SENT SMS : School Event Notification Through SMS

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Abstract - *Mobile phones are now considered as an essential part of people's daily lives which is used for communication and provides diversified information. The use of mobile phone is not only limited to communication alone, but now used for subscription to value-added services like disaster warning, alert systems, and notifications.*

The development of School Event Notification Through SMS (SENT SMS) is beneficial to students, teachers, and parents in receiving first-hand information from the school right into their mobile phone. With the use of SMS Notification, students will be notified with the upcoming events of the school, changes in schedule of events, and suspension of classes due to bad weather. Teachers will be notified for schedule of meetings, emergency meetings, and deadlines of requirements. Parents will also be informed about the school activities and be aware of the activities of their children in school.

The system was tested and evaluated using ISO 9126 standard questionnaire for software quality characteristics such as functionality, reliability, usability, efficiency, maintainability, and portability.

The result implies that the overall usefulness of the system is very effective, that is, it is highly functional, highly reliable, highly usable, highly efficient, highly maintainable and highly portable.

Keywords: *Event Notification, Mobile Application, SMS Notification*

INTRODUCTION

In 2013, the rate of mobile-cellular subscription is almost as many as people in the world with 6.8 billion total subscriptions with more than half in the Asia-Pacific Region which corresponds to 3.5 billion. Mobile devices are becoming popular in use nowadays and Philippines is considered as the texting capital of the world with over 1 billion text messages sent per day [1].

SMS have been developed with different demands and create a new approach for interaction and communication. As we know SMS alert system is useful in some cases for delivering alerts in emergency and there are some applications are developed as pre-disaster warning devices [2], [3].

Educational institutions are expected to extend their services through mobile phones by providing easy access of information to students, teachers, as well as parents. The development of School Event Notification through SMS offers a remarkable improvement of communication between students, parents, teachers, and school through timely delivered SMS messages [4].

The primary objective of this development is to notify students and parents about upcoming school activities, cancelation of classes due to typhoon, and other broadcasted school information. The system will also notify the faculty and staff of the school for upcoming activities, scheduled meetings, reminders, and other individual notices.

OBJECTIVES OF THE STUDY

This research aims to develop a School Event Notification through SMS.

Specifically, it aims to develop an application that will store contact details of students, guardian, faculty and staff; develop an application that will store calendar of events; develop an application that will enable students, faculty, and school staff to subscribe/unsubscribe to school notifications through SMS; develop an application that will broadcast school events to students, guardians, faculty and staff through SMS; and evaluate the system using ISO 9126 criteria in terms of functionality, reliability, usability, efficiency, maintainability, and portability.
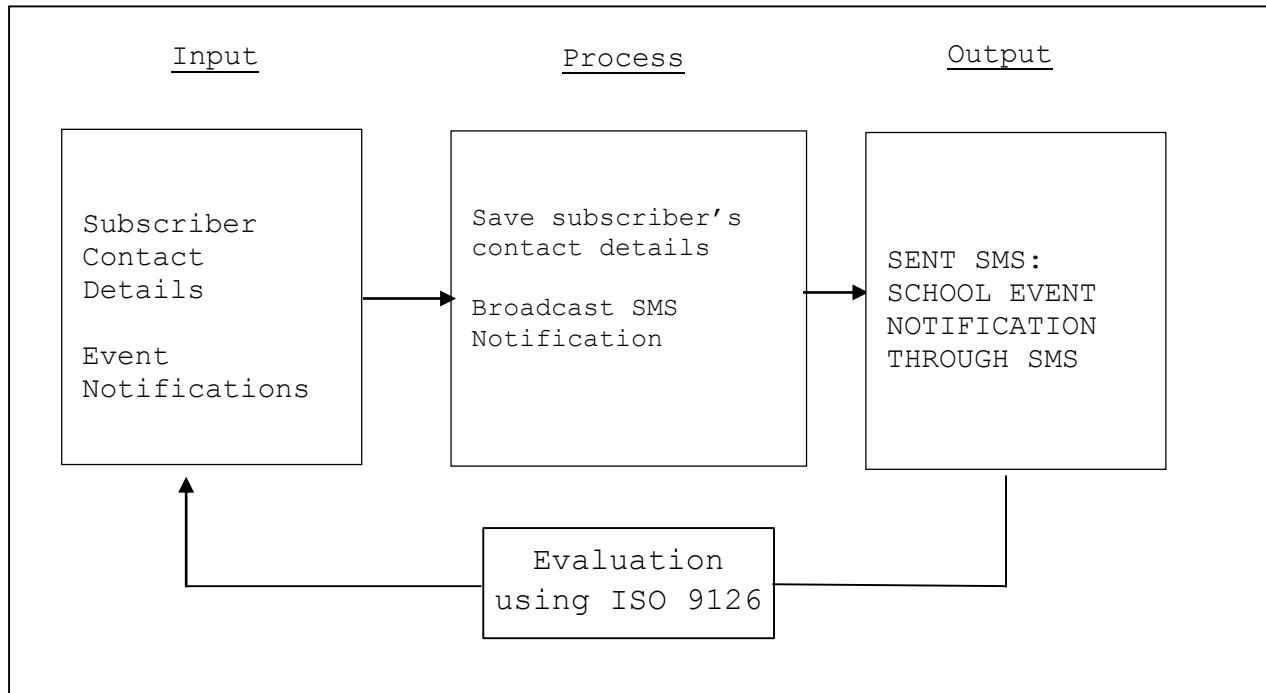
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      Input                    Process                   Output

  ┌──────────────┐         ┌──────────────┐         ┌──────────────┐
  │              │         │              │         │              │
  │  Subscriber  │         │ Save subscriber's       │ SENT SMS:    │
  │  Contact     │         │ contact details         │ SCHOOL EVENT │
  │  Details     │────────▶│              │────────▶│ NOTIFICATION │
  │              │         │ Broadcast SMS │         │ THROUGH SMS  │
  │  Event       │         │ Notification │         │              │
  │  Notifications│        │              │         │              │
  └──────────────┘         └──────────────┘         └──────────────┘
        ▲
        │                  ┌──────────────────┐
        └──────────────────│   Evaluation     │
                           │  using ISO 9126  │
                           └──────────────────┘
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Figure 1 Conceptual Framework

CONCEPTUAL FRAMEWORK

Figure 1 shows the conceptual framework of the study illustrating the flow of the proposed system.

As shown in the figure, the major input is the subscribers' contact details which contains their mobile number. The mobile number is essential because this will be registered into the system and will receive the SMS notifications.

Another input is the event notifications, this includes the details about the school activities and announcements that will be published to the subscribers. The subscriber's contact details will be save in the data storage application and a mechanism to broadcast SMS notification will send the SMS to the subscriber's mobile number.

The system was evaluated using the ISO 9126 criteria in terms of functionality, reliability, usability, efficiency, maintainability, and portability to ensure its quality. The evaluation process served as basis for further development and improvement of the system [5], [6].

RELATED WORK
Globe Telecom Campus Connect

Campus Connect is a text messaging service in partnership with Globe Telecommunications. It provides an ICT solution that caters to the information and communication needs of employees, students, parents and the community through SMS.

Campus Connect disseminates information to all registered subscribers (students, parents and guardians, faculty and staff) schedules of examination, start and end of classes; deadline for enrolment, payment; schools activities; cancellation of classes due to bad weather and the like. Campus Connect is only exclusive to Globe or TM subscriber. To use the services, the subscriber must register first using the given keyword format: For non-student, KEYWORD[space]enroll then send to 2327, for student, KEYWORD <space> REG <space> LastName/FirstName/Course/Year/Section/Birthdate/IDNumber.

Registered users may opt to STOP or REACTIVATE Campus connect service anytime through text.

SMART InfoBoard

The SMART InfoBoard Service is a web-based solution that offers various SMS facilities with different functions and capabilities catering to the needs of the school.

With the InfoBoard, the user can receive feedback, comments, suggestions, queries and other user-specific messages straight to email, internet inbox or any specified Smart mobile number; provide general information, advisories, and announcements;

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provide user-specific data like grades, accounts dues, account details, follow-ups; conduct polls and surveys and provide real time results; create customized SMS solutions; and text broadcast to pre-registered Smart subscribers.

SMART InfoBoard has a TEXTCAST that enables content provider to broadcast messages to group of registered subscribers.
To register: KEYWORD [space] REG [space] NAME/COURSE/ STUDENT ID NUMBER and send to 717XXXX
To subscribe: KEYWORD [space] PUSH [space] ON and send to 717XXXX
To unsubscribe: KEYWORD [space] PUSH [space] OFF and send to 717XXXX
To check subscription: CHECK/ OFF/ OUT/ STOP/ CANCEL/ QUIT/ NO and send to 717XXX
To stop all subscription: STOP ALL and send to 717XXXX
To inquire about Account, type:
TUITION<space><ID Number>/<SCHOOL YEAR>/<SEMESTER> then send to 717XXXX
 To inquire about Grades, type:
GRADES<space><ID Number>/<SCHOOL YEAR>/<SEMESTER> then send to 717XXXX

METHODOLOGY
Project Development
In this study, the researcher used the spiral model for the systems development. Figure 2 shows the model, the phases are planning, risk analysis, engineering, construction and release, and system evaluation. These phases are iteratively followed one after other during system's development [7].
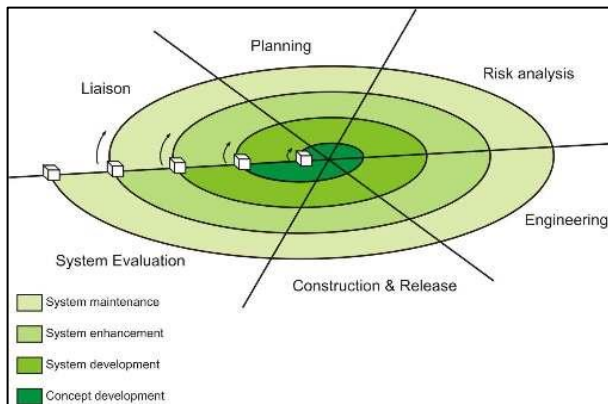

Figure 2. Spiral Model for System's Development [7]

Iterating the phases helps in understating the problems associated with a phase and dealing with those problems when the same phase is repeated next time, planning and developing strategies to be followed while iterating through the phases.

System Architecture
Figure 3 shows the system architecture. The administrator adds the school event to the data storage application, the event will be broadcasted using the GSM Modem that will communicate with the mobile network and this will be sent to the user's mobile phone through SMS.
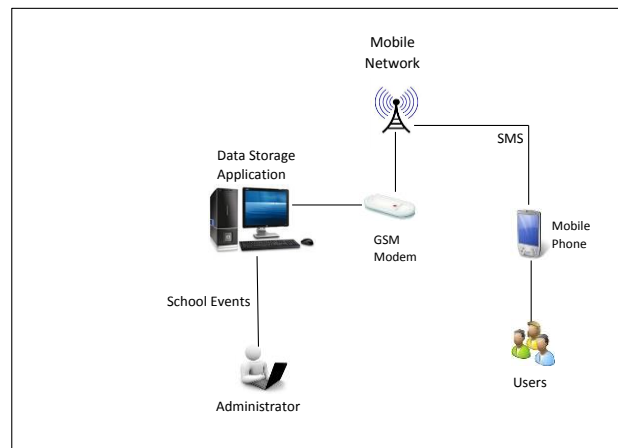

Figure 3 System Architecture
Operation and Testing
After the development, a test case was created and the researcher presented the system to the technical panel for evaluation. There are some errors that were found out during the technical presentation and series of revisions and improvements were done to correct the errors and improve the functionality.

Evaluation
The system was evaluated using the ISO 9126 standard questionnaire. The questionnaire sought to evaluate the system using the standards set by ISO 9126 otherwise known as the Software Quality Model in terms of six main characteristics of good software, namely, functionality, reliability, usability, efficiency, maintainability and portability [8].

The evaluators were five (5) IT Experts who are in line with database and mobile development. For the users, it was evaluated by ninety (90) parents, ninety (90) students, and twelve (12) faculty and staff who were chosen based on random selection using the random number generator. The respondents were

chosen based on their number that were randomly picked by the number generator. The researcher used the five (5) point Likert Scale as the basis for evaluating the system. The given scale was used to interpret the result of the study: 4.21 – 5.00: Very Effective (VE); 3.41 – 4.20: Effective (E); 2.61 – 3.40: Moderately Effective (ME); 1.81 – 2.61: Ineffective (I); 1.60 - 1.80P: Not Effective (NE).

The result of the evaluation was tabulated using the Statistical Package for Social Sciences (SPSS) software and Mean was used to determine the result of the evaluation. To determine the effectiveness of the application the mean scores were computed and categorized using the same description.

RESULTS
Evaluation of the System using ISO 9126

In the implementation of the system, an evaluation was conducted to test the quality standard of the system using ISO 9126 in terms of functionality, reliability, usability, efficiency, maintainability and portability. This was evaluated by panel of experts, faculty and staff, students, and parents.

Functionality

Table 1 shows the results of the evaluation of the Functionality of the system by the IT experts, faculty and staff, students and parents. As shown in Table 1, the system was rated by Technical Experts (M = 4.04) Student (M=4.11) and Parent (M=4.10) as "Effective", and Faculty and Staff (M =4.58) as "Very Effective"

This means that the system functions appropriately according to its specified attribute. It is also effective in producing accurate results. It functions without errors effectively. It adheres to related standards or conventions or relations in laws effectively and the system has the ability to prevent unauthorized access to programs or data whether accidental or deliberate effectively.

This implies that the respondents believe that the system can functions correctly and serve its purpose. It further implies that the respondents believe that the system is functional because it functions accurately according to specification without exceptions or problems.

Table 1. Level of Functionality

Category	Technical Expert		Faculty & Staff		Students		Parents		As a Whole	
	WM	VI	WM	VI	WM	VI	WM	VI	WM	VI
1. The system functions appropriately	4.17	E	4.75	VE	4.08	E	4.08	E	4.27	VE
2. The system produces accurate result and functions without errors or problems	3.83	E	4.33	VE	3.96	E	3.96	E	4.02	E
3. The system adheres to related standards or regulations in laws.	4.00	E	4.50	VE	4.17	E	4.22	E	4.22	E
4. The system has the ability to prevent unauthorized access to program or Data whether accidental or deliberate	4.17	E	4.75	VE	4.23	VE	4.15	E	4.32	VE
5. As a whole	4.04	E	4.58	VE	4.11	E	4.10	E	4.20	VE

Table 2. Level of Reliability

Category	Technical Expert		Faculty & Staff		Students		Parents		As a Whole	
	WM	VI	WM	VI	WM	VI	WM	VI	WM	VI
1. The system functions for a long time Without crashes or service interruptions	3.50	E	4.25	VE	4.00	E	4.00	E	3.93	
2. The software can manage and/or recover from component or environmental failure	3.67	E	4.17	E	4.10	E	4.00	E	3.98	E
3. The system can be revived and become fully operational even in the event of failure.	3.83	E	4.41	VE	4.02	E	3.90	E	4.04	E
Composite Mean	**3.66**	**E**	**4.27**	**VE**	**4.04**	**E**	**3.96**	**E**	**3.98**	**E**

As shown in the table 1, the criteria that the system produces accurate result and functions without errors or problems got the lowest evaluation, but it is still on the bracket of effective, this factor maybe the cause of network jam, which causes the delay of SMS. However, this, network error is beyond the control of the current system and this is more on the network provider services. In general, the overall evaluation was "Very Effective" it shows that the system could provide quality service to its clientele.

Reliability

As shown in Table 2 in terms of reliability, the system was rated by Technical Experts (M = 3.66) Student (4.04) and Parent (M = 3.96) as "Effective", and Faculty and Staff (M =4.27) as "Very Effective". This means that the system has the ability to maintain its service and withstand to factors that may affect it. The respondents were satisfied of the system developed by the researcher. Specifically, Faculty and Staff rated "effective" in terms of all criteria set in the ISO 9126 standards.

This implies that the system can perform its function and the users can rely on its services. As defined in an overview of the ISO 9126-1 software quality model definition, reliability defines the capability of the system to maintain its service provision under defined conditions for defined periods of time.

A shown in the table, the overall result of the evaluation is "Effective" which shows that the system can perform its services and can manage to recover in the event of environmental failure, and the users can rely on its services.

Usability

As shown in Table 3 in terms of Usability, system was rated by Technical Experts (M = 4.33) Faculty and Staff (M =4.63) Student (4.22) and Parent (M = 4.22) as "Very Effective". This means that the system is highly usable and the system is easy to operate. It also means that different types of users could easily use the system. It does not require technical skill and sophisticated learning efforts on the part of different types of users in order to make use of the system.

This implies that the system is user-friendly, and easy to operate especially in the use of the apps. The use of the apps does not require technical skills, once installed, the user can just select an option without any configuration. As shown in the table, the respondents' evaluation on the functionality of the system is "Very Effective" which shows that the system is easy operate and the respondents finds it easy to use without the need for technical skills, especially the parents who are not technical savvy.

Table 3. Level of Usability

Category	Technical Expert		Faculty & Staff		Students		Parents		As a Whole	
	WM	VI	WM	VI	WM	VI	WM	VI	WM	VI
1. The function of the system is easily understood.	4.16	E	4.58	VE	4.27	VE	4.37	VE	4.34	VE
2. The system us user-friendly. It does not require learning effort for different type user.	4.33	VE	4.58	VE	4.06	E	4.10	E	4.26	E
3. The system is easy to operate.	4.50	VE	4.75	VE	4.33	E	4.20	E	4.44	E
4. As a whole	4.33	VE	4.63	VE	4.22	VE	4.22	VE	4.35	VE

Table 4. Level of Efficiency

Category	Technical Expert		Faculty & Staff		Students		Parents		As a Whole	
	WM	VI	WM	VI	WM	VI	WM	VI	WM	VI
1. The system bears on response and processing time and on throughput rates in performing its functions	3.83	E	4.75	VE	4.17	E	4.19	E	4.23	VE
2. The system requires minimal amount of Computing resources	4.0	E	4.50	VE	4.06	E	3.91	E	4.11	E
Composite Mean	**3.91**	**E**	**4.62**	**VE**	**4.11**	**E**	**4.05**	**E**	**4.17**	**E**

Efficiency

As shown in Table 4 in terms of Efficiency, system was rated by Technical Experts (M = 3.91) Student (4.11) and Parent (M = 4.05) as "Effective", and Faculty and Staff (M =4.62) as "Very Effective" This means that the system's performance was not affected by the amount of resource utilization and could continue to deliver its function under certain conditions.

This implies that the system has the ability to report the root cause of failure, it can manage the system changes, it requires less effort for fault removal or environmental change and it requires minimal efforts to test a system changes

As shown in the table, the respondents evaluated the system as "Effective" which shows that the respondent believe that the system could continue to deliver its functions under certain conditions and can cater to multiple and parallel inquiries.

Maintainability

As shown in Table 5 in terms of Maintainability, system was rated by Technical Experts (M = 3.75) Student (4.13) and Parent (M = 4.14) as "Effective", and Faculty and Staff (M =4.49) as "Very Effective". This means that the respondents believed that the system could easily adopt to changes such as new specifications, operating environments or upgrade in system requirement without affecting its operation.
It implies that the system required less effort to maintain and the services would not be affected during the maintenance period. This further implies that the system had the ability to report the root cause of failure, it can manage the system changes, it requires less effort for fault removal or environmental change and it requires minimal efforts to test a system changes.

Table 5. Level of Maintainability

Category	Technical Expert		Faculty & Staff		Students		Parents		Total	
	WM	VI	WM	VI	WM	VI	WM	VI	WM	VI
1. The system has the ability to report the root cause of failure.	3.50	E	4.58	VE	4.11	E	4.17	E	4.09	E
2. The system can manage to system changes.	3.67	E	4.50	VE	4.22	VE	4.14	E	4.13	E
3. The system requires less effort for modification, fault removal or environmental failure.	3.83	E	4.58	VE	4.14	E	4.12	E	4.16	E
4. Lesser effort needed to verify or test a system change.	4.00	E	4.33	VE	4.08	E	4.14	E	4.13	E
Composite Mean	**3.75**	**E**	**4.49**	**VE**	**4.13**	**E**	**4.14**	**E**	**4.12**	**E**

Table 6. Level of Portability

Category	Technical Expert		Faculty & Staff		Students		Parents		As a Whole	
	WM	VI	WM	VI	WM	VI	WM	VI	WM	VI
1. The system can easily adapt to changes such as new specifications, operations, operating environments or upgrades in system requirements.	3.50	E	4.58	VE	4.23	VE	4.16	E	4.11	E
2. The system is easy to install. The component software is also easy to install.	3.83	E	4.50	VE	4.26	VE	4.05	E	4.16	E
3. The system conformed to the industry standard	3.83	E	4.50	VE	4.28	VE	4.27	E	4.22	E
4. The system allows easy exchange of given software/hardware component within specified environment.	4.0	E	4.67	VE	4.29	VE	4.21	E	4.29	VE

As shown in the result of evaluation, the respondents rated it as "Effective", and it shows that the system could not be easily affected by the phone updates, change of mobile phone and application update.

Portability

As shown in Table 6 in terms of portability, the system was rated by Technical Experts (M = 3.79) and Parent (M = 4.18) as "Effective", and Faculty and Staff (M =4.56) and Student (4.26) as "Very Effective.

This means that the system is highly portable, could easily adapt to changes such as new specifications, operating environments or upgrades in system requirement without affecting its operation and can be installed easily.

It implies that the users can manipulate and use the system developed by the researcher since it can easily be installed on their mobile phones. Furthermore, users believed that it can conform to the industry standard of the present technology.

As shown in the evaluation the respondents rated it as "Effective", it shows that the SMS can be received on any mobile devices.

Overall Evaluation

Table 7 shows the result of the system's evaluation regarding the system compliance to the ISO 9126 standards evaluated by the technical experts, faculty and staff, students and parents. The result shows as a whole this group of evaluators rated the system as "very effective". The obtained means of the following characteristics were functionality (M = 4.20), reliability (M = 3.99), usability (M = 4.35), efficiency (M = 4.18), Maintainability (M = 4.13) and portability (M = 4.19) of which all mean equivalent for each characteristic as "very effective".

The result implies that the overall usefulness of the system is very effective, that is, it is highly functional, highly reliable, highly usable, highly efficient, highly maintainable and highly portable.

Table 7. Perception of Evaluators as a Whole

Category	Technical Expert		Faculty & Staff		Students		Parents		Entire Group	
	WM	VI	WM	VI	WM	VI	WM	VI	WM	VI
A. Functionality	4.04	E	4.58	VE	4.11	E	4.10	E	4.20	VE
B. Reliability	3.67	E	4.28	VE	4.04	E	3.97	E	3.99	E
C. Usability	4.33	E	4.64	VE	4.22	VE	4.22	VE	4.35	VE
D. Efficiency	3.92	E	4.63	VE	4.12	E	4.05	E	4.18	E
E. Maintainability	3.75	E	4.50	VE	4.14	E	4.15	E	4.13	E
F. Portability	3.79	E	4.56	VE	4.26	VE	4.18	E	4.19	E
Total	**3.91**	**E**	**4.53**	**VE**	**4.14**	**E**	**4.11**	**E**	**4.17**	**E**

CONCLUSIONS AND RECOMMENDATIONS

The system met its objective of providing SMS notifications to students, parents, faculty and staff. The students, parents, faculty and staff agreed that the system is usable especially the event notifications and important school announcements. The overall result of the IT experts' evaluation using the ISO 9126 criteria in terms of functionality, reliability, efficiency, maintainability, and portability was effective. It implies that the proposed system meets the criteria for the software quality. The result implies that the system is very useful in terms of broadcasting information to the faculty, staff, students and parents. This will result in a faster communication process and awareness about the school events and activities.

It is recommended that the system is recommended for implementation because results proved that the system can manage its operation efficiently in terms of its functionality, efficiency, reliability, maintainability, usability and portability. The system architecture can be used by other researchers as basis in developing similar system for it requires less resources. It is further recommended for the conduct of similar and related studies in the future for further improvement of the system. Since the application is only limited to school event notification, it is recommended to conduct further studies to include grades and account inquiry, as well as development of mobile application for smartphone or online services.

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