

# Development and Evaluation of a Management Information System with Sms Notification Technology in a Philippine Military Camp

Andy A. Lapada

**Abstract:** *This study aimed to develop a Management Information System that stores information of a Reservist can send SMS, has a calendar of events, displays the profile and information of the Reservists, has an attendance for the Reservists and generates reports and other information. The researcher used Iterative method. It allows for dynamic development. It has different phases; planning, analysis, design and implementation. The system was evaluated using IBM usability evaluation tool as an intermediary questionnaire, and undergoes testing for the usability and acceptability through sets of questionnaire, by some experts and end-users to ensure that the system reached the standards and functionality that was needed by the end-users. Expert testing resulted to 4.8 and was interpreted as Highly Usable. End-user testing were conducted also which resulted to a weighted mean of 4.7 interpreted as Highly Usable. Results shows that the MIS met the IBM standard. Therefore, implementation of the system is highly recommended.*

**Index Terms:** *Information System, Management Information System, SMS technology, SMS*

## I. INTRODUCTION

The advances in computer technology have affected everybody's daily lives. Computers support and assist almost every single human activity. Automation runs important task in all walks of life. Nowadays, particularly in most government agencies and organizations rely more in technology to make their work faster and more efficient (Andreu et.al., 1991)<sup>1</sup>. According to Imus (2018), information system is a formal set of processes that, working from a collection of data structured depending to the company's needs, gathers, processes and distributes the information necessary for the company's operations and for its corresponding management and control activities, thereby supporting, at least in part, the decision-making processes necessary for the company to perform its business functions in line with its strategy<sup>2</sup>. Based on the study of Schleyer et. al. (2017), Management Information System provides an efficient and effective way to record and manage information that are needed in the organization<sup>3</sup>. The 802<sup>nd</sup> Community Defense Center (CDC), 8<sup>th</sup> Regional Community Defense Group (8<sup>th</sup> RCDG) Army Reserve Command (ARESCOM) is located at Barangay Alang-alang, Borongan City, Eastern Samar. 802<sup>nd</sup> CDC is the only Headquarters of ARESKOM in Eastern Samar.

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Andy A. Lapada, Department of Information Technology, Eastern Samar State University, Philippines

It is created for the sole purpose of Reserve force management, procurements and organization in the areas encompassing the Province of Eastern Samar. It also serves as the primary mobilization center for units under the operational arm of Ready Reserve Infantry Battalion (RRIBn). Its function is to expand the Regular and Reserve Force in the event of war invasion, assist the government in Relief and Rescue Operation in the event of calamities or disaster.

Currently, all their data and information are stored in their record book and placed in cabinets and unsecured areas. They manually transact and process the papers, documents, certificates and information of the Reservists. Thus, they encounter difficulties such as lacking of certificates and information, manually searching, organizing data and information of a particular Reservist and also they are having problems in terms of mustering for their events and activities. That is where the researcher came up of the idea of developing an MIS for this organization.

## II. OBJECTIVES OF THE STUDY

This study aimed to develop an MIS with SMS Notification Technology for 802<sup>nd</sup> CDC RRIBn. Specifically:

1. Develop a system that will store information that has the following features;
  - 1.1 Sends SMS to the recipients;
  - 1.2 Has a calendar of events that sends automatically;
  - 1.3 Displays the profile and information of the Reservists;
  - 1.4 Has an attendance for the Reservists; and
  - 1.5 Generation of reports and other information
2. Evaluate the system using IBM usability evaluation tool as an intermediary questionnaire

## III. RESEARCH METHODOLOGY

The Software Development Life Cycle (SDLC) framework, shown in figure 1 provides a sequence of tasks for the researcher to follow. This study used Iterative method. Iterative process starts with a simple implementation of a subset of the software requirements and iteratively enhances the evolving versions until the full system is implemented. At each iteration, design modifications are made and new functional capabilities are added. The basic idea behind this method is to develop a system through repeated cycles (iterative) and in smaller portions at a time (incremental).



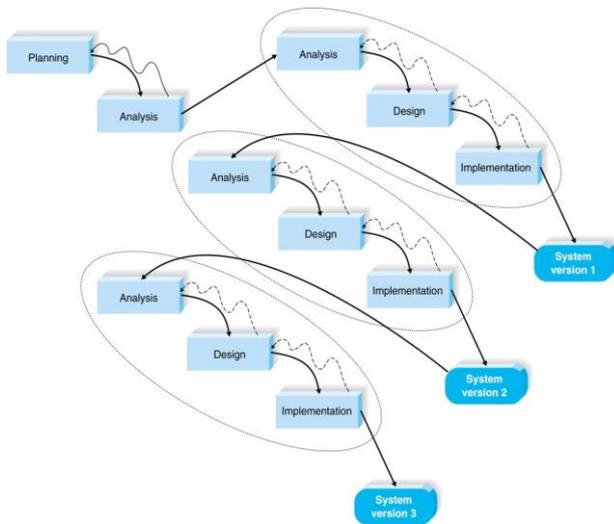


Figure 1. Iterative Model (John Wiley & Sons)

**Planning**

In this stage, the researcher started planning where all the elements will be set in order to develop a system. Planning starts with defining the overall flow of the system. In this phase, the system’s requirements are clearly defined and a thorough feasibility study is done from various perspectives including technical, schedule and operational.

**Analysis**

In this stage, the researcher focused on conducting the study as to what system is going to be developed. The researcher conducted an interview to the target client for the information requirements needed. Data were analyzed which served as the basis in system development.

**Design**

In this stage, the researcher decided how the system will operate using the identified software and hardware specification. Designing, developing and coding based on the information gathered to build the system is the focus of this phase.

**Implementation**

In this stage, the system prototype was developed it was tested and evaluated by the experts in Information Technology and end-user. Recommendations from respondents were considered and integrated in the final development of the system.

**System**

In this stage, the system is finally developed, implemented and ready to be used by the end user. The developed system will be maintained by the researcher to carry out and prevent some failure.

**Research Design**

Research design refers to the overall strategy chosen to integrate the different components of the study in a coherent and logical way, thereby, ensuring addressing the research problem effectively; it constitutes the blueprint for the collection, measurement, and analysis of data.

**Instrumentation**

The system was evaluated using the Software Quality Evaluation Tool based on IBM Computer System Usability Scale. It consists of questions that measure the user satisfaction with system usability.

**Data Analysis**

Calculation of the overall usability of the system was done by getting the general weighted mean of all the items in the questionnaire used and then adding them all to calculate the grand mean.

Where:

$$\sum x = \text{sum of all scores}$$

$$\bar{x} = \frac{\sum x}{n}$$

n = number of scores/items

**Coding Scheme**

The system was evaluated with the use of the following scale:

- 5 – Strongly Agree
- 4 – Agree
- 3 – Slightly Agree
- 2 – Slightly Disagree
- 1 – Strongly Disagree

The obtained mean was interpreted using the following:

**Numerical Rating Scale**

- 4.2 – 5.0
- 4.19 – 3.4
- 3.39 – 2.6
- 1.8 – 2.59
- 1.0 – 1.79

**Adjective Rating**

- Highly Usable
- Usable
- Moderately Usable
- Moderately Unusable
- Highly Unusable

**System Testing (Alpha Test)**

Alpha testing is a type of testing that is done on an application towards the end of a development process when the product is almost in a usable state. The system was evaluated by 15 experts in the field of Information Technology and was evaluated using IBM software usability evaluation tool as an intermediary questionnaire.

**Acceptance Testing (Beta Test)**

Acceptance testing is a level of software testing where a system is tested for acceptability. The purpose of this test is to evaluate the system’s compliance with the business requirements and assess whether it is acceptable for delivery. In this phase, the researcher presented and demonstrated to 802<sup>nd</sup> CDC 8<sup>th</sup> RCDG ARESKOM how the system work. Respondents try and use the system and then asked for their comments and feedbacks after. The system was evaluated by 30 respondents using the IBM software usability evaluation tool.

**IV. RESULTS AND DISCUSSIONS**

This part displays the screenshots of the actual system and the data collected from different test and evaluation conducted.



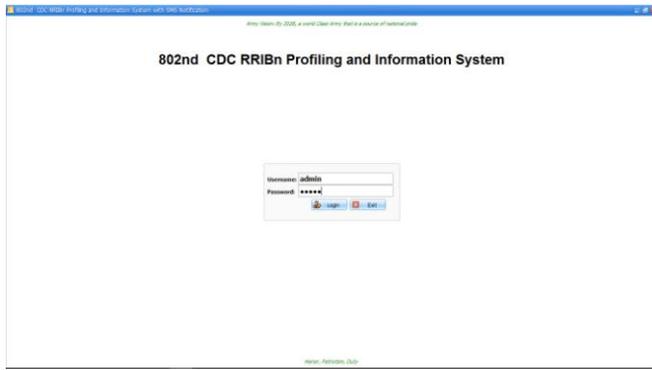


Figure 2. User Login Form

Figure 2 shows the User Log in Form where the user can log in to the system and if the account exists, it will go to the main form.

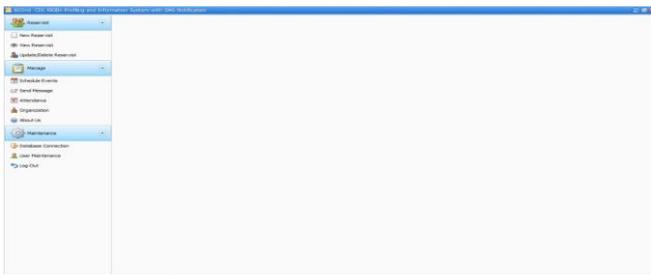


Figure 3. Main Form

Figure 3 shows the Main Form which displays the Reservist, Manage and Maintenance options

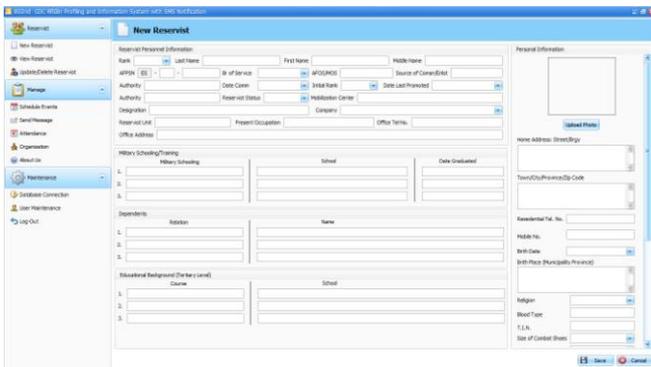


Figure 4. Add New Reservist Form

Figure 4 shows the New Reservist Form where the user can add new Reservist together with their data and information.

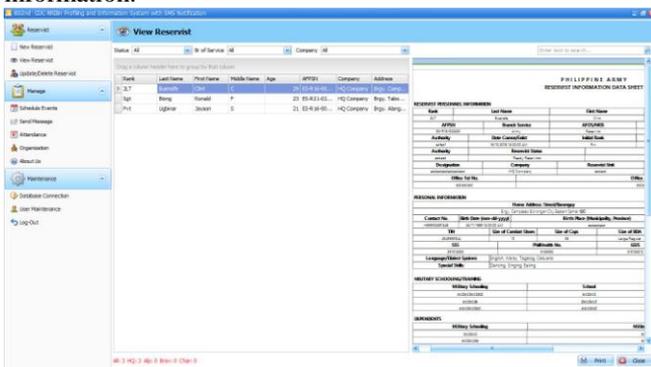


Figure 5. View Reservist Form

Figure 5 shows the View Reservist Form where the user can see the list of the registered Reservist and can print their

information.

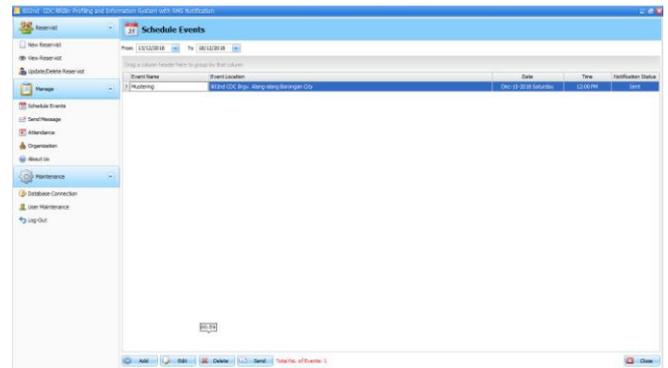


Figure 6. Schedule Events Form

Figure 6 shows the Schedule Events Form where the user can add and schedule an event.

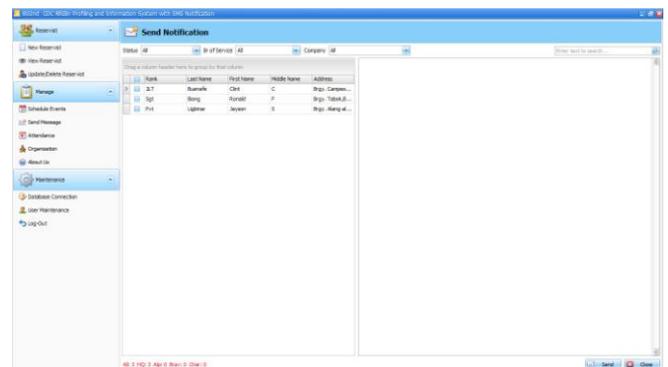


Figure 7. Send Notification Form

Figure 7 shows the Send Notification Form where the user can send SMS manually to a particular Reservist.

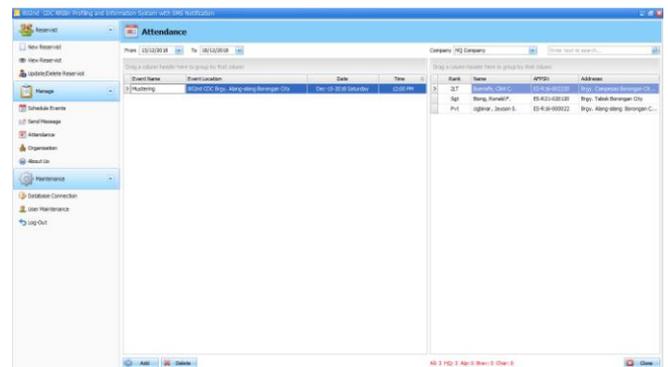


Figure 8. Reservist Attendance Form

Figure 8 shows the Reservist Attendance Form where the user can add an attendance from the given event.

**Table 1. Weighted Mean and Interpretation (Alpha Testing)**

Questions	Mean	Interpretation
1. Overall, I am satisfied with how easy it is to use this system	4.8	Highly Usable
2. It was simple to use this system	4.8	Highly Usable
3. I can effectively complete the tasks using this system	4.4	Highly Usable
4. I am able to complete my work quickly using this system	5.0	Highly Usable
5. I feel comfortable using this system	5.0	Highly Usable
6. It was easy to learn to use this system	4.0	Highly Usable
7. Whenever I make a mistake using the system, I recover easily and quickly	4.8	Highly Usable
8. The organization of information on the system screens is clear	5.0	Highly Usable
9. The interface of this system is pleasant	4.8	Highly Usable
10. I like using the interface of this system	4.8	Highly Usable
11. Overall, I am satisfied with how easy it is to use this system	4.8	Highly Usable
<b>Grand Mean</b>	<b>4.8</b>	<b>Highly Usable</b>

Table 1 shows a grand mean of 4.8 interpreted as Highly Usable. All the sub parameter was rated as Highly Usable; this result implies that the system is in consonant with the standard set by IBM.

**Table 2. Weighted Mean and Interpretation (Beta Testing)**

Questions	Mean	Interpretation
1. Overall, I am satisfied with how easy it is to use this system	4.8	Highly Usable
2. It was simple to use this system	4.7	Highly Usable
3. I can effectively complete the tasks using this system	4.7	Highly Usable
4. I am able to complete my work quickly using this system	4.5	Highly Usable
5. I feel comfortable using this system	4.8	Highly Usable
6. It was easy to learn to use this system	4.6	Highly Usable
7. Whenever I make a mistake using the system, I recover easily and quickly	4.6	Highly Usable
8. The organization of information on the system screens is clear	4.8	Highly Usable
9. The interface of this system is pleasant	4.6	Highly Usable
10. I like using the interface of this system	4.8	Highly Usable
11. Overall, I am satisfied with how easy it is to use this system	5.0	Highly Usable
<b>Grand Mean</b>	<b>4.7</b>	<b>Highly Usable</b>

Table 2 shows a grand mean of 4.7 interpreted as Highly Usable. All the sub parameters were rated as Highly Usable; this result implies that the system is in consonant set by IBM standard.

## V. CONCLUSION

### Conclusion

Based on the results, the researcher comes up with the following conclusions:

1. The researcher was able to develop a system that that store information. Specifically, the researcher were able to develop a system that:
  - a) Sends SMS to the recipient;
  - b) Has a calendar of events and sends automatically;
  - c) Displays the profile and information of a Reservists;
  - d) Has an attendance for the Reservists; and

- e) Generate reports and other information
2. The researcher used IBM questionnaire evaluation tool as an intermediary questionnaire. As a result, a weighted mean of 4.8 resulted during Alpha Testing which is interpreted as Highly Usable and a weighted mean of 4.7 resulted during Beta Testing, interpreted as Highly Usable which means that the system is in consonant with the standard set by IBM.

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## AUTHORS PROFILE



**Andy A. Lapada** has a Bachelor's Degree in Information Technology. He was also graduated with his masters in Information Technology in 2011 and his PhD in Technology Management in 2016. Currently he is working as a College Instructor and designated as a Program Head of the BS Information Technology Program of Eastern Samar State University. His interests includes GIS, MIS, Web development and software evaluation.