Effectiveness of Information Systems in the Enrolment of State Universities and Colleges in Region III: A Basis for Enhancement

Dr. Menchie A. Dela Cruz, Associate Professor, College of Communication and Information Technology, Ramon Magsaysay Technological University, Iba Zambales

ABSTRACT

Information System is our gateway to quality information in today's fast phased communication era. Such information covers quality output for vast majority of business, society and different institutions that includes state universities and colleges as well.

This study aims to determine the effectiveness of the information systems being used in the enrolment of State Universities and Colleges (SUC) in Region III, assess what features are to be integrated in the information systems and their level of readiness for online enrolment. This study made use of the causal comparative descriptive research to determine the cause of differences that already exist between or among group of individuals. The study involved two groups of respondents; the personnel and student respondents which determined through the use of purposive sampling technique. The DeLone and McLean Success Models were used as bases for the selection of appropriate Information System measures; information quality, system quality, service quality, intention to use, user satisfaction and net benefits. The study revealed that Information Systems in the enrolment of SUC's in Region III is "Effective" in terms of Information Quality, Systems Quality, Service Quality, Intention to Use, User Satisfaction and Net Benefits; the Level of Readiness for Online Enrolment is described as "Moderately Ready" in terms of Infrastructure, Equipment and Devices, Human Resources, Software Requirements and Budget Requirements; Online Registration/Reservation of subjects to be enrolled ranked as the top preference and priority of the respondents.

Keywords

Effectiveness, information systems, enhancement, service quality, user satisfaction, net benefits

INTRODUCTION

An information system is an integrated set of components for collecting, storing, and processing data and for delivering information, knowledge, and digital products. Business firms and other organizations rely on information systems to carry out and manage their operations, interact with their customers and suppliers, and compete in the marketplace. For instance, corporations use information systems to reach their potential customers with targeted messages over the Web, to process financial accounts, and to manage their human resources. Governments deploy information systems to provide services cost-effectively to citizens. Digital goods, such as electronic books and software, and online services, such as auctions and social networking, are delivered with information systems. Individuals rely on information systems, generally Internet-based, for conducting much of their personal lives: for socializing, study, shopping, banking, and entertainment. (https://www.britannica.com/contributor/Vladimir-Zwass/4614).

The need for an efficient information systems paved way to the development of various information systems. Such systems aim to address problems on data handling and processing for quick access to data and information as well as fast and efficient transactions.

State Universities and Colleges are continuously working on the implementation of information systems particularly the enrolment system. This effort among educational institutions to automate enrolment system integrates various processes into an information system which consolidates data into a database server, thus, access to data and information becomes more efficient. The implementation of such systems also lessens time requirement for a certain transaction to finish and therefore increases personnel efficiency and productivity.

THEORETICAL FRAMEWORK

According to the DeLone and McLean (1992) Success Model, there are six interdependent variables which are theoretically connected, (1) the Systems Quality, (2) Information Quality, (3) System Use, (4) User Satisfaction, (5) Individual Impact and (6) Organizational Impact. Systems Quality measures the quality of the information processing within the system. The IS output is measured by Information Quality. Use is seen as the demand or consumption of Information System (IS) output. User satisfaction describes the reaction of the recipient to the use of the IS output. The impact of information on user/receiver behavior is measured by Individual Impact. Finally, Organizational Impact describes the influence of Information on overall organizational success.

Figure 1 below is the DeLone and McLean (1992) Success Model where six (6) interdependent variables are theoretically connected.

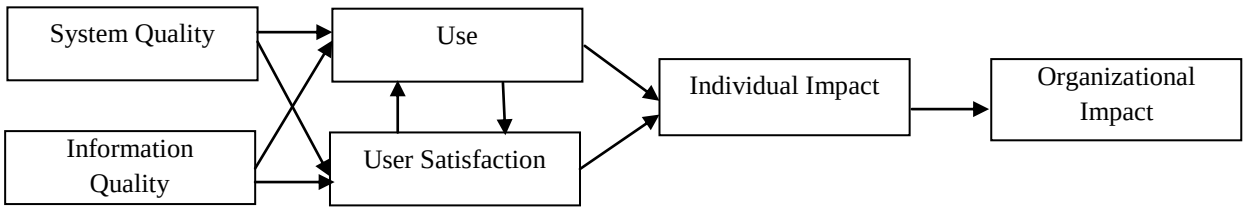

Figure 1: D&M Success Model

In their 10-year-update, DeLone and McLean discussed which hypotheses had been found to be significant. In descending order, these are: System Use – Individual Impacts; System Quality – Individual Impacts; Information Quality – Individual Impact. With one exception (System Use – Organizational Revenues), the order interdependencies have been confirmed as well. DeLone and McLean reject Seddon's criticism about Use being no success factor. Instead, the difficulty is to be seen in the complexity of the Use variable and therefore a missing simple definition (DeLone and McLean 1992, [16]). Especially e-commerce, where system use by customers is essential, clarifies the importance of Use.

Besides Organizational Impact and Individual Impact, further entities could be affected by IS activities. Therefore researchers suggested considering Group Impacts, Inter-organizational and Industry Impacts, Consumer Impacts, and Society Impacts. Instead of a model extension, DeLone and McLean decided to consolidate all impacts as Net Benefits. As a quid pro quo, this generalization requires a defined frame of reference sponsor, user and stock holder. Despite the cancellation of Individual Impact and Organizational Impact, the analysis perspective must still be mentioned (e.g. Individual Perspective and Organizational Perspective).

Pill et al (2003) criticized that IS success is focused on products but not on services. Therefore, the system characteristics were extended by Service Quality.

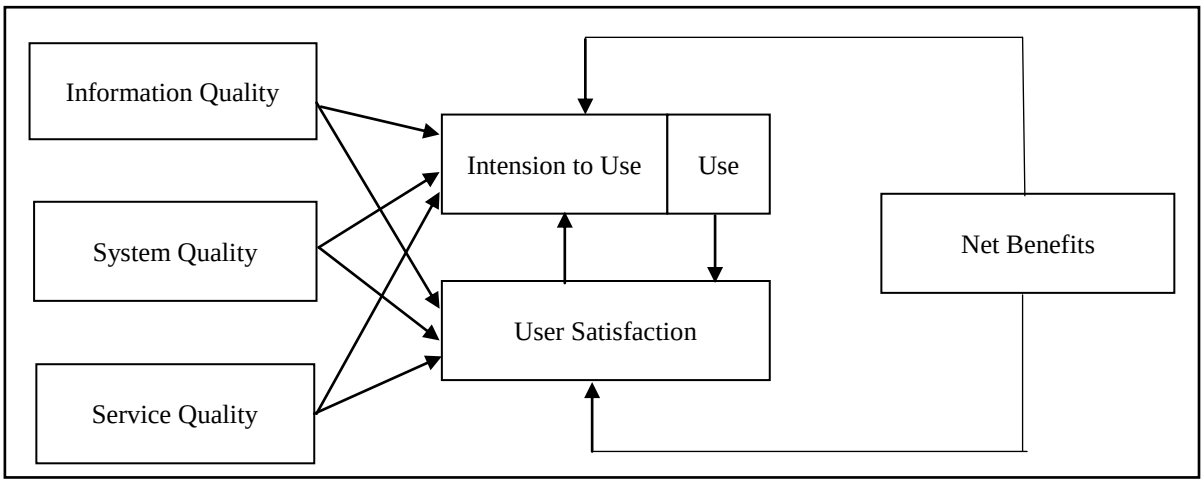

Figure 2: Updated D&M Success Model

CONCEPTUAL MODEL

The main thrust of the study is to determine the effectiveness of information systems in the enrolment of State Universities and Colleges in Region III.

Figure 3.0 (Dependent and Independent Variables) Best illustrates the variables used in the study.

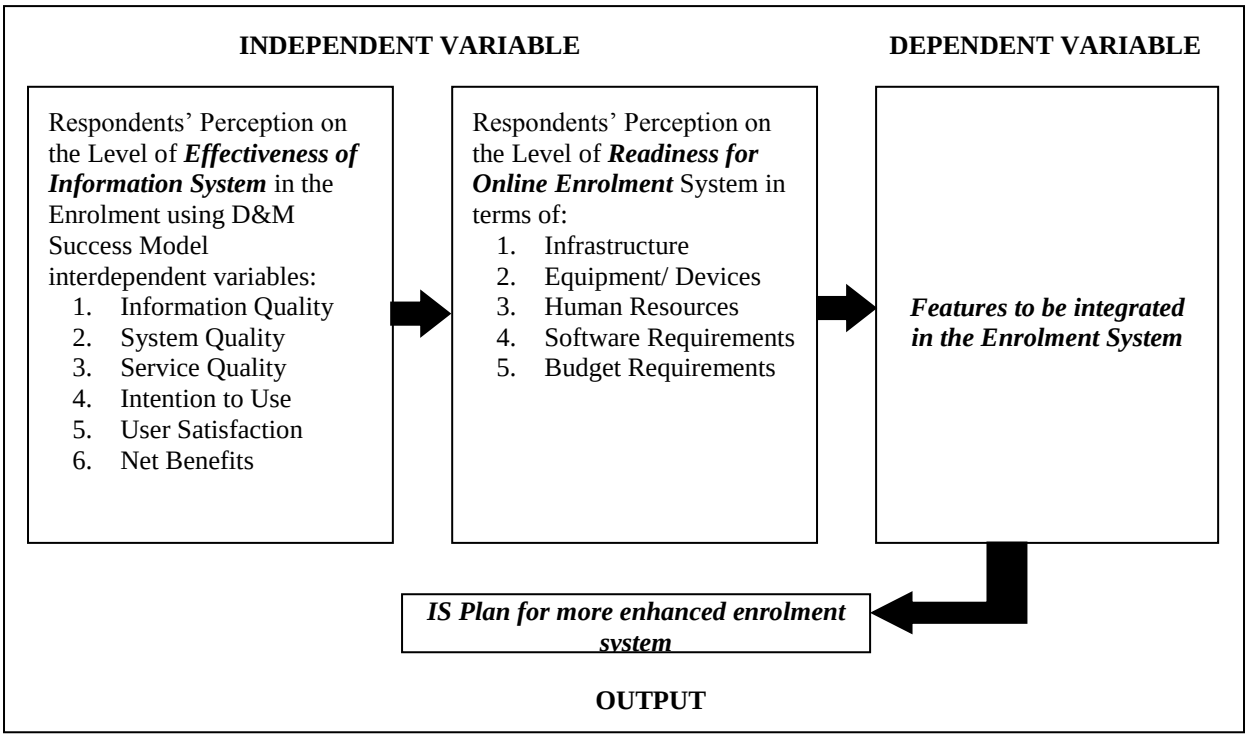

Figure 3: Conceptual Model

The independent variables used in the study include the respondents' perception on the effectiveness of information system in the enrolment in terms of information quality, system quality, service quality, intention to use, user satisfaction and net benefits; the respondents' perception on the level of readiness for online enrolment system in terms of infrastructure, equipment/devices, human resources, system requirements and financial requirements and the difference on the respondents' perception on the level of effectiveness of information systems and the level of readiness for online enrolment.

The dependent variable includes the features to be integrated in the enrolment system and the output is the IS Plan for more enhanced enrolment system of SUC's in Region III.

STATEMENT OF THE PROBLEM

This research study aimed to determine the effectiveness of information/computerized system being used in the enrolment of State Universities and Colleges in Region III and assess what features are to be integrated in the information system that SUC's are using to improve the level of effectiveness.

Specifically, the study sought to answer the following questions:

1. What are the perceptions of the personnel and student respondents on the effectiveness of Information System in their enrolment in terms of:

   1.1. information quality,

   1.2. system quality,

   1.3. service quality,

   1.4. intention to use,

1.5. user satisfaction, and

1.6. net benefits?

2. What is the difference between the perceptions of personnel and student respondents' on the effectiveness of information system in the enrolment using the criteria in Problem 1?

3. What are the perceptions of the personnel and student respondents' on the level of readiness of their institution for Online Enrolment in terms of:

   3.1 . infrastructure,

   3.2 . equipment/devices;

   3.3 . human resources;

   3.4 . software requirements, and

   3.5 . budget requirements?

4. What is the difference between the perceptions of personnel and student respondents on the level of readiness for online enrolment of SUC's using the criteria in Problem 3?

5. What IS Plan may be developed for enhancement of enrolment system for SUC's in Region 3?

HYPOTHESES

To make the data more lucid, the following hypotheses were tested:

1. There is no difference between the perceptions of personnel and student respondents' on the effectiveness of information system in the enrolment using criteria in problem 1?

2. There is no difference between the perceptions of personnel and student respondents on the level of readiness for online enrolment of SUC's using the criteria in problem 3?

RESEARCH METHODOLOGY

This study made use of causal comparative descriptive research. This is used to determine the cause or consequences of differences that already exist between or among group of individuals. The researcher selected two groups of participants, the experimental and control groups, but more accurately referred to as comparison groups. One group possesses a characteristic that the other does not. Each group has the characteristic, but to differing degrees or amounts. The independent variable differentiating the groups must be clearly and operationally defined, since each group represents a different population. In causal-comparative research the random sample is selected from two already existing populations, not from a single population as in experimental research. As in experimental studies, the goal is to have groups that are as similar as possible on all relevant variables except the independent variable.

SAMPLING SCHEME

There exist a considerable number of respondents that were used. This study made use of five hundred fifty (550) student-respondents and eighty-five (85) personnel-respondents with a total of six hundred thirty five respondents from State Universities and Colleges in Region III using Information Systems in the enrolment.

These respondents were chosen using a purposive sampling technique, as based on the identified group of the respondents, the researcher as well as on the availability of personal resources that were used in this study. Based on the total numbers of students and personnel a representative sample ratio was used to obtain data which are necessary to evaluate the effectiveness of information/computerized system in the enrolment of State Universities and Colleges in Region III.

Table 1: Frequency and Percentage Distribution of Respondents

Respondent	Population Frame	Sample Frame	Percentage
Student	80,000	550	.69 %
Personnel	150	85	.57 %
TOTAL	**80,150**	**635**	**.79 %**

DESCRIPTION OF THE RESPONDENTS

There were ten SUC's in Region III with Information Systems in their enrolment and an estimated population frame of eighty thousand for student respondents and one hundred fifty for personnel respondents. Personnel-respondents pertain to the group of respondents who are either a faculty member or non-teaching staff or administrator of the institution who are using the information/computerized system of enrolment. On the other hand, student-respondents pertain to the bonafide students of the institution who are directly affected by the implementation of enrolment system.

RESEARCH INSTRUMENT

This study was conducted in various State Universities and Colleges in Region III. The researcher has made use of a structured questionnaire that served as one of the important survey instrument and means of gathering first-hand information to the respondents of this study – the students and system personnel who are directly involved and affected in the operation of information systems.

DATA GATHERING PROCEDURES

The researcher identified the locale of respondents. Permission to conduct research was sought from the University Presidents of SUC's in Region III and from the concerned authorities and individuals of institutions under study. Upon the approval of these individuals to conduct the research administrator of the questionnaire was performed. Retrieval of these was done as soon as the respondents completed the survey questionnaire. The results obtained from the questionnaires were tallied scored, analyzed and interpreted.

RESULTS AND DISCUSSIONS

1. Respondents' Perceptions on the Effectiveness of the Information System in Enrolment.

1.1 Information Quality

Table 2 below represents the Level of Effectiveness of Information System in the Enrolment of SUC's in Region III in terms of Information Quality.

Table 2: Respondents' Perception of the Level of Effectiveness of Information System in the Enrolment of SUC's in Region III in terms of Information Quality

Indicators	Personnel		Student	
	Mean	Descriptive Rating	Mean	Descriptive Rating
a. The system supports information to the user.	3.88	Effective	3.91	Effective
b. The system provides information to the user straightforward.	3.66	Effective	3.75	Effective
c. The system ensures that the information within is correct.	3.91	Effective	3.84	Effective
d. The system can handle growing/bulk amount of work and information.	3.76	Effective	3.64	Effective
e. The system gives quality desired output.	3.89	Effective	3.87	Effective
Average Weighted Mean	**3.82**	**Effective**	**3.80**	**Effective**

Table 2 shows that the personnel and student respondents rated the Level of Effectiveness of Information System in the Enrolment of SUC's in Region III in terms of Information Quality as "Effective". This result could be attributed to the fact that system ensures the information within is correct, it provides information directly through reports generation despite rapid data growth, the system also supports accurate information and gives quality output to the users directly involved in the enrolment, particularly the students.

According to Swartz (2007), almost all institutions depend on data. Consequently, witnessing a profound change in the way in which institutions perceive, understand, and manage their information. There in now a clear recognition of the value of information, the creation of new information, the retrieval of existing information, the storage of important information, and the disposal of redundant information. There is also greater awareness of the cost of acquiring bad, incomplete, or inaccurate information.

1.2. System Quality

Table 3 below represents the Level of Effectiveness of Information System in the Enrolment of SUC's in Region III in terms of System Quality.

Table 3: Respondents' Perception of the Level of Effectiveness of Information System in the Enrolment of SUC's in Region III in terms of System Quality

Indicators	Personnel		Students	
	Mean	Descriptive Rating	Mean	Descriptive Rating
a. The system is capable of com`pleting tasks in a fast and in real-time.	3.86	Effective	3.88	Effective
b. The system required	3.65	Effective	3.73	Effective

minimal steps to get information needed.				
c. The system is protected by passwords and firewalls.	3.92	Effective	3.82	Effective
d. The system is secured from unauthorized personnel.	3.73	Effective	3.62	Effective
e. The system is user friendly.	3.86	Effective	3.84	Effective
Average Weighted Mean	**3.80**	**Effective**	**3.78**	**Effective**

Table 3 shows that the personnel and student respondents rated the Level of Effectiveness of Information System in the Enrolment of SUC's in Region III in terms of System Quality as being "Effective". This means that the system is capable of completing tasks in a fast and in real-time manner, user friendly and secured from unauthorized users. The system also requires minimal steps or procedures to accomplish enrolment transactions. It provides to view their academic records as well as the ability to check their account balances and payments; it provides instructors and departmental administrators with class list information; and provides advisors and departments with access to the individual academic records of their students. Therefore, this information system is capable of acquiring, storing, analyzing and controlling the flow of student data throughout the institution.

1.3. Service Quality

Table 4 below represents the Level of Effectiveness of Information System in the Enrolment of SUC's in Region III in terms of Service Quality.

Table 4: Respondents' Perception of the Level of Effectiveness of Information System in the Enrolment of SUC's in Region III in terms of Service Quality

Indicators	Personnel		Student	
	Mean	Descriptive Rating	Mean	Descriptive Rating
a. The system helps the personnel and students in accomplishing tasks easier and faster.	3.87	Effective	3.85	Effective
b. The system improves job performance of personnel.	3.59	Effective	3.71	Effective
c. The system increases productivity of personnel.	3.88	Effective	3.80	Effective
d. The personnel are technically competent.	3.67	Effective	3.60	Effective
e. The system is serviceable to students in a fast period of time.	3.88	Effective	3.81	Effective
Weighted Arithmetic Mean	**3.78**	**Effective**	**3.75**	**Effective**

Table 4 shows that the personnel and student respondents rated the Level of Effectiveness of Information System in the Enrolment of SUC's in Region III in terms of Service Quality as being "Effective". This result could be attributed to the fact that the system improves job performance and increases productivity of the personnel because of the fast turn-around of service to the students. Transactions like registration, advising, assessment, payments and request for credentials increased compared to the old transactions because it requires minimal steps or procedures to accomplish the enrolment.

Richard (2004) stressed that information about students is vital, but time-consuming to manage and it is essential that the most effective tools be used to aid both staff and students go about their work and studies. The Cambridge Student Information System (CAMSIS) replaced various student records system used by the colleges, department and universities. It provides comprehensive and accurate information about student body and also improves data quality, reduce the administrative burden dramatically and provides better services to both academic staff and students.

1.4. Intention to Use

Table 5 below represents the Level of Effectiveness of Information System in the Enrolment of SUC's in Region III in terms of Intention to Use.

Table 5: Respondents' Perception of the Level of Effectiveness of Information System in the Enrolment of SUC's in Region III in terms of Intention to Use

Indicators	Personnel		Student	
	Mean	Descriptive Rating	Mean	Descriptive Rating
a. The system can be used in generating reports.	3.93	Effective	3.90	Effective
b. The system can be used in sharing of data and information through Local Area Networks.	3.65	Effective	3.73	Effective
c. The system can be used in accessing & retrieving data and information.	3.95	Effective	3.82	Effective
d. The system can be used in the over-all operations of enrolment.	3.75	Effective	3.62	Effective
e. The system can be used in updating information.	3.99	Effective	3.85	Effective
Weighted Arithmetic Mean	**3.85**	**Effective**	**3.79**	**Effective**

Table 5 shows that the respondents averagely rated the Level of Effectiveness of Information System in the Enrolment of SUC's in Region III in terms of Intention to Use as "Effective". This result could be attributed to the fact that the system can be used in the over-all operations of enrolment such as accessing, retrieving, updating, generating reports and sharing of data and information within the enrolment environment. According to Adrian (2011), enrolment is very useful in retrieving vital information of the students. Without it can lead difficulty both for the administration of school and student in enrolment processes.

1.5. User Satisfaction

Table 6 below represents the Level of Effectiveness of Information System in the Enrolment of SUC's in Region III in terms of User Satisfaction.

Table 6: Respondents' Perception of the Level of Effectiveness of Information System in the Enrolment of SUC's in Region III in terms of User Satisfaction

Indicators	Personnel		Student	
	Mean	Descriptive Rating	Mean	Descriptive Rating
a. The user is satisfied with the over-all information quality of the system.	3.88	Effective	3.86	Effective
b. The user is satisfied with the over-all system quality.	3.66	Effective	3.71	Effective
c. The user is satisfied with the over-all service quality of the system.	3.85	Effective	3.80	Effective
d. The user is satisfied with the over-all usability of the system.	3.71	Effective	3.59	Effective
e. The user is satisfied with the over-all benefits of the system.	3.94	Effective	3.82	Effective
Average Weighted Mean	**3.81**	**Effective**	**3.76**	**Effective**

Table 6 shows that the respondents averagely rated the Level of Effectiveness of Information System in the Enrolment of SUC's in Region III in terms of User Satisfaction as Effective. "This result could be attributed to the fact that the user is satisfied with the over-all benefits of the system. The system help both the enrolment personnel-in-charge and the students easily process the enrolment in a lesser time. It provides efficient and accurate information services to the users involved in the enrolment. According to Dunn and Scott (2005), enrolment system has made huge impact into the school arena. It is a system that is built on innovative program strategies. Distinct from traditional enrolment, LAN enrolment system process large assortment of student records and provides efficient and consistent information services.

1.6. Net Benefits

Table 7 below represents the Level of Effectiveness of Information System in the Enrolment of SUC's in Region III in terms of Net Benefits.

Table 7: Respondents' Perception of the Level of Effectiveness of Information System in the Enrolment of SUC's in Region III in terms of Net Benefits

Indicators	Personnel		Student	
	Mean	Descriptive Rating	Mean	Descriptive Rating
The system provides relevant information to the community.	3.76	Effective	3.72	Effective
The system provides better services to the stakeholders.	3.52	Effective	3.56	Effective
The system provides better services to students.	3.82	Effective	3.69	Effective
The system provides sharing of data to the inter-organizations within the campus.	3.65	Effective	3.58	Effective
The system provides a more efficient and effective means of accomplishing tasks to the personnel.	3.76	Effective	3.70	Effective
Average Weighted Mean	**3.70**	**Effective**	**3.65**	**Effective**

Table 7 shows that the respondents averagely rated the Level of Effectiveness of Information System in the Enrolment of SUC's in Region III in terms of Net Benefits as "Effective". "This means that the system provides relevant information to the community and provides more efficient and effective means of accomplishing tasks to the personnel". The system also provides sharing of data to the inter-organizations within the campus and to the stakeholders outside the campus like scholarship sponsors and other local government organizations.

Chart 1 below represents the Summary of Respondents' Perception on the Level of Effectiveness of Information System in the Enrolment of SUC's in Region III.

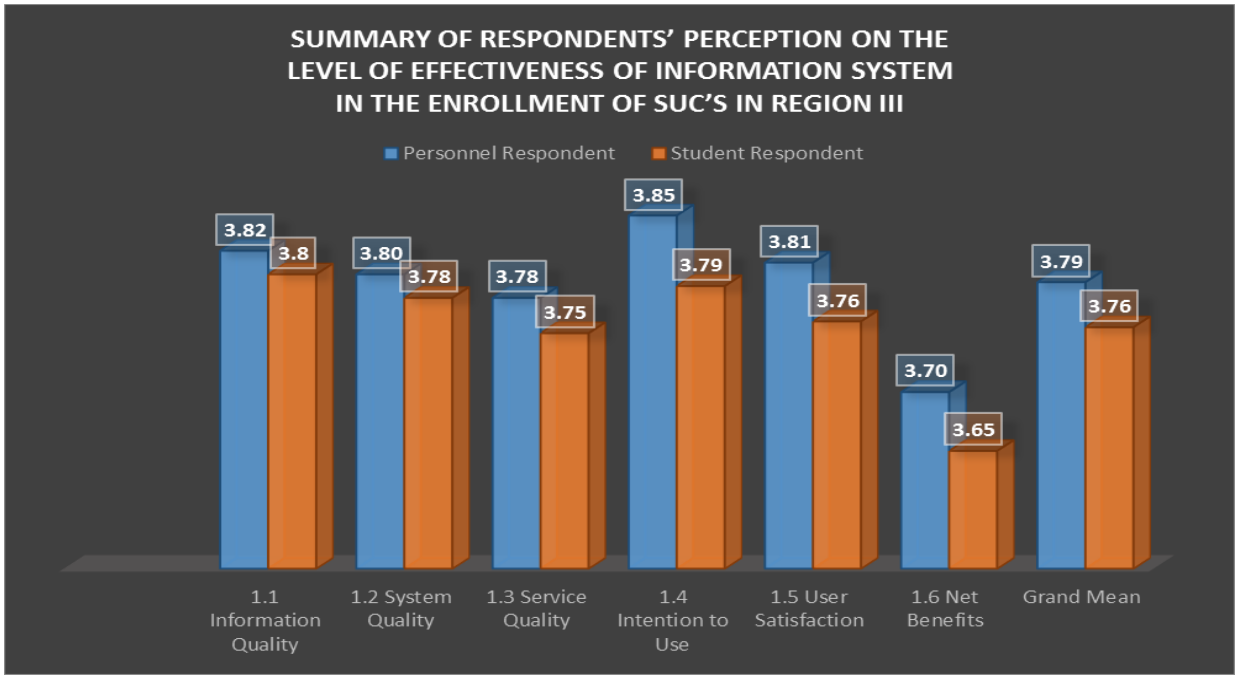

Chart 1

Chart 1 shows that personnel and student-respondents rated the Level of Effectiveness of Information System in the Enrolment of SUC's in Region III as "Effective". This could be attributed to the fact that the D&M Success Model measurements; information quality, system quality, service quality, intention to use, user satisfaction and net benefits obtained in the enrolment of SUC's in Region III.

Without the development of an effective performance indicator system enrolment management, as a truly innovative concept, will diminish in stature and will be viewed by many as just another administrative black hole-another office spending money without a clear definition or purpose. Castello, (1989).

The table 8 below represents the Difference of the Respondents' Perception on the Effectiveness of Information System in the Enrolment of SUC's in Region III.

2. Difference between the Perceptions of the Personnel and Student Respondents on the Effectiveness of the Information System.

Table 8: t-Computed Value of the Effectiveness of Information System

Indicators	df	t Stat	P (T<=t) one-tail	t Critical one-tail	Hypothesis
Information Quality	633.00	-0.39	0.35	1.65	No Difference, Fail to Reject Ho
System Quality	633.00	-0.50	0.31	1.65	No Difference, Fail to Reject Ho
Service Quality	633.00	-.0.52	0.30	1.65	No Difference, Fail to Reject Ho
Intention to Use	633.00	-1.48	0.07	1.65	No Difference, Fail to Reject Ho
User Satisfaction	633.00	-1.06	0.15	1.65	No Difference, Fail to Reject Ho
Net Benefits	633.00	-1.04	0.15	1.65	No Difference, Fail to Reject Ho

Table 8 shows that there is no significant difference on the respondents' perception on the effectiveness of Information System in the enrolment of SUC's in Region III using the criteria information quality, system quality, service quality, intention to use, user satisfaction and net benefits.

Effective enrolment management as described by Claffey and Hossler (1986) are holistic in vision, proactive instance, informed in decision making, flexible and tolerant in climate, and led by the highest levels of administration.

Planning and evaluation are at the heart of an enrolment management system, but the single most critical element in all of this effort is accurate, timely, usable information. Thus, our ability to influence our enrolments to any degree is a direct function of the information available.

3. Perceptions of the Respondents on the Level of Readiness of their institutions for Online Enrolment.

1.1. Infrastructure

Table 9 below represents the Respondents' Perception of the Level of Readiness for Online Enrolment in terms of Infrastructure.

Table 9: Respondents' Perception of the Level of Readiness for Online Enrolment of SUC's in Region III in terms of Infrastructure

Indicators	Personnel		Student	
	Mean	**Descriptive Rating**	**Mean**	**Descriptive Rating**
a. Availability of Data Center and ICT Office.	3.18	Moderately Ready	2.83	Moderately Ready
b. Availability of Internet Provider Center.	3.12	Moderately Ready	2.82	Moderately Ready
Average Weighted Mean	**3.15**	**Moderately Ready**	**2.82**	**Moderately Ready**

Table 9 shows that the respondents rated the Level of Readiness for Online Enrolment of SUC's in Region III in terms of Infrastructure as "Moderately Ready". This means that some SUC's in Region III has no available data center, ICT office and Internet Provider Center. Local Area Networks were only available in accessing the

records of students and during enrolment period. There are SUC's that internet access were limited because of low bandwidth and low signals.

Holmes (2006), stated that internet is neither an extraordinary communication tool nor revolutionary. It simply represents the current stage in the development of human capabilities through written language, which itself derived from the spoken form. That statement only shows that advancement in modern technology is at their highest peak. Nowadays, Web-based applications are widely used due to their ubiquity.

1.2. Equipment/Devices

Table 10 below represents the Respondents' Perception of the Level of Readiness for Online Enrolment in terms of Equipment and Devices (Hardware).

Table 10: Respondents' Perception of the Level of Readiness for Online Enrolment of SUC's in Region III in terms of Equipment and Devices (Hardware)

Indicators	Personnel		Student	
	Mean	Descriptive Rating	Mean	Descriptive Rating
a. Availability of Computer Units.	3.36	Moderately Ready	3.05	Moderately Ready
b. Availability of Data Server and other devices for internetworking	3.21	Moderately Ready	3.00	Moderately Ready
Average Weighted Mean	**3.29**	**Moderately Ready**	**3.02**	**Moderately Ready**

Table 10 shows that the respondents rated the Level of Readiness for Online Enrolment of SUC's in Region III in terms of Equipment and Devices (Hardware) as Moderately Ready. This could be attributed to the fact that some SUC's in Region III does not have enough computer units to be used for enrolment and no available data server and other devices for internetworking. Because of the limited budget of SUC's for the procurement of hardware - computer units and other devices, the enrolment system suffered from these unavailability and lack of equipment.

1.3. Human Resources

Table. 11 below represents the Respondents' Perception of the Level of Readiness for Online Enrolment in terms of Human Resources (Peopleware)

Table 11: Respondents' Perception of the Level of Readiness for Online Enrolment of SUC's in Region III in terms of Human Resources (Peopleware)

Indicators	Personnel		Student	
	Mean	Descriptive Rating	Mean	Descriptive Rating
a. Availability of Network Administrator.	3.21	Moderately Ready	2.96	Moderately Ready
b. Availability of Database Administrator.	3.09	Moderately Ready	2.99	Moderately Ready
c. Availability of Systems Designer.	3.24	Moderately Ready	2.97	Moderately Ready
d. Availability of MIS Head/ Systems Analyst.	3.07	Moderately Ready	2.98	Moderately Ready
e. Availability of Programmer.	3.16	Moderately Ready	2.98	Moderately Ready
f. Availability of Technical Staff.	3.21	Moderately Ready	3.00	Moderately Ready
g. Readiness of System Users (directly involved in using the system – registrar, cashier, students. etc.)	3.27	Moderately Ready	3.00	Moderately Ready
Average Weighted Mean	**3.18**	**Moderately Ready**	**2.98**	**Moderately Ready**

Table 11 shows that the respondents rated the Level of Readiness for Online Enrolment of SUC's in Region III in terms of Human Resources (Peopleware) as Moderately Ready. This means that the unavailability of plantilla positions for network administrator, database administrator, system designer, MIS head/Systems analyst, programmer and technical staff were present in SUC's in Region III, so the Commission on Higher Education recommended to study and review the staffing pattern for SUC's and give priority to MIS Staff/Personnel for better service and security of tenure of highly qualified IT experts and professionals.

According to the study of the group of Abrogar (2009), one major factor in growth in information and communication technology (ICT) is what industry insiders call "peopleware" – or the human component of the industry. Peopleware has become a classic on building effective development teams. More than hardware and software, peopleware completes the equation, which spells the success of ICT and ICT enabled enterprises in the country.

1.4. Software Requirements

Table 12 below represents the Respondents' Perception of the Level of Readiness for Online Enrolment in terms of Software Requirements.

Table 12: Respondents' Perception of the Level of Readiness for Online Enrolment of SUC's in Region III in terms of Software Requirements

Indicators	Personnel		Student	
	Mean	Descriptive Rating	Mean	Descriptive Rating
Availability of Licensed Operating System.	2.69	Moderately Ready	2.55	Slightly Ready
Availability of Licensed Database.	2.68	Moderately Ready	2.53	Slightly Ready
Availability of Licensed Firewall/Anti-Viruses.	2.66	Moderately Ready	2.77	Slightly Ready
Average Weighted Mean	**2.68**	**Moderately Ready**	**2.61**	**Slightly Ready**

Table 12 shows that the respondents rated the Level of Readiness for Online Enrolment of SUC's in Region III in terms of Availability of Licensed Operating System as "Moderately Ready", in terms of Availability of Licensed Database as "Moderately Ready" and Availability of Licensed Firewall/Anti-Viruses as "Moderately Ready". This could be attributed to the fact that most SUC's in Region III were not updated on their licensed softwares used – operating system, database, application and firewall/antivirus softwares. Licensed software are required to State Universities and Colleges for better system supports by the manufacturers or developers.

1.5. Budget Requirements

Table 13 below represents the Respondents' Perception of the Level of Readiness for Online Enrolment in terms of Budget Requirements.

Table 13: Respondents' Perception of the Level of Readiness for Online Enrolment of SUC's in Region III in terms of Budget Requirements

Indicators	Personnel		Student	
	Mean	Descriptive Rating	Mean	Descriptive Rating
a. Availability of funds for paying monthly internet services and other miscellaneous expenses.	3.44	Moderately Ready	2.92	Moderately Ready
b. Availability of funds for paying monthly human resources (IT Staffs).	3.38	Moderately Ready	2.90	Moderately Ready
Weighted Arithmetic Mean	**3.41**	**Moderately Ready**	**2.91**	**Moderately Ready**

Table 13 shows that the respondents rated the Level of Readiness for Online Enrolment of SUC's in Region III in terms of Budget Requirements as "Moderately Ready". This could be attributed to the fact that SUC's in Region III has limited budget for other miscellaneous expenses and paying additional human resources (IT staff). Some SUC's designated IT faculty as MIS Staff to maintain, supervise the existing information system in their university given an equivalent teaching load for their service.

Chart 2 below represents the Summary of Respondents' Perception on the Level of Readiness for Online Enrolment of SUC's in Region III.

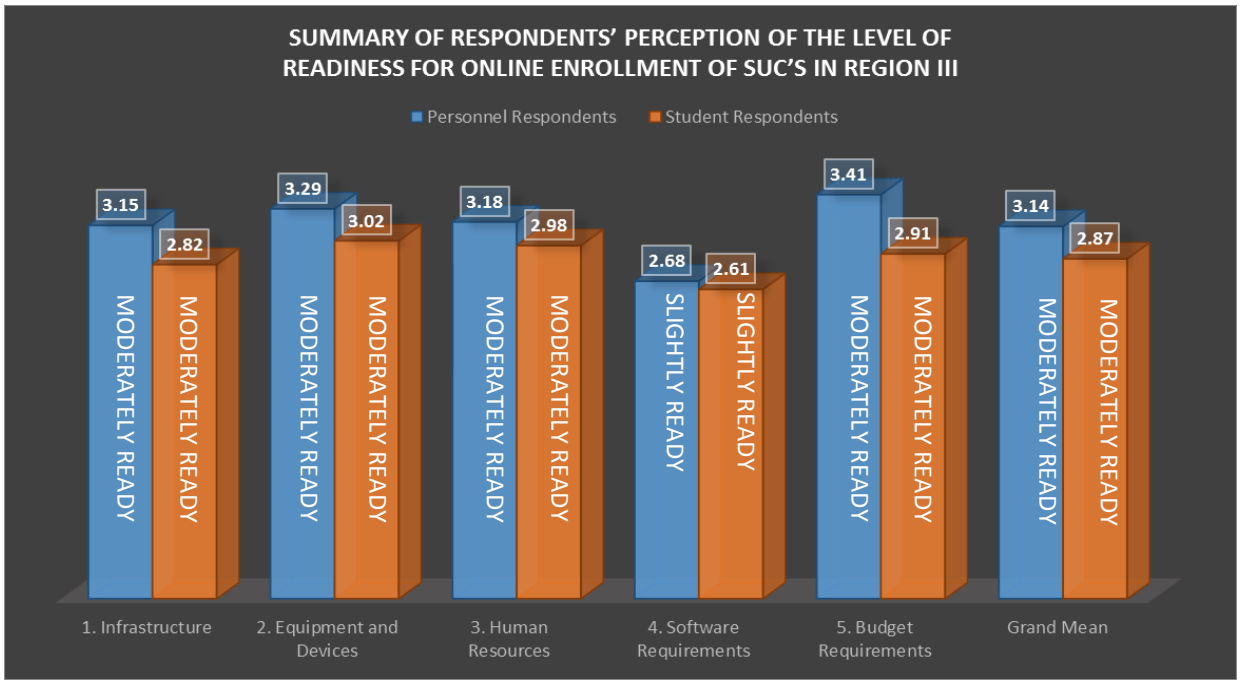

Chart 2

Chart 2 shows that the respondents rated the Level of Readiness for Enrolment Online Enrolment as "Moderately Ready". This could be attributed to the fact that SUC's has limited budget for Infrastructure, Equipment and Devices, Human Resources, Budget Requirements and Software Requirements which obtained the lowest rating.

Difference of the Respondents' Perception on the Level of Readiness for Online Enrolment of SUC's

Table 14 below represents the Difference of the Respondents' Perception on the Level of Readiness for Online Enrolment of SUC's in Region III.

Table 14: t-Computed Value on the Level of Readiness for Online Enrolment

Indicators	df	t Stat	P (T<=t) one-tail	t Critical one-tail	Hypothesis
Infra-structure	633.00	-3.60	0.00	1.65	No Difference, Fail to Reject, Ho
Equipment and Devices (Hardware)	633.00	-2.94	0.00	1.65	No Difference, Fail to Reject, Ho
Human Resources	633.00	-2.29	0.01	1.65	No Difference, Fail to Reject, Ho
Software Require-ments	633.00	-0.56	0.29	1.65	No Difference, Fail to Reject, Ho
Budget Require-ments	633.00	-5.00	0.00	1.65	No Difference, Fail to Reject, Ho

Table 14 shows that there is no significant difference on the respondents' perception on the level of readiness for Online Enrolment for SUC's in Region III using indicators infrastructure, equipment and devices, human resources, software requirements and budget requirement.

Respondents' Perception on the Features to be Integrated in the Information Systems.

Table 15 below represents the Respondents' Perception on the Features to be integrated in Information System for Enrolment of SUC's in Region III.

Table 15: Respondents' Perception on the Features to be Integrated in Information System for Enrolment of SUC's in Region III

Features to be integrated in IS	Personnel		Student		Final Rank
	Mean	Rank	Mean	Rank	
a. Online Registration/Reservation of subjects to be enrolled.	**1.72**	**1**	**1.57**	**1**	**1**
b. Online Payment of dues through banks.	**3.27**	**3**	**3.75**	**4**	**5**
c. Payment through Debit/Credit cards.	**3.14**	**2**	**3.75**	**4**	**4**
d. Online processing of requests for credentials.	**3.34**	**4**	**2.82**	**2**	**2**
e. 24/7 access to student information through online kiosk.	**3.49**	**5**	**3.21**	**3**	**3**
f. Others: Online Verification	**3.55**	**6**	**3.80**	**5**	**6**

Table 15 shows that the first preference and priority of personnel-respondents is the Online Registration/ Reservation of subjects to be enrolled, second priority is the payment though debit/credit cards; third is the online payment of dues through banks; fourth priority is the online processing of requests for credentials; and the last priority is the 24/7 access to student information through online kiosk. This shows that personnel-respondents preferred online registration and reservation of subjects to be enrolled by the students rather than the usual way of enrolment in the university. Preference also of the personnel is the use of credit cards and banks for payment of fees not only to lessen the bulk of work of the cashier but also for the convenience of students and parents, while the first preference and priority of student-respondents is the Online Registration/Reservation of subjects to be enrolled, second priority is the online processing of requests for credentials, third is the 24/7 access to student information through online kiosk, payment through debit/credit cards and online payment of dues through banks both ranked fourth in preference and priority. This means that student-respondents priorities were the online registration and reservation of subjects to be enrolled, online processing of requests for credentials and access of student information through online kiosk accessible in 24/7.

CONCLUSIONS

Based on the findings of the study stated above, the following conclusions were drawn.

1. Information Systems / Computerized Systems in the enrolments of State Universities and Colleges in Region III is **"Effective"** in terms of Information Quality, Systems Quality, Service Quality, Intention to Use, User Satisfaction and Net Benefits.

2. There is no significant difference on the level of effectiveness of information systems in the enrolment in terms of Information Quality, Systems Quality, Service Quality, Intention to Use, User Satisfaction and Net Benefits as perceived by the personnel and student respondents.

3. The Level of Readiness for Online Enrolment of SUC's in Region III is described as **"Moderately Ready"** in terms of Infrastructure, Equipment and Devices (Hardware), Human Resources (Peopleware), Software Requirements and Budget Requirements.

4. There is no significant difference on the level of readiness for online enrolment in terms of infrastructure, equipment/devices, human resources, software requirements and budget requirements as perceived by the personnel and student respondents.

5. The features that personnel and student respondents preferred to be integrated in the Information System is included in the developed IS Strategic plan for more enhanced enrolment system of SUC's in Region III.

RECOMMENDATIONS

Based on the above mentioned conclusions, the following are the recommendations.

1. The integration / provision of essential features is recommended to enhance systems performance and effectiveness. This includes the following in order of preference and priorities, namely; (1) Online Registration/Reservation of subjects to be enrolled"; (2) "Online processing of requests for credentials"; (3) "24/7 access to student information through online kiosk"; (4) "Payment through Debit/Credit cards" and (5) "Online Payment of dues through banks".

2. It is also recommended to upgrade infrastructure, equipment and hardware devices, human resources, budget requirements and particularly software

requirements which obtained the lowest level of readiness among SUCs in region III.

3. Online Registration/Reservation must be prioritized for the enhancement of enrolment system of SUC's in Region III.

4. The implementation of IS Plan is highly recommended for State Universities and Colleges in Region III for more enhanced enrolment system.

5. The development and enhancement of Online or Web based enrolment system not only in Region 3 but for all the SUC's in the Philippines be recommended for future study of other researchers.

Information System (IS) Strategic Plan
for Enhanced Enrollment System of
State Universities and Colleges in Region III
(Year 2016-2020)

Strategies and Initiatives

Goal 1 : To prepare infrastructure for data center/ICT building.

Strategic Direction : Construction / Renovation of Data Center and ICT Building.

Objectives : 1. To provide conducive, organized and well ventilated data center and ICT building.

2. To extend internet provider center nearby the institution.

Tasks	Individual Group Responsible	Time Frame		Key Results Area (Milestones)					Total Budget	Success Indicators
		Start	End	2016	2017	2018	2019	2020		
1. Construction/ Renovation of Data Center and ICT Building	Administration and University Engineer	2016 3rd Q	2019 1st Q	25%	25%	25%	25%	Turn-over	Php 260,000,000	Fully furnished data center and ICT Building
2. Provide enhanced internet services access with high bandwidth.	MIS Group/IT Personnel	2016 1st Q	2017 1st Q	50%	50%				Php 39,000,000	Well implemented WIFI

Goal 2 : To purchase upgraded equipment and devices.

Strategic direction : The allotted budget for the following requirements must be continue and has its own fund.

Objectives : To support the new technology.

Tasks	Individual Group Responsible	Time Frame		Key Results Area (Milestones)					Total Budget	Success Indicators
		Start	End	2016	2017	2018	2019	2020		
1. Upgrade existing equipment and devices.	Network Admin / IT personnel	2016 3rd Q	2017 4th Q	50%	50%				Php 13,000,000	Increased number of existing computers units and devices
2. Procurement new equipment and devices.	Network Admin / IT personnel	2016 3rd Q	2017 4th Q	50%	50%				Php 39,000,000	Purchased required number of computer units and devices.
3. Installation of the Internet system.	Network Admin / IT personnel	2016 3rd Q	2017 4th Q	50%	50%				Php 19,500,000	Complete Installation of internet connection with high bandwidth (fiber optics)

Goal 3 : Hire/Train IT personnel.

Strategic Direction : Schedule hiring of at least (6) staff of IT Personnel and train/re-tool the existing personnel directly involved in the enrollment.

Objective : To provide skilled IT Personnel that will maintain implementation of enrollment system.

Tasks	Individual Group Responsible	Time Frame		Key Results Area (Milestones)					Total Budget	Success Indicators
		Start	End	2016	2017	2018	2019	2020		
1. Send existing IT personnel to trainings/ workshops in national or in abroad	Administration/ HR Personnel	2016 3rd Q	2017 4th Q	50%	50%				Php 6,500,000	Completed trainings/workshops of IT personnel.
2. Hire at least (6) additional skilled and highly qualified IT personnel.	Administration/ HR Personnel	2016 3rd Q	2017 4th Q	50%	50%				Php 2,500,000/yr	Additional IT personnel were hired.

Goal 4 : Purchase licensed software and develop web based enrollment system.

Strategic Direction : Determine the recommended software and features to be integrated in the system.

Objective : Acquisition of the software needed for the system.

Tasks	Individual Group Responsible	Time Frame		Key Results Area (Milestones)					Total Budget	Success Indicators
		Start	End	2016	2017	2018	2019	2020		
1. Procurement of Licensed Softwares and development of web based enrollment system.	Procurement Officers	2016 3rd Q	2018 4th Q	25%	25%	50%	Eval.	Eval.	Php 26,000,000	Licensed Softwares, web based enrollment system (Oracle/MySQL Database, Windows NT, Etc.) were purchased
2. Installation of the acquired software and system.	MIS Group/ Technical Group	2016 1st Q	2018 4th Q	25%	25%	50%	Eval.	Eval.	Php 2,000,000	Completed installation of software and system.

Goal 5 : Provide continuous internet services.

Strategic direction : The allotted budget for the internet services has its own fund.

Objectives : To maintain the availability of internet access.

Tasks	Individual Group Responsible	Time Frame		Key Results Area (Milestones)					Total Budget	Success Indicators
		Start	End	2016	2017	2018	2019	2020		
1. Provide budget for monthly internet services.	Budget Officers	2016 1st Q	2020 4th Q	100%	100%	100%	100%	100%	Php 7,800,000/yr.	Continuous fast-access of internet services and cloud computing storage of databases.
2. Maintenance of the system.	Budget Officers	2016 1st Q	2020 4th Q	100%	100%	100%	100%	100%	Php 1,560,000/yr.	Well maintained system operation.

REFERENCES

[1] DeLone, W.H., and McLean, E.R. (1992). Information Systems Success: The Quest for the Dependent Variable. Information Systems Research, 3(1), 60-95.

[2] Grover, V., Leong, S.R., Segars, A.H. (1996): Information systems effectiveness: The construct, space and patterns of application. Information & Management 31 (4), 177 – 191

[3] Kelly, R., & Turban, E. (2009). Introduction to Information System. Second Edition. John Wiley & Sons (Asia) Pte Ltd. Pages 162-163.

[4] Kesner, Richard M. *Information Systems: A Strategic Approach to* Planning and Implementation. Chicago, IL: American Library Association, 1988. pp. 14-43.

[5] Lee, C. S., Ko, I.S., Jeong, C. (2009): Evaluating the effectiveness of Information Service for SMEs on Information Orientation and Firm Performance. In: Proceedings of the 42nd Hawaii International Conference on Systems Science. IEEE Computer Society

[6] Nleml, H., Pekkla, S. (2009): Adapting the DeLone and Mclean Model for Enterprise Architecture Benefit Realization Process. In: Proceedings of the 42nd Hawaii International Conference on System Sciences. IEEE Computer Society.

[7] Pearson, S.W. (1983). Development of a Tool for Measuring and Analyzing Computer User Satisfaction. Management Science, 29 (5), 530-545.

[8] Rai, A., Lang, S.S., Welker, R,B. (2002): Assessing the Validity of IS Success Models: An Empirical Test and Theoretical Analysis. Information Systems Research 13 (1), 50-69.

[9] Seddon, P.B. A Respecification and Extension of the DeLone and McLean model of IS success. Information Systems Research, 8, 3 (1997), 240–253. 98), 115–124.

[10] Shannon, C.E., and Weaver, W. The Mathematical Theory of Communication. Urbana, IL: University of Illinois Press, 1949.

[11] Swartz, N. (2007). Data Management Problems Widespread: Organizations should regard data as their greatest asset and invest in data Management Accordingly. On the Edge: The Use & Misuse of Information). Retrieved from www.accessmylibrary.com

[12] Torkzadeh, G., and Doll, W.J. The development of a tool for measuring the perceived impact of information technology on work. Omega—The International Journal of Management Science, 27, 3 (1999), 327–339.

[13] Van Dyke, T.P.; Kappelman, L.A.; and Prybutok, V.R. Measuring information systems service quality: Concerns on the use of the SERVQUAL questionnaire. MIS Quarterly, 21, 2 (1997), 195–208.

[14] Yuthas and Young, Information & Management, Volume 33, Issue 3, 12 January 1998, Pages 115-124

[15] Zwass, Vladimir Foundations of Information Systems, Irwin/McGraw Hill ©1997 ISBN:0697133125, (2007).

[16] Pitt, L.F., Watson, R.T., Kavan, C,B. (1995): Service Quality: A Measure of Information System Effectiveness. MIS Quarterly 19 (2), 173-187.

[17] Andres, C. (2005). Admission System and Online Examination for Benguet State University.

[18] Butag, F. (2007). Benguet State University Elementary Laboratory School Enrolment and Pupil Information System. Undergraduate Project Study. Benguet State University.

[19] Jiang, Z. and I. Benbasat (2007). Investigating the Influence of the Functional Mechanisms of Online Product Presentations, Information Systems Research (18)4, pp. 454-470.

[20] Marrero, S. (2007). Student Information System for the University of the Cordilleras. A master project study. University of the Cordilleras.

[21] DeLone, W.H., McLean, E.R. (2003): The DeLone and McLean Model of Information Systems Success: A Ten-Year Update. Journal of Management Information Systems 19 (4), 9-30

[22] Forman (2007): History and Technology: An International Journal, Volume 23, Issue 23, Issue 1-2, 2007.

[23] Petter, S., DeLone, W.H., McLean, E.R. (2008): Measuring information systems success: models, dimensions, measures, and interrelationships. European Journal of Information Systems 17 (3), 236 – 263

[24] Catherine, A. (2007). Rapid Application Development: A Quick Methodology. Retrieved from www.ezinearticles.com.

[25] Desousa, T. (2008). Benefits of Web Applications. Retrieved from www.articlesbase.com.

[26] Kaatib, A. (2005). Rapid Application Development: IS it really a need today? Retrieved from www.ezineacrticles.com.

[27] Massachusetts Institute of Technology (MIT). (2009). About WebSIS. Retrieved from http://student.mit.edu/cgi-docs/govwbin1.html.

[28] Swartz, N. (2007). Data Management Problems Widespread: Organizations Should Regard Data as their Greatest an Asset and Invest in Data Management Accordingly. (ON THE EDGE: The Use & Misuse of Information). Retrieved from www.accessmylibrary.com.

[29] Silver et al. (1995) https://en.wikipedia.org/wiki/Zheng_He

[30] Adrian (2011). Lack of Enrolment. http://www.slideshare.net/EzhrihmCradan/chapter-2-28073663.

[31] Dunn and Scott (2005). Science and Technology. http://books.google.com.ph/books?id=7

[32] Bacala&Reanno (2009). Web-based Enrolment System. http://thesisbook.readthedocs.io/en/latest/Chapter%2011.html