advances brought applications of innovations to education (Durak et al., 2016). The Quick Response (QR) code is highly secure as all the delicate data put away and transmitted is encoded, easy to utilize and cost-efficient management system (Kadu et al., 2017). Scanning QR codes also allow a person to record a huge amount of data and transfer them to a Microsoft Excel file through a mobile app.

Whether in public or private schools, a majority of the students already uses smartphones, and all connected to the internet. Thus, students nowadays are more technology savvy, routine activities and teaching strategies must also advance. There has been many studies and researches about the use of QR codes in checking the attendance or used as a school id system or even used of a barcode in the business industry. Most of the studies are specially meant for their school id system where a specific program has been made and implement which may cause a lot of money and sometimes maybe too expensive to afford.

In this research, the proposed attendance system will be using two Android applications that are completely free. By scanning the QR codes of the student that they have generated free on the internet. The teacher will be using a smartphone as the scanning device to scan the students' code upon entering the classroom. The records of the student will then be saved on an Excel format that can be exported easily to a laptop. An Excel summary sheet will also be generated to identify the number of absences each student has incurred. As awareness increases about the usefulness of these codes, we can expect them to be used in more public domains (Singh, 2016).

Since the researcher pioneered the QR code as an attendance monitoring system, the study was limited to 20 teachers' participant from different places in the country who adapted and utilized QR code in managing the attendance of their students for one quarter. It involves 36 students as participants who were engaged in QR code as a means of checking their attendance during the first quarter of the academic year 2018. The scope underscores the features of the QR code as attendance monitoring system; the level of acceptability in terms of the reliability, efficiency, accuracy, usability, security, and confidentiality of the platform. It provides a perspective and an avenue for continuous adaptation and development of an innovative mobile application for education purposes.

This study is a significant initiative in promoting an innovative attendance monitoring system that is environment-friendly, cost-effective and easier access to data. This system would also provide teachers with a proper motivational intervention for students who are not always present at school. It would be beneficial to the school personnel in adapting the QR code electronic-based attendance monitoring system that is essential in simplifying the checking of attendance more efficient and fast that has easy access to QR code readers. The attendance monitoring system using QR code evidence-based practice will be an indicator of the 21st-century skill competitive advantage that will serve as a guide for other institution in institutionalizing action plans in accordance of QR code mobile application database program interface and ICT integration embedded on educational purposes. Moreover, this study would be helpful to schools in building motivation that will improve students' attendance. Hence, this would add excitement to come to class, to have their codes scanned and it will also give students an idea that there are limitless possibilities in the use of technology while they are having fun. This pioneering study would serve as a model to implement the innovative mobile application for checking the attendance of the students in the classroom. Moreover, teachers' empowerment and advocacy are significant towards a productive and successful adaptation of the database program interface in school.

It is in this context, the researcher wanted to conduct the study to enabling awareness of the features of the attendance monitoring system using the QR code. It also intended to determine the level of acceptability of QR code attendance monitoring system as perceived by particular teachers-user and the students of General Emilio Aguinaldo National High School as participants of the study. Thus, this study is geared towards evidence-based practice using this type of computer system that will serve as a preference towards continuous improvement and work on the recommendation on how this type of system can be adapted in the school context.

## **Review of Literature**

This section presents the conceptual and related literature from various entity where the study anchored upon to provide evidence and significant review of the topic grounded with the current study. The coherence and consistency of this review of related literature illustrated from empirical studies.

## **Propagation of QR Code System Application**

These past few years, the use of technology in has grown rapidly faster than we could ever imagine. Almost every year, new technological ideas emerged that are smarter, innovative, and more affordable (Lamey, 2018). With all these technological resources that we have or available, is there any way we can utilize them as part of the educational strategies? In the educational world, our students have embraced this idea since they were little. It can be said that students nowadays are digital natives where they are already exposed to state-of-the-art technology such as computers, video games, and internet, while teachers are considered digital immigrants since they were not born into the digital aspect of the new technology (Santisteban, 2017).

QR codes are two-dimensional matrix barcodes used to provide easy access to digital information through a smartphone. Last decade witnessed a steady growth in commercial and business-oriented usage of these QR codes with the advent of smart and web-capable mobile phones (Shettar, 2016). Indrayani (2014) explores the extent of the effectiveness and the efficiency of the use of biometric systems categorized based on quality systems indicators such as relevancy, capacity, timeliness, accessibility, flexibility, accuracy, reliability, security, economy and simplicity can increase productivity and efficiency as well as reduce job turnaround time in checking the accuracy of the data with the card owner.

For a QR code campaign to be successful, the study suggests a company needs to have clear objectives, know who they are targeting, provide valuable contents and place the platform at appropriate locations for ease of scanning. Qianyu (2014) the QR Code is still updating, therefore, further research possibilities explore the security of using the QR Code for organization which can be suited and adopted.

## **Practical Uses of QR Codes**

Here are some ways for using QR codes that are mostly in practice now, as well as a few that we will be seeing in the very near future. QR Codes could be used: The back (or front and back) of your business card, your brochures, and other marketing materials, the sides of trucks and trailers, product tags and packaging, convention and event nametags, restaurant menus, event ticket stubs, point-of-sale receipts (Korhan, 2011). The potential for QR Codes is limitless and the next generation of barcodes will hold even more information wherein the content will be effectively embedded in the code and an internet connection will not even be necessary (Korhan, 2011).

## **QR Code in Education**

Singh (2016) analyzed QR code from the perspective of their significance and uses. It was recommended to increase awareness about the usefulness of the QR codes, to make public aware and be familiar with the QR code. According to (Asare and Asare, 2015) for a QR code campaign to be successful, the study suggests a company needs to have clear objectives, know who they are targeting, provide valuable contents, place code at appropriate locations for ease of scanning, decide on the right time for the campaign and finally execute it in a creative way that anyone could efficiently adapt the system. It's been proven that the use of this two-dimensional QR code is one of the best to use compared to barcode and RFID (Radio-Frequency Identification). It

can also be used in different teaching strategies depending on the like of the teachers like games, reading, science, in math and many more.

In the study carried out by Durak et al. (2016) though it is easier to use QR Codes, it is not possible to use them without technological necessities, so, QR Codes would increase in line with the increase in the related technologies like smartphones and tablets. The propagation of the smartphones and tablet PCs could soon be the first choice when surfing and scanning quick response codes with the support of internet access.

The study of Rizal et al. (2016) concludes that Smart Attendance System Applying QR Code enables to speed up the process of taking attendance and would save us valuable teaching time. He further stressed that this initiative helps students avoid consequences that may result from poor attendances that should be stipulated in the policy and academic regulations of the school.

There are many other ways you can use QR codes in school are becoming a popular tool in modern education. (Lamey, 2018 and Santisteban, 2017). Teachers of the 21<sup>st</sup> century are generally enthusiastic to embrace the used of modern technologies, considering a sound fiscal allocation and management. Teachers are more likely wanted simplicity and efficiency with combine speed, ease, and novelty with the capacity to hold a large amount of data that can actually do a lot to enrich such classroom management (Lamey, 2018).

## **Methodology**

This chapter contains the discussion of the research design used, the sampling method, the research instrument, the data gathering procedures, and the plan for data analysis.

### **Research Design**

The descriptive research design was employed in the study. The descriptive method was used to provide a detailed organization of data and information collected using a survey questionnaire. Unstructured interview was also conducted to support the findings of the study and it was analyzed, synthesized and coded accordingly. It described the features of the platform and the level of acceptability of QR code as an attendance monitoring system. The standardized tool was adapted from ISO 9126 used in evaluating computer program interface.

### **Sampling Method**

The participants of the study was purposively composed of 20 teachers-user of the QR code as an attendance monitoring system and 36 students who were involved in the study handled by the researcher.

### **Data Gathering Procedure**

The respective participants evaluated the QR code as attendance monitoring system based on components of the standardized evaluation checklist for computer program

interface. An unstructured interview was conducted to generate participants' view on the use of the QR code as an attendance monitoring system. Using online survey technique, the survey questionnaire was distributed electronically. The data were interpreted and analyzed based on participants' evaluation. To run the program, these were the following step by step procedure of QR Code Attendance System procedures executed by the researcher:

### **How to CREATE a QR Code for Teacher**

1. Download QR ATTENDANCE CONTROL on Android Google Play.
1. Download the BARCODE SCANNER as per advised by the QR ATTENDANCE CONTROL.
2. Open the App and start Scanning.
3. Press SCAN and put the students' QR codes inside the box and wait for it to beep.
4. CONTINUOUS SCANNING: The app made a recent update and added Continuous Scanning. This makes scanning QR codes faster with only a single tap on the Scan Button. Make sure to ENABLE that option. Before Scanning, make sure that Arrival is ticked. Although optional, Teachers can tick the DEPARTURE to before students leave the room.
5. EXPORTING CSV FILE. Click on the TOOL icon on the lower left and click on EXPORT.
6. QR Attendance Control will default the Date as the file name which can be replaced by the teacher in charge.
7. One saved, go to your FILE FOLDER and click on INTERNAL FOLDER.
8. Click on the QR ATTENDANCE CONTROL folder and click on the File Name. This file can be transferred on to your laptop/desktop via Bluetooth for consolidation.

### **How to a CREATE a QR Code for Students**

1. (ONLINE). Open your Internet browser and type in [www.qr-code-generator.com](http://www.qr-code-generator.com). Choose TEXT and write the name of your Student, Grade Level and Section (if any). Once done, click on CREATE QR CODE. Each student must have their own unique code for scanning. Save the QR Code or students can take a photo and save it on their phone. Printing the QR code is the most recommended.
2. (OFFLINE). Open your Internet browser and copy the link below of the QR CODE STUDIO. Once Link: <https://www.tec-it.com/en/download/free-software/qrcode-studio/Download.aspx>.
3. Once downloaded successfully, you can type the information on the green space and QR code will automatically be generated even when there is no internet connection. Save and print.

### **Research Instrument**

The primary tool used in the conduct of the study was the used of the survey questionnaire. It consists of evaluation criteria that measure the level of acceptability of the QR code mobile application as an attendance monitoring system. To evaluate the QR code mobile application, five main components to measure the system of a

computer database interface namely: reliability, efficiency, accuracy, usability, security and confidentiality and unstructured interview with regards to the views and opinions of the participants on the use of the QR Code. A set of survey questionnaire was distributed electronically to the participants of the study.

### **Plan for Data Analysis**

To interpret the level of acceptability of the attendance monitoring system using the QR code. The following scale was used.

Table 1. Arbitrary Scale and Verbal Interpretation of the Data

<b>Response</b>	<b>Arbitrary Scale</b>	<b>Verbal Interpretation</b>
5	4.21-5.0	Excellent - Very Highly Acceptable
4	3.41-4.2	Very Good - Highly Acceptable
3	2.61-3.4	Good - Acceptable
2	1.81-2.6	Fair - Less Acceptable
1	1.0-1.8	Poor – Not Acceptable

### **Result and Discussions**

This part presents the findings of the study in an illustrative table, analysis, interpretation, and discussion of results based on the gathered data.

#### **Features of the QR Code Attendance Monitoring System**

1. The QR code is easy to generate and it's free. QR code generators are available online for free and there is also other software where you can download the generators for free and can be used even when not online. If a student tends to forget his/her QR code, generating a new one only takes seconds.
2. Scans very quickly with a 2-dimensional barcode. QR codes are two-dimensional codes making it very easy to use because they carry a lot of information both vertically and horizontally and can be printed or save on the phone for scanning.
3. Paperless. The attendance system doesn't use much paper since everything is done digital making it very environment-friendly and use a lot of paper compared to the traditional way of checking attendance.
4. Apps Available Free on Android Smart Phones. Compared to other attendance systems available now and costs a lot of money making it impossible for the public sector to afford. The attendance system being used here are completely free on Android smartphones and Microsoft Excel for creating the summary.
6. System doesn't require internet connection. Aside from downloading the apps on the Google play store, the rest of the system doesn't require an internet connection. QR codes can be generated offline and scan students QR codes using the QR attendance Control App can also be used without an internet connection. This is very useful especially if your school is located in remote areas where internet and phone signal are limited.

7. Very Fast and Efficient. Whether printed or saved on the phone, whatever size as long as it's not stretched, scanning QR codes only takes a few seconds making attendance checking for the whole class fast and efficient.

8. Ideal for a Big Class. Checking attendance especially if a teacher has a big class normally takes a lot of time to figure out who's absent or not. With the use of QR codes, scanning each one of their codes only takes second which makes checking quick and easy. An ideal type of system if you have a lot of sections and students teaching every day.

### Level of Acceptability of Attendance Monitoring System using QR Code

Table 2. Evaluation of the Attendance Monitoring System Using QR Code

Components	Mean			Verbal Interpretation
	Teachers	Students	Total Mean	
1. Reliability	4.27	4.51	4.39	Very Highly Acceptable
2. Efficiency	4.32	4.75	4.54	Very Highly Acceptable
3. Accuracy	4.43	4.6	4.52	Very Highly Acceptable
4. Usability	4.42	4.66	4.54	Very Highly Acceptable
5. Security	3.92	3.98	3.95	Highly Acceptable
<b>Composite Mean</b>	<b>4.27</b>	<b>4.5</b>	<b>4.39</b>	<b>Very Highly Acceptable</b>

Table 2 present the results of the evaluation of the acceptability level of the attendance monitoring system using the QR code. In general, as far as the acceptability is concerned, the teachers and students registered a composite mean evaluation of 4.27 and 4.5 with an overall grand mean of 4.39, which means that the platform is very highly acceptable.

The participants rated the reliability of the program interface as very highly accepted with evaluation means of 4.27 and 4.51 respectively, and a combined mean of 4.39. Both groups of respondents very highly accepted the components of the program interface. Apparently, there was no such trouble encountered by the users. In fact, the data is running and consistent all the time and reduces the potential for data redundancy. This is an indication that both the teachers and students found the QR code program interface highly consistent and reliable to the users.

In terms of efficiency, the participants rated very highly acceptable with evaluation means of 4.32 and 4.75 and a total mean of 4.54. It signifies that the QR code database interface provides a current report on attendance. Furthermore, the program responds proximately and accurately; it's paperless and it generates reports even without the need of internet.

The level of accuracy of the QR code as attendance checker is rated very highly acceptable with evaluation means of 4.43 and 4.6, correspondingly and a combined mean of 4.52. It could be observed that the perception of the participants exhibited that the data entered on the QR code database interface is accurate, valid, consistent, and up-to-date. The content of the program is very organized in a coherent way. This implies that users were able to understand the program interface easily.



The participants' evaluation on the level of usability of the QR rated the platform as very highly acceptable with means of 4.42 and 4.66, respectively with a total mean of 4.54. It signifies that the user interface shows the correct labeling and important information of the program and color themes of the application are pleasing to the eyes and the color combinations are not distressing. Moreover, with the used of smartphones, it provides touchscreen press controls for easy navigation while QR code generates data from the attendance automated records.

In terms of security and confidentiality, it was revealed the teachers' mean evaluation of 3.92 and the students mean evaluation of 3.98 with a total mean of 3.95, interpreted as highly acceptable. The table reflects that the students had a higher mean evaluation than the teachers. It can be said that the program can only be accessed by the teacher who utilized the system using the QR attendance control and barcode scanner installed on smartphones. Meanwhile, the QR code for students can be access on files-QR code Attendance Control Folder. It is clear that both teachers and students find that the program is not protected and secured by access password.

Aguirre, (2016) asserted that another important attribute of using technology is to go paperless. The QR code was developed, applied, and tested designed to decode the data quickly and quite easy to create and use these codes (Durak et al., 2016). This innovation embed in the classroom attract attention and drive to the students to go to school every day. This experiential study showed that the learners using the QR attendance control and barcode scanner demonstrated meaningful improvements in terms of students' attendance. Thus, it fosters motivation among the students.

### **Teachers-user and Students View about QR Code as Attendance Monitoring System**

**Environment-friendly.** It is very evident nowadays that schools consume a lot of papers. From the students up to the teachers, more papers are being used and a lot of them are put into waste. Some teachers traditionally check their attendance using the traditional method, meaning they will have to print papers which they will use to check the attendance. With the use of the QR code as an attendance system, the number of papers being used by the teachers will definitely be much less. Since everything is done digitally, no papers are being used or papers to be recycled in this process. Everything is done using a smartphone and a laptop to export the file. With this type of system, it is more likely that the number of waste produced can be lessened and it can also create an awareness of how the environment can be protected.

**Cost-effective.** Compared to other systems already being used by private institutions where a lot of money had been invested to generate the system, the QR code attendance system that the researchers proposed are completely free. With the use of internet connections, teachers can download the app QR Attendance Control and QR Bar Code Scanner for free on Google Play. QR codes of the students can also be downloaded for free over the internet or by downloading a software called QR Code Studio where teachers and students can generate code without the need of internet connection.

**User-friendly.** The QR Attendance Control uses a very simple yet very easy to use interface for easy understanding. The different options that are found in the

application are very easy to understand. The application had also made an update recently where they added a continuous scanning for fast scanning of the QR codes. Using the export option, users can easily look at the scanned files in an Excel format. Transferring the data to the computer is also very easy with the use of Bluetooth technology.

## **Conclusions**

The benefits of the QR Code is it easy to generate if in case the student lost or misplaced his/her own code. It can be generated for free and the app can also be downloaded for free on Android phones and can also be generated even without the use of the internet which make it cost effective and practical. Both teachers and students agreed that this innovation made an impact on the way they manage their classroom and how students are liking the idea of going digital when attendance is being checked. Teachers also mentioned that aside from checking attendance, the use of QR Codes can also be used in different fields of education. Teachers find it more effective to figure out who is absent from the class especially if you are handling big classes every day. Students on the other hand also enjoy this innovation because they know how fast attendance are being checked. Though this has been done for years this idea is very new in the public school system. QR code attendance system is a very simple app that has a scanner which scans the code of the students when they arrived in the classroom. All the data can be transported easily in an Excel format. The interface is very simple making it very easy to understand and use for teachers of all ages. With the newly updated app, teachers can continuously scan the QR codes of the students. So instead of manually pressing the scan button after each student, teachers can just put the phone in one place, press the continuous scan and just let students place their codes in front of the phone to be scanned. Teachers use bundles of papers each year and some of them go to waste. With this innovation, everything is done in digital format and the number of paper being used is minimized making it paperless and eco-friendly.

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