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Sms-based information dissemination system with android application controller for Taguig city university

Tan[a], Edmar .G[a]

Taguig City University, Philippines

Corresponding author.
Correspondence: Tan
Email: ramdenat1987@gmail.com

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Abstract
This study aimed to determine the accessibility of information in Taguig City University in terms of Class Suspensions, Schedule of Enrollment, Meetings and Seminars, Programs/Events, New School Policies and Grade Inquiry. It also focused on the development of SMS-Based Information Dissemination System with Android Application Controller and intended to determine the evaluation of the students, faculty members, non-teaching personnel and IT practitioners on the developed SMS-Based Information Dissemination System with Android Application Controller using the criteria based on ISO 25010 Software Quality Standards. A total of 307 students, 38 faculty members, 38 non-teaching personnel and 20 IT practitioners from Taguig City University participated in the study. In order for the researcher to develop the SMS-Based Information Dissemination System with Android Application Controller, the design covers the model used in the development of the application that is called the Waterfall Model. The results revealed that the level of accessibility of information at Taguig City University as perceived by the respondents was "Accessible". It was also found out that the evaluation of the respondents on the proposed SMS-Based Information Dissemination System with Android Application Controller was "Very Satisfactory". The results of one-way ANOVAs revealed that there were no significant differences in the evaluation of SMS-Based Information Dissemination System with Android Application Controller between students, faculty and non-teaching personnel. Lastly, the enhancements that were suggested by the respondents include Improve Graphical User Interface, Security Features, Reports Generation and Develop Android Application for Students.

I. INTRODUCTION

The rapid progression in technology has drastically enhanced our lifestyles. One of which is the advancement in communication which permits everyone to be in touch and exchange information with individuals from different parts of the earth with ease, speed and reliability.

Wireless technology is the most attention-grabbing technology in the ICT industry today where there is much improvement and research. As technology developed through time, advances in computer hardware and telecommunication knowledge have led to the materialization of mobile computing. Mobile computing provides immediate deployment of service over a large geographical area and offers every user many services. Information and communication technologies (ICTs) are crucial to the development of developing countries.Short Messaging Service (SMS) is rapidly expanding as a convenient and low-cost mobile communication solution. According to Jain (2017), the global number of mobile phone users is predicted to surpass five billion by 2019.According to Jain (2017), the global number of mobile phone users is predicted to surpass five billion by 2019.In 2014, approximately 60% of the world's population had access to a mobile phone. The percentage of people who own a mobile phone is expected to rise to 67 percent by 2019. Simultaneously, SMS applications have evolved to deliver consumer-oriented services to mobile consumers. It may also help with communication and information transformation between businesses, between businesses and consumers, and between employers and workers, resulting in additional value-added services.

After phone conversations, short messaging service (SMS) technology is one of the most reliable and extensively used mobile communication techniques.After phone conversations, short messaging service (SMS) technology is one of the most reliable and extensively used mobile communication techniques.The majority of tertiary students have mobile phones that can receive brief messages as a kind of event notice.In theory, a text message can be used as a one-way communication to deliver information to the user, such as a reminder or an alarm, or as a two-way communication to allow the user to send and receive information.SMS event notification is a well-known method of informing consumers about an event that is planned to take place within a specific time frame in an institution. Furthermore, mobile text messages are excellent communication aids when information must be sent over long distances or in the absence of a well-functioning communication system or infrastructure, or when people cannot physically meet the personnel in question, provided that the cost of the text message is low and it is accessible to virtually everyone. Text messaging has been proven to be beneficial in a variety of everyday uses, such as in academic settings. Different types of reminders and instructions, reporting of laboratory test results or home assessments for students, remote controlling and monitoring, and so on are typical examples of these application areas. It is possible to save costs by reducing needless trips and phone calls by adopting this type of communication; mobile phone messaging in institutions has been the focus of intense study effort for almost a decade.

The existing process of notification and information dissemination in Taguig City University is paper-based, such as memos and announcements posted on the bulletin boards. Grade inquiry takes time especially when there are long queues on the registrar's office having different transactions such as request of documents (TOR, Diploma, Certification, etc), enrolment and other matters.

In this paper, the development of an SMS-Based Information Dissemination System with Android Application Controller was studied to improve the accessibility to information and grade inquiry and to strengthen the information dissemination at Taguig City University as well as to provide easier access of the administrator to the system using android phones.

II. LITERATURE REVIEW

Based on the information gathered by the researcher, Short Message Service technology has been very popular and effective means of the delivery of information and it is integrated technology to several systems. Text messages sent over SMS do not require the recipient's phone to be turned on in order for them to be sent. An SMS-based content alert system was developed by Sridevi and Anbu (2013). The goal of the project is to see how SMS-based mobile notifications may be used to efficiently promote library services and provide value-added services in libraries. Because mobile SMS is more accessible than web-based services, Jaiswal (2011) prefers mobile SMS over web-based services. Since mobile SMS is more accessible than web-based services, Jaiswal (2011) believes that mobile SMS is superior to both. According to Herniak-Babef (2016), SMS is extremely safe since the network providers encrypt the communications. Esparcia (2015) created an interactive information website for the City Disaster Risk Reduction Management Office using SMS technology to efficiently convey vital information to the citizens of Cagayan de Oro City about natural catastrophes that can strike at any moment. Furthermore, mobile development is a new trend, and Android Studio may be used to create android application controllers. When it comes to connecting modem devices, particularly in the construction of SMS Server software, a complete understanding of AT Commands is required. This proves that the system that the proposed by the proponents is reasonable as it shows that there are lots of literature and studies that gives the proponents a positive idea to continue doing the project.

III. RESEARCH METHODOLOGY

The researcher used the descriptive and developmental approach in this study. To be specific, the researcher used the descriptive-survey method, which describes the assessment of the respondents on the accessibility of information of Taguig City University and the evaluation of the three groups of respondents to the proposed SMS-Based Information Dissemination System with Android Application Controller.

The researcher also used a systematic process to develop the system prototype until its completion. The researcher used the project development method for this study to help the researchers develop a system following the concept of System Development Life Cycle (SDLC) model as a guide through step by step process during the system analysis and design. SDLC methodology produces high quality systems that are well designed and contrasted.

Purposive sampling technique was used as a sampling technique to choose the participants from students, faculty, non-teaching personnel and IT Practitioners. It means that only those who have a direct participation on the demonstration of the system will be the respondents of the survey. A total of 307 students,

38 faculty members, 38 non-teaching personnel and 20 IT practitioners from Taguig City University participated in the study.

The researcher utilized the developed and validated survey questionnaires on the level of accessibility of information at Taguig City University. While standardized questionnaires (based on ISO/IEC 25010) were used in the evaluation of the proposed system.

IV. FINDING AND DISCUSSION

The salient findings of this research are synthesized in this section based on the statement of the research problem.

Assessment of the Students, Faculty and Non-teaching Personnel of the Current Accessibility of Information in Taguig City University

Table 1
Summary of the Assessment of the Students, Faculty and Non-Teaching Personnel on the Current Accessibility of Information in Taguig City University

Criteria	Students		Faculty		Non-Teaching Personnel		Average	
	W.M.	Interpret	W.M.	Interpret	W.M.	Interpret	W.M.	Interpret
Class Suspension	3.68	Accessible	3.32	Moderately Accessible	3.85	Accessible	**3.62**	**Accessible**
Schedule of Enrollment	3.64	Accessible	3.39	Moderately Accessible	3.71	Accessible	**3.58**	**Accessible**
Meetings and Seminars	3.41	Moderately Accessible	3.12	Moderately Accessible	3.59	Accessible	**3.37**	**Moderately Accessible**
Programs/Events	3.51	Accessible	3.12	Moderately Accessible	3.72	Accessible	**3.45**	**Moderately Accessible**
New School Policies	3.35	Moderately Accessible	2.94	Moderately Accessible	3.53	Accessible	**3.28**	**Moderately Accessible**
Grade Inquiry	3.04	Moderately Accessible	2.84	Moderately Accessible	2.97	Moderately Accessible	**2.95**	**Moderately Accessible**
Overall Weighted Mean	**3.44**	**Moderately Accessible**	**3.12**	**Moderately Accessible**	**3.56**	**Accessible**	**3.38**	**Moderately Accessible**

Table 1 presents the overall assessment of students, faculty and non-teaching personnel on the current accessibility of information of Taguig City. It was revealed that the over-all weighted mean of the criteria has a rating of **3.38** which is interpreted as **"Moderately Accessible".** It can be noted that **"Class suspension"** garnered the highest accessibility rating of **3.62** which is interpreted as **"Accessible"** while **"Grade Inquiry"** garnered the lowest rating of **2.95** which is interpreted as **"Rarely Accessible"**.

It also shows that the non-teaching personnel garnered the highest rate of **3.56** which is interpreted as **"Accessible"**, followed by the students which obtained **3.44** which is interpreted as **"Moderately Accessible"** while faculty members garnered the lowest rate of **3.12** which is also rated as **"Moderately Accessible"**.

Evaluation of the Students, Faculty and Non-teaching Personnel on the Proposed SMS-Based Information Dissemination System with Android Application Controller Using Criteria Based on ISO 25010.

Table 2

Summary of the Evaluation of the Students, Faculty and Non-Teaching Personnel of the Proposed SMS-Based Information Dissemination System with Android Application Controller Based on ISO 25010

Indicators	Students		Faculty		Non-Teaching Personnel		Average	
	W.M.	Interpret	W.M.	Interpret	W.M.	Interpret	W.M.	Interpret
Functional Suitability	4.27	Very Satisfactory	4.22	Very Satisfactory	4.25	Very Satisfactory	4.25	Very Satisfactory
Performance Efficiency	4.27	Very Satisfactory	4.24	Very Satisfactory	4.29	Very Satisfactory	4.27	Very Satisfactory
Usability	4.28	Very Satisfactory	4.27	Very Satisfactory	4.31	Very Satisfactory	4.29	Very Satisfactory
Reliability	4.25	Very Satisfactory	4.22	Very Satisfactory	4.30	Very Satisfactory	4.26	Very Satisfactory
Portability	4.24	Very Satisfactory	4.32	Very Satisfactory	4.30	Very Satisfactory	4.28	Very Satisfactory
Overall Weighted Mean	**4.26**	**Very Satisfactory**	**4.25**	**Very Satisfactory**	**4.29**	**Very Satisfactory**	**4.27**	**Very Satisfactory**

Table 2 presents the summary of the evaluation of the students, faculty and non-teaching personnel of the proposed SMS-Based Information Dissemination System. The over-all weighted mean of the indicators has a rating of 4.27 which is interpreted as "Very Satisfactory". It also shows that all groups obtained a "Very Satisfactory" rate.

Table 2 shows that the non-teaching personnel garnered the highest rate of **4.29**, followed by the students who obtained **4.26** while faculty members garnered the lowest rate of **4.25**. It is also shown that the criteria **"Usability"** garnered the highest rating of **4.29** which is interpreted as **"Very Satisfactory"** while the criteria **"Functional Suitability"** garnered the lowest rating of **4.25** which is also interpreted as **"Very Satisfactory"**.

The result shows that the system has meet the minimum requirements or specifications based on ISO/IEC 25010 Software Quality Standards.

Significant Difference in the Evaluation Between Students, Faculty and Non-teaching Personnel on SMS-Based Information Dissemination System with Android Application Controller

There is no significant difference among the three groups of on the on the evaluation of the proposed SMS-Based Information Dissemination System with Android Application Controller in terms of Functional Suitability. This is inferred by the computed F - value of 0.508 which is much lower than the tabular F - value of 5.143 at 0.05 level of significance. Thus, the null hypothesis is accepted.

Likewise, no significant difference is identified among the three groups of respondents on the evaluation of the proposed SMS-Based Information Dissemination System with Android Application Controller in terms of Performance Efficiency. This is inferred by the computed F - value of 1.542 which is much lower than the tabular F - value of 5.143 at 0.05 level of significance. Thus, the null hypothesis was accepted.

There is also no significant difference among the three groups on the on the evaluation of the proposed SMS-Based Information Dissemination System with Android Application Controller in terms of Usability. This is inferred by the computed F - value of 0.344 which is much lower than the tabular F - value of 3.682 at 0.05 level of significance. Thus, the null hypothesis is accepted.

There is no significant difference among the three groups on the on the evaluation of the proposed SMS-Based Information Dissemination System with Android Application Controller in terms of Reliability. This is inferred by the computed F - value of 1.263 which is much lower than the tabular F - value of 4.256 at 0.05 level of significance. Thus, the null hypothesis is accepted.

There is no significant difference among the three groups on the on the evaluation of the proposed SMS-Based Information Dissemination System with Android Application Controller in terms of Portability. This

is inferred by the computed F - value of 3.618 which is much lower than the tabular F - value of 5.143 at 0.05 level of significance. Thus, the null hypothesis is accepted.

Evaluation of IT Practitioners of the SMS-Based Information Dissemination System with Android Application Controller Using Criteria Based on ISO 25010

Table 3
Summary of the Evaluation of the IT Practitioners of the Proposed SMS-Based Information Dissemination System with Android Application Controller Based on ISO 25010

Criteria	W.M.	Interpret
Compatibility	4.24	Very Satisfactory
Security	4.05	Very Satisfactory
Maintainability	4.24	Very Satisfactory
Overall Weighted Mean	**4.177**	**Very Satisfactory**

Table 3 shows that the over-all weighted mean of the indicators has a rating of **4.177** which is interpreted as **"Very Satisfactory"**. It can be seen that the indicative statement **"Compatibility"** and **"Maintainability"** garnered the highest rating of **4.24** which is interpreted as **"Very Satisfactory"** while the indicative statement **"Security"** garnered the lowest rating of **4.05** which is also interpreted as **"Very Satisfactory"**.

This result implies that as perceived by the IT Practitioners, the newly developed system can run on different platforms, has security features such as user authentication, and can easily modified and improve.

Enhancements Suggested by the Students, Faculty and Non-teaching Personnel of the SMS-Based Information Dissemination System with Android Application Controller

Table 4
Enhancements Suggested by the Students, Faculty and Non-Teaching Personnel on the SMS-Based Information Dissemination System with Android Application Controller

Suggestion	Freq.	Percentage
1. Graphical User Interface	132	**34.46%**
2. Security Features	151	**39.43%**
3. Develop Android Apps for Students	179	**46.74%**
4. Reports Generation	162	**16.19%**

Table 4 shows that among the enhancements specified, **"Develop Android Apps for Students"** got the highest percentage distribution of **179** or **46.74%**, followed by improve **"Security Features"** which garners **151** or **39.43%** percentage distribution; **132** or **34.46%** of the respondents proposed to improve the **"Graphical User Interface"**. While improve the **"Reports Generation"** obtained the lowest percentage distribution of **62** or **16.19%.**

This clearly shows that most of the respondents wanted to have an android apps to lessen their time and to avoid misspelling and wrong syntax or format of the text codes and grade inquiry.

V. CONCLUSION AND FURTHER RESEARCH

On account of the foregoing significant findings, the following conclusions were derived:

1. The overall level of accessibility of information in Taguig City University is Moderately Accessible. It implies that there is a need to improve the system of disseminating information of class suspensions, schedule of enrollment, meetings and seminars, programs/events, new school policies and grade inquiry.
2. The overall evaluation of the students, faculty and non-teaching personnel to the proposed SMS-Based Information Dissemination System with Android Application Controller (in terms of functional suitability, performance efficiency, usability, reliability and portability) is Very Satisfactory. This means that students, faculty, and non-teaching personnel observed that the system meets stated and implied needs, has rapid response and processing times, and high throughput rates, can be used effectively, efficiently, and satisfactorily by specified users to accomplish specified goals, performs function for a specified period of time, and can be transferred from one hardware, software, or other operational or usage environment to another.This hypothesizes that the proposed system meets the minimum requirements of international standards ISO 25010 Software Quality Model.

3. No significant difference exists between the evaluations of the respondents on the proposed SMS-Based Information Dissemination System with Android Application Controller. This proves that the students, faculty and non-teaching personnel understand and agree on the criteria and have the homogeneity in their evaluation of the proposed system.
4. The overall evaluation of IT Practitioners (in terms of compatibility, security and maintainability) to the proposed SMS-Based Information Dissemination System with Android Application Controller is Very Satisfactory. This means that the IT Practitioners perceived the proposed system can exchange information with other products, systems, have the degree of data access appropriate to their types and levels of authorization and the system can be modified to improve it. This hypothesizes that the proposed system meets the minimum requirements of international standards ISO 25010 Software Quality Model.
5. There are enhancements suggested by the respondents for the improvement of SMS-Based Information Dissemination System with Android Application Controller which includes improve the graphical user interface, improve the security features, develop Android Application for students and improve report generation.

In the light of the conclusions made in this study, the researcher recommends the following:

1. According to the overall assessment of the level of Accessibility of Information at Taguig City University which is rated as moderately accessible, it is recommended to improve the system/manual process of disseminating information and grade inquiry services such as posting announcements on the bulletin boards, sending memorandum, provide a department or office that prints the grades of students at the end of every semester and develop the SMS-Based Information Dissemination System with Android Application Controller.
2. According to the overall evaluation result obtained from the students, faculty, non-teaching personnel and IT practitioners, although the mean of the seven (7) criteria used is very satisfactory, the developed system still needs some improvements and maintenance.
3. For future studies which include the SMS-Based Information Dissemination System with Android Application Controller, it is recommended to develop Android Application for students to eliminate typo errors in sending textcodes and grade inquiry text format.

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