4P's Management Information System with SMS Gateway

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Abstract

The government's primary project for poverty alleviation in the Philippines is the PantawidPamilyang Pilipino Program (4P's). Conduct of in-person meetings is strictly prohibited due to the covid-19 pandemic. In this case, the researchers designed and developed a 4P's Management Information System with SMS Gateway that would provide a platform for members to be informed with relevant information about the activities in the organization. This system uses descriptive and developmental research design.The statistical technique used by the researchers is the mean. The designed features and functions of the stated system were tested using a standard questionnaire. In the software development cycle, the Rapid Application Development Model was utilized as a model. In terms of usefulness, usability, and performance, the conclusion conveyed was Very Good.

Keywords: 4P's, Management Information System, SMS Gateway, RAD Model, DSWD

I. INTRODUCTION

The PantawidPamilyang Pilipino Program (4P's) is the government's flagship initiative for poverty alleviation in the Philippines, which is executed by the Department of Social Welfare and Development (DSWD) in collaboration with key partner government agencies in the country[1]. Through this program, they group the member of the 4P's per barangay and each barangay has its own leader. For them to be able to manage well their communication dissemination they tend to physically attending the meeting whenever the venue is. However, when the COVID-19 Pandemic strikes it is prohibited to attend the meeting physically. So, the researchers opted and come up with the idea of developing a 4P's Management Information System with SMS Gateway in order to assist them in promoting a more effective mode of communication.

The use of information technology in numerous industries has aided decision-making in a variety of business tasks. An information system is a type of information technology that combines hardware and software to provide useful data[2]. Several studies that have been developed in the form of Evaluating Information System Effectiveness - Part I: Comparing Evaluation Approaches[3]. Management Information System s in Public and Private Organizations: An Empirical test [4] Also the Factors Affecting Successful Adoption of MIS in Organizations towards Enhancing Organizational Performance [5].

The use of web media as an interface for information systems is growing one of the real-time and easily accessible communication media web browsers and the internet infrastructure[6]. However, the internet usage system is more limited than using cell phones for personal communication. Among the SMS is a type of mobile communication service. Cell phones have become an indispensible element of modern life, allowing people to connect in ways never previously imaginable. While most cell phones are utilized for their intended purpose of making wireless phone calls, they also have a slew of additional features that are rarely used or disregarded. The brief message service, or text messaging, is one function that customers have begun to fully embrace in recent years. This basic service allows members to send and receive brief text messages [7].

With this, the researchers designed and developed a 4P's Management Information System with SMS Gateway to determine the level of usability of the developed system in terms of learnability and operability. Determine the level of functionality of the developed system as perceive by the Office of the DSWD in terms of its security, accurateness and suitability. Evaluate the level of performance of the system as perceive by the expert evaluators in terms of time behaviour and resource utilization. It can encourage a better manner of communicating with its clientele with the help of the said system.

1.1 Conceptual Framework
  This paper conceptualizes to developa 4P's Management Information System with SMS Gateway.
  In this study: input phase; process phase; and output phase are compromised. Input phase refers to the Member Profile/ Personal Information, Programs and Event. Process Phase includes the 4P's Management Information System with SMS Gateway that will send messages to the member whatever communication they have. The Output phase is the system's evaluation regarding to its usability, functionality and performance.
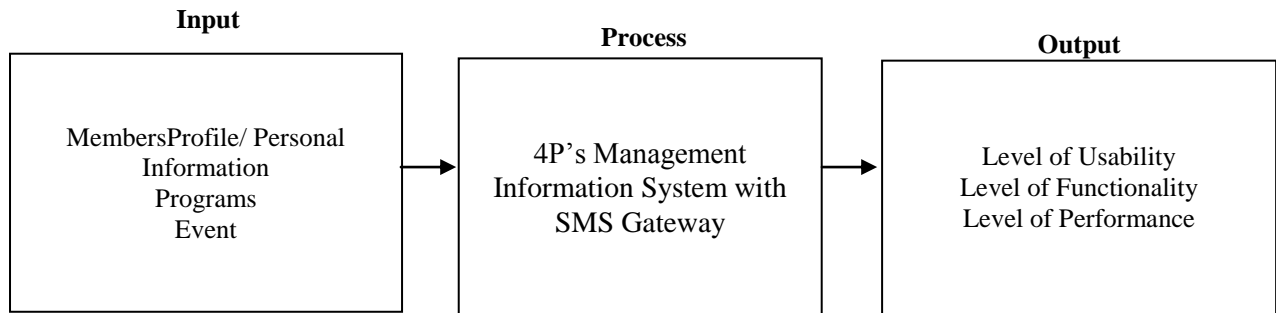
Input	**Process**	**Output**
MembersProfile/ Personal Information Programs Event	4P's Management Information System with SMS Gateway	Level of Usability Level of Functionality Level of Performance

Figure 1. The Conceptual Framework of the Study.

II. METHODOLOGY
  The research design, respondent selection, research instrument, data collection procedure, and statistical treatment are all covered in this chapter.

2.1 Research Design
  A research design is an arrangement of settings for data collecting and analysis that seeks to balance relevance to the research goal with efficiency and method[8].
  Developmental and descriptive research designs were used in this study.The systematic study of creating, producing, and assessing educational programs, processes, and products that must meet the criteria of internal consistency and effectiveness is known as developmental research design. Also, it is the investigation of the entire instructional design, development, and assessment process or specific process components[9]. A sort of inquiry committed to the generation of new knowledge and the confirmation of existing practice that is particular to the instructional design and technology field[10].
  Descriptive research is defined as large-scale, quantitative research that aims to "elucidate" a hypothesis (short of being able to confirm it). A descriptive finding could complement an insight gained from a more in-depth, open-ended approach in exploratory research. An organization can determine whether a concept is held by a few people and is irrelevant, or whether it is widespread and should be implemented. Credibility is established via descriptive research. However, description cannot "prove" anything is true or false; with that level of assurance, an experiment is required[11].

2.2 Software Development Life Cycle
  The Software Development Life Cycle Model is a method for developing and modifying software. SDLC is used in systems engineering, software engineering, and information systems. SDLC is a notion that is employed by a variety of software development processes now available on the market or in the software industry. SDLC is a framework for developing, planning, and controlling any type of information system[12].The study employed the Rapid Application Development (RAD) paradigm, which streamlines the software development process and, as a result, improves software project management.Rapid Application Development (RAD) is a software development process that relies on prototyping rather than detailed design. In the RAD approach, less emphasis is placed on planning and more emphasis is placed on development activities. It aims to create software in a short amount of time[13].When the RAD model is updated, the software process improves, and software project management improves. This enhancement to the work-task portion can aid software developers at work by allowing them to attain high productivity (performance) in less time and effort[14].
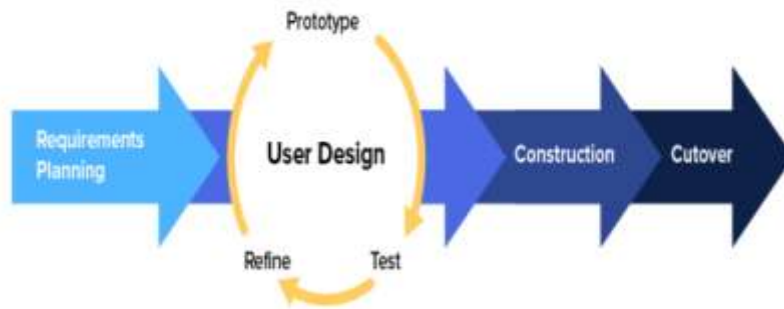
Figure 2. The Rapid Application Development Model

2.3 Entity-Relationship Diagram

As a data model, the entity-relationship model is available. The entity-relationship diagram (ERD) is a language for specifying the structure (and functionality) of databases and information systems. It uses inductive structuring development. Base data types are given basic properties. The model describes the relational model's organization conceptually and graphically, and it is now used as the main conceptual model[15].

The developed system has five entities, namely: Program/Event, User, SMS, SMS Logs and Member.One or many User Entity has one and only one Program/Event. User can add a program/event. One or many Member can receive a one and only one SMS.A one-to-many link exists between the user entity and the program when the system is used. The user's action is the log object, which has a one-to-many relationship, and SMS Logs were used to capture messages from SMS.
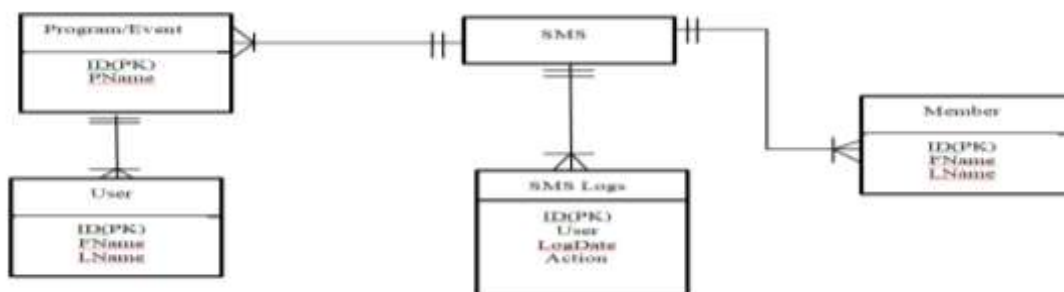

Figure 3.The Entity Relationship Diagram of the Developed System.

2.4 Testing and Evaluation

Following the completion of the developed system, the researcher asked the testers to evaluate it in terms of usability, functionality, and performance efficiency. The interface design, as well as the system's usability, functionality, and performance efficiency, were all subjected to a survey questionnaire. On the developed system prototype, a 5-point Likert scale was employed, with 1 representing poor and 5 representing excellent. The Mean statistics were used to determine whether the produced system met the evaluation criteria statistically. The Mean is calculated as follows:

$$\overline{X} = \frac{\Sigma X}{n}$$

Where $\overline{X}$ is the mean

ΣX is the summation of individual raw scores

n   is the number of populations

The obtained mean score was interpreted using the following verbal description:

Mean Score	Description
4.21 – 5.00	Very Good
3.41 – 4.20	Good

2.61 – 3.40	Average
1.81 – 2.60	Fair
1.00 – 1.80	Poor

III. PRESENTATION OF DATA ANND INTERPRATATION OF RESULTS
This chapter reported, analyzed, and interpreted findings that addressed the document's objectives.

3.1 Level of usability of the 4P's Management Information System with SMS Gateway in terms of learnability and operability.
The result showed that the usability of 4P's Management Information System with SMS Gatewaycomposed with the following mean: in terms of learnability (M=4.78) was interpreted as "Very Good", operability (M=4.65) which was verbally interpreted as "Very Good".

Table 1:The level of Usability of the Developed System in term of Learnability, and Operability

Implementation Indicators	Mean	Verbal Interpretation
Learnability	4.78	Very Good
Operability	4.65	Very Good

Legend: 1.00-1.80 (Poor); 1.81-2.60 (Fair); 2.61-3.40 (Average); 3.41-4.20 (Good); 4.21-5.00 (Very Good).

3.2 Level of functionality of the developed system as perceive by the Office of the DSWD in terms of its security, accurateness and suitability
The result shown below indicates that the functionality of 4P's Management Information System with SMS Gatewaycomposed with the following mean: in terms of security (M=4.60) was verbally interpreted as "Very Good", accurateness (M=4.71) was interpreted as "Very good" and it's suitability (M=4.80) was interpreted as "Very Good".

Table 2: Level of functionality of the developed system as perceive by the Office of the DSWD in terms of its security, accurateness and suitability

	Implementation Indicators	Mean	Verbal Interpretation
a.	Security	4.60	Very Good
b.	Accurateness	4.71	Very Good
c.	Suitability	4.80	Very Good

Legend: 1.00-1.80 (Poor); 1.81-2.60 (Fair); 2.61-3.40 (Average); 3.41-4.20 (Good); 4.21-5.00 (Very Good);

3.3 The Level of Performance Efficiency of the Developed System in terms of time Behavior and Resource Utilization
A Resource Utilization that assesses performance and effort over a period of time is resource usage (or capacity). Project managers can predict resource availability across many categories with optimal resource usage. This knowledge enables teams to plan their labor schedules intelligently and make real-time corrections to ensure new project success[16].The result showed that in terms of time behavior (M=4.68) the system was interpreted as "Very Good" and for resource utilization (M=4.80) was interpreted as "Very Good".

Table 4 :The Level of Performance Efficiency of the Developed System in terms of time Behavior and Resource Utilization

	Implementation Indicators	Mean	Verbal Interpretation
a.	Time Behavior	4.68	Very Good
b.	Resource Utilization	4.80	Very Good

Legend: 1.00-1.80 (Poor); 1.81-2.60 (Fair); 2.61-3.40 (Average); 3.41-4.20 (Good); 4.21-5.00 (Very Good);

IV.   CONCLUSION
After considering the findings of the study, the following conclusions were reached:
In terms of learnability and operability, respondents assessed the 4P's Management Information System with SMS Gateway as "Very Good." This indicates that the 4P's Management Information System with SMS Gateway, which was built, had a good level of usability, with users finding the system's operations to be user-

friendly and the information provided on the system to be generic enough for easy comprehension. Because the system was built to be user-friendly, it was straightforward for new users to navigate.

It possessed a high level of security, accuracy, and suitability, with only authorized users being able to access the system and log records for system activities being kept. Furthermore, the system preserves meticulous records of data management.

The 4P's Management Information System with SMS Gateway was found to have a high level of performance efficiency in terms of time behavior and resource utilization, with the system being able to complete tasks in reasonable time intervals and get all necessary data. As a result, the system remains stable even when a large number of message requests are received.

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