GLOBUS

Globus An International Journal of Management & IT
A Refereed Research Journal
Vol 12 / No 2 / Jan-Jun 2021 ISSN: 0975-721X

SCHOOL ANDROID BASED E-SERVICES

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Paper Received: 28.03.2021 / **Paper Accepted**: 14.04.2021 / **Paper Published**: 17.04.2021
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Abstract

Every educational institution aims to use a variety of digital platforms to help add mobility and automation to the educational system and institutional operations so that they can deliver services faster, more efficiently, and more consistently. Higher education institutions, on the other hand, are confronted with unfavorable constraints and problems. When it comes to processing, requests took time and effort, particularly for students who lived far away from school and had to travel to school to request and review their grades and subjects. The School Android Based e-Services is a mobile and a cloud based electronic platform which can perform the core operational services needed by the college students as well as the other individuals that require such services. This project created an Android mobile application which had increased the performance in the daily transactions of the Graduate School Office. This study relied on developmental research.

Keywords: Android, e-Services, Event Notification, Mobile Application, Push Notification.

Introduction

The quality of services offered in an institution is vital in meeting the expectations and satisfaction of its clientele. In the modern world of digital technology, educational institutions aim to utilize various digital platforms which helps in adding mobility and automation in educational system and institutional activities to provide faster, efficient and systematic approach in delivering services. However, higher educational institutions are experiencing inauspicious limitations and complications [1]. Students face challenges when it comes to obtaining knowledge about their records and learning about school activities. It takes time and effort to process their requests, especially for students who lived far from school and had to travel to school to request and review their grades and subjects. Also, information is disseminated to students in the form of notices, handwritten manuals, and verbal messages. All details had to be viewed in a hard file or on a database. At the same time, looking for information is very difficult to do and requires a significant amount of time.

In these adverse hindrances, institutions need to take initiatives by utilizing accelerated and practical schemes in delivering quality services to students so as to increase customer satisfaction. In order to address the gap, an Android-based smart phone application was developed to make school records processing simpler, safer, and less error-prone [4]. Android is a mobile operating system that runs on smartphones and tablets [7]. The mobile device becomes a game-changer and a trend-setter in terms of how business transactions with clients can be conducted in a more creative and productive manner [5]. Furthermore, it is critical to use newer forms of statement, such as mobile phone technology, to facilitate faster and easier communication among students [4]. School Android Based e-Services is a mobile and a cloud based electronic platform which can perform the core operational services needed by the college students as well as the other individuals that require such services. It is an intuitive, secure and user-friendly application with the capabilities of handing multi-transactions of the school. Moreover, eServices are defined by various researchers as the services provided over through the Internet [2]. The School android based e-services can provide quality services to the student through their mobile, eliminate excess efforts in going to school, reduce

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hours spent in requesting and applying transactions, keep the students up to date of school events and maintain a systematic approach of the services offered by the school. Users can access mediated and self-service tools, as well as databases, announcements, registration, events, book appointments, and schedules, among other items, through this app [3].

The long-term survival of higher education institutions lies in the provision of quality services [6]. Therefore, improving the delivery of services constitutes a high performing institution. In today's highly competitive climate, service-oriented educational, institutions must demonstrate that their offerings are customer-focused and that they are committed to continuous performance improvement. Thus, the ability to connect with customers, which is one of the main factors in achieving a competitive advantage over other organizations, is the level of providing quality services.

Using mobile devices to help business processes would improve school administrations' and students' deliberation of transactions. The ability to connect with external bodies, which are important factors in business growth, is a key component of providing high-quality services. It enabled the school to connect with its clients over the internet and become more efficient. This application aided students by using its integration modules, making it simple for them to ask about grades, service request status, events, and the like. As technology advances, this application will continue to investigate the functionalities that may be required. This will assist them in further developing the system and identifying functionality that will enable the application to offer additional services to its users. This will also assist them in further improving the system and discovering functionality that will enable the application to offer additional services to its users.

In the efforts of educational institutions to address the students' difficulty in transacting businesses, this study aimed to design and develop an Android based mobile application which allows push notifications and generate reports on student's grades, requested services and subjects offered anywhere using their Android phone or tablet. Also, the researcher was able to envision a device that would be easier to use, interesting, and interactive. Furthermore, the Northern Negros State College of Science and Technology students greatly benefitted from the application.

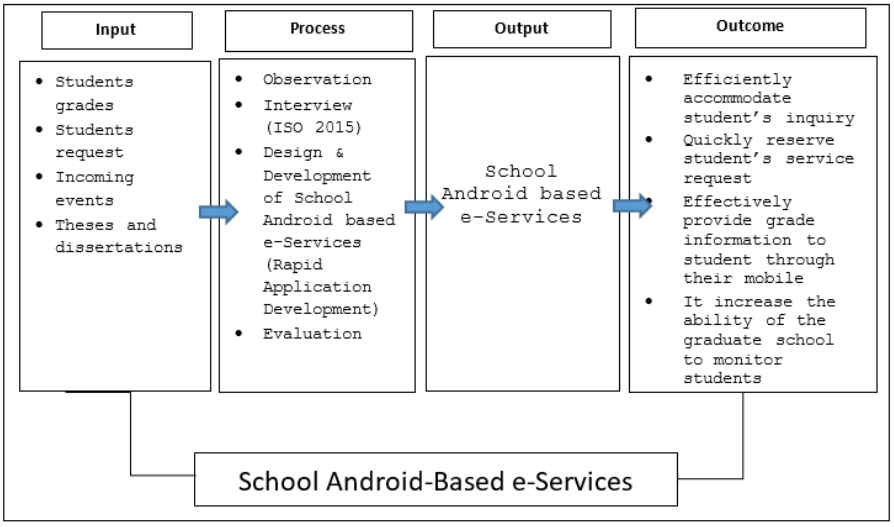


Figure 1: Conceptual Framework

Methodology

Developmental method of research was used in this study. The respondents were chosen using a method known as purposive sampling. This study included 52 participants, 50 of whom were students pursuing a Master's Degree in Information Technology (MIT) during the First Semester, A.Y. 2018 - 2019 and two of whom were Graduate School staff.

Research Instrument

This research used a survey instrument in evaluating the School Android Based e-Services. This software evaluation instrument is a criteria-based assessment questionnaire that quantifies software's operability, sustainability, and maintainability in a variety of areas based on International Organizations for Standardization/ International Electro-technical Commission

(ISO/IEC 25010, 2011). The survey uses a five-point scale, with 5 being the highest and 1 being the lowest.

Table 1: Five-point Likert Scale

Mean Score	Verbal Interpretation
4.21 – 5.00	Very Good
3.41 – 4.20	Good
2.61 – 3.40	Average
1.81 – 2.60	Poor
1.00 – 1.80	Very Poor

The research instrument was subjected to appropriate validity and reliability test before it was administered to the actual respondents.

Validity and Reliability of the Instrument

In the reliability test, the researcher used Test-retest reliability. Whether repeating the questionnaire under the same conditions and same respondents produce the same results. The reliability coefficient resulted 0.90. Interpreted as reliable.

Content validation was performed by the instructors on related field. Suggestions were being incorporated in the final draft of the questionnaire.

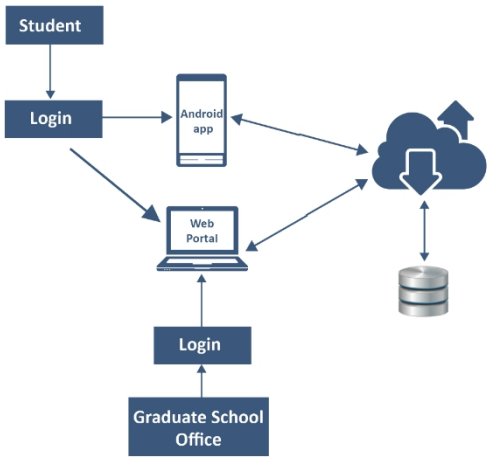
Data Gathering Procedures

To allow the researcher to perform the analysis, a request letter was sent to the Graduate School Office. Clients were interviewed about their current situation and the issues they were having with the current protocol. The results, current programs, and papers from other schools and apps are all included in the relevant literature.

The researcher directly distributed and administered questionnaires to the respondents in the second part of the data collection process. The respondents were given adequate time to answer the questionnaire. After that, the researcher personally retrieved the accomplished questionnaires and were tabulated and analyzed.

Data Analysis Procedure

The researcher used the mean to assess and evaluate School Android Based e-Services in terms of functionality, reliability, usability, efficiency, maintainability, portability. To encode the assessment rating and compute the mean, the researcher used a spreadsheet software.



System Architecture

Figure 2: Proposed System Architecture of School Android Based e-Services

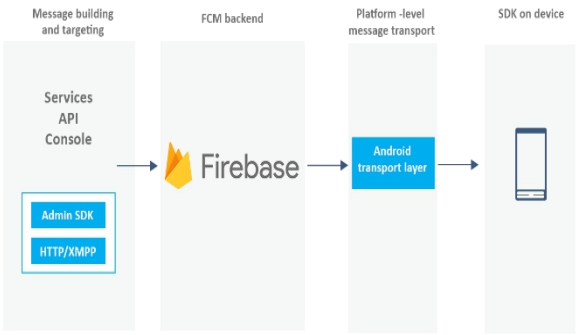


Figure 3: Firebase Cloud Messaging (FCM) System Architecture

Results and Discussion

Based on the data gathered, the overall result was 4.51 which was interpreted as very good. This means that the app was stable, effective, compatible, accessible, accurate, safe, maintainable, and portable to use. This is further shown in Table 2.0.

Table 2: Evaluation of the Respondents of the School Android Based e-Services

Areas	Mean	Verbal Interpretation
Functionality	4.32	Very Good
Performance Efficiency	4.50	Very Good
Compatibility	4.49	Very Good
Usability	4.54	Very Good
Reliability	4.45	Very Good

Security	4.74	Very Good
Maintainability	4.47	Very Good
Portability	4.44	Very Good
Overall	4.51	Very Good

Table 2.0 shows the results of the respondents' assessments using ISO/IEC 9126-1:25010 Software Quality Model Characteristics.

On the Functional Stability

The app earned a high rating. This is due to the fact that the app works well on mobile phones, especially on Android devices, and it automatically adjusts to the user's device compatibility.

On the Performance Efficiency

The outcome showed that the app is effective in terms of time management and resource efficiency when conducting its tasks, resulting in a very positive outcome.

On the Compatibility

The app works on any Android device, regardless of version, as long as the operating system is Android. The app was rated very good.

On the Usability

The software is easy to use and install with a simple user interface and straightforward approach. The app was rated very good as a result of the survey.

On the Reliability

The app was rated very good. This is due to the fact that the project makes use of the most recent versions of Android Studio and Kotlin to create Android applications.

On the Security

Since it will be submitted to the Google Play Store, the app can be considered stable. It is a safe place to get Android apps and install them on your android phone. You can only change the contents of the app if you have a copy of the source code; otherwise, the app cannot be updated. The app performed admirably in terms of protection, according to the findings.

On the Maintainability

The app can be updated, revised, and deployed in a short period of time because of its straightforward approach. The app can be rebuilt in a matter of minutes, and an update for Android devices can be installed. For that, the app was rated very good.

On the Portability

The app was rated very good. This is because Android apps are bundled as APKs (android packages), and with the introduction of file sharing apps, files can be moved from one computer to another without the need for an internet connection.

Expert Testing

Expert testing was also carried out to ensure that the application met Software Quality Requirements. Three IT experts gave the software a perfect score. The experts' assessment of the School Android Based e-Services using the McCall's Software Quality Model was summarized in Table 4.

Table 3.0: The McCall's Software Evaluation Criteria for Software Quality Model was used to evaluate the School Android Based e-Services by IT Experts.

Criteria	Mean	Verbal Interpretation
Auditability	4.66	Very Good
Accuracy	4.33	Very Good
Completeness	4.66	Very Good
Communication Commonality	5.0	Very Good
Conciseness	4.33	Very Good
Consistency	4.66	Very Good
Operability	4.66	Very Good
Security	3.66	Good
Documentation	4.66	Very Good
Simplicity	5.0	Very Good
Software System Independence	4.33	Very Good
Traceability	4.66	Very Good
Training	5.0	Very Good
Controllability	4.66	Very Good
Data Commonality	4.33	Very Good
Error Tolerance	4.33	Very Good
Execution Efficiency	4.66	Very Good
Expandability	5.0	Very Good
Hardware Independence	5.0	Very Good
Instrumentation	4.33	Very Good
Modularity	4.0	Very Good
TOTAL MEAN	4.62	Very Good

Table 3.0 shows that the developed application garnered a 4.66 rating from experts, indicating that it is very good in terms of auditability, which measures the ease with which standards can be reviewed. The experts rated a score of 4.33, which means very good, for accuracy, which referred to the precision of calculations and power.

The system's completeness, or the extent to which all necessary functions have been implemented, rated a mean score of 4.66, which is interpreted as very good.

In line with communication commonality or the degree to which standards interfaces and protocols are understood, the system was rated as 5.0 which is interpreted as very good. It earned a mean score of 4.33 for the system's conciseness or program's compactness in terms of lines of code, which is considered very good.

The system's consistency, or the use of standardized design and documentation techniques in the software development project, rated a very good score of 4.66.

The established system received a mean of 3.66, which is interpreted as good, in terms of the system's security or the availability of the system's mechanisms that monitor or protect the programs and data. A mean of 4.66 was achieved in the system's self-documentation, which was interpreted as very good.

The derived mean for the degree to which the program can be understood without difficulty or the software's simplicity was 5.0, which was perceived as very good.

The experts rated it a mean of 4.33, or very good, for software system independence, or the degree to which the program is independent of nonstandard programming language features, operating system characteristics, and other environmental constraints.

The ability to trace a design representation or actual software component back to specifications, or the system's traceability, was rated very good by the experts at 4.66.

The app received a rating of 5.0, which means very good, in terms of training, or the degree to which the program assists in allowing new users to apply the method. The experts gave a score of 4.66, or very good, for controllability, or the ability to easily manage and manipulate the system in terms of execution, program structure, and design. The system's data commonality, or the use of standard data structures and forms in the program, received a score of 4.33, which is very good.

When it came to error tolerance, or the amount of harm that occurs when a program experiences an error, the experts rated the established software a score of 4.33, which interpreted to "very good." The developed software received a rating of 4.66, which is interpreted as very good, for its run-time output or execution efficiency.

The developed software received a 5.0 rating for the degree to which architectural, data, or procedural design can be expanded, as well as the system's expandability.

The average score for the system's generality or the scope of possible implementation of the software components was 4.66, which is interpreted as very good. The app received a 5.0 or very good rating for the degree to which the program is decoupled from the hardware on which it runs, or the system's hardware independence.

Experts gave a rating of 4.33 as a mean, translated as very good, for device instrumentation, or the degree to which the software tracks its own operation and detects errors that do occur. Finally, the software received a mean score of 4.0, which indicates that it is very good in terms of device modularity or functional independence of program components.

The School Android Based e-Services earned a total mean of 4.62, which is very good, based on the results of the experts' system evaluation.

Conclusion and Recommendation

As a result, the device appears to be very useful for managing multiple transactions in the office. As a result, communication will be more effective, and students will be more aware of school events and activities.

The researcher emphasizes that School Android Based e-Services serves a significant portion in improving school administrations' and students' deliberation of transactions. Hence, address the students' difficulty in transacting businesses.

The device works well. The Graduate School Office's Android-based e-Services is a huge aid to students in obtaining knowledge about their records and learning about school activities. Also, through this app the school can provide quality services to its clientele through their mobile phones, eliminate excess efforts in going to school, reduce hours spent in requesting and applying transactions, keep the students up to date of school events and maintain a systematic approach of the services offered. Therefore, it is recommended that Northern Negros State College of Science and

Technology introduce School Android Based e-Services.

In order to process requests electronically, both the Graduate School Office and the students must have access to the internet. The researcher recommends to the future researchers to establish online payment through their mobile phone.

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