History of the Belize Health Information System

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Abstract

The Belize Health Information System (BHIS) is a dynamic, comprehensive tool that will provide the best health care services in the quickest, most affordable and efficient way to all citizens.

The benefits of this new system are dynamic and inclusive application to all hospitals in the country. The BHIS will collect data from the various sectors of the Ministry of Health and will act as a central repository for the critical information that flows in and out of the Ministry of Health.

Belize Health Information System will be the pioneer in creating an affordable, efficient, effective and confidential computer system that will be sustained in Belize Central America, by Belizeans for the benefit of every Belizean throughout the length and breadth of this wonderful country. Given the level of expertise that have been utilized in the analysis, design and development of the BHIS, this system will be a very affordable software that will aid in the delivery of equitable and efficient health care services in Belize.

Keywords: Belize Health Information System (BHIS), Information System (IS), Success Module (SM), Health Care, Health Information Exchange (HIE).

Introduction

We chose the Belize Health Information System (BHIS) because it is a very important system that is being used and facilitates the collection of data on common issues affecting the people. This system was first piloted in 2005 at Karl Heusner Memorial Hospital and was inaugurated on 16th September, 2008. This system links the Ministry of Health with the public hospitals, laboratories and clinics across the country. The Belize Health Information System allows authorized users to access the data as soon as it has been entered in the system. It improves the efficiency of the country's health system and encourages a more general approach to diagnosis and treatment: The information of a patient is captured during the first visit of said patient to a public hospital. Thereafter, whenever the patient seeks future medical attention at the public hospital, lab or clinics, said institution already has access to his/her medical history.

The BHIS provides a completely cohesive information system that offers every client with an Electronic Health Record and thus provide accurate and adequate support to both the individual and the public health authorities. The Belize Health Information System is a unique system that will integrate the entire health sector of Belize effectively eliminating the gaps that exist between many "stand alone health applications" that are not comprehensive enough to incorporate all the various components of a health care system.

The system like other systems also has many challenges: the local bandwidth limitations that accommodated the scale down systems since it was designed for developed countries; electrical surges are common place in Belize and could damage the equipment needed to run the system; and the perennial budgetary constraints that limit many public health initiatives. Despite these challenges, Belize's Health Information System is widely recognized, particularly in the Caribbean as one of the best in the region.

The Belize Health Information System (BHIS) is dynamic and wide-ranging (or all-encompassing), that attempts to make healthcare services more operational, inexpensive and rapid. In a developing country like Belize this means enhancement of the overall quality of healthcare service provided to Belizean Citizens.

This paper will explain our findings in a Literature Review, the methodology of the study, data analysis and results. The main objective of this research is to evaluate and improve the efficiency and effectiveness of the Belize Health Information System, while maintaining patients' privacy. In addition, the goal of the research is to understand if the system is used properly, how effective the system is and evaluate the adequacy of the system in terms of the provision of enhanced services by the system will support the appropriate use of information to improve the provision of services by health providers and thus improve the quality of life for all Belizeans.

History of the Belize Health Information System

The BHIS is a centralized healthcare system that captures and stores information of patients at the local, regional and national levels. The system facilitates access of information to the government by inter connecting with most public health providers nationwide.

The information system facilitates the collection of data on general issues such as the percentage of the population living with HIV and also evaluating the BHIS System Success at BCVI Second Annual Research for National Development Conference, University of Belize 2018. It also captures heath trends, health outbreaks, supply usage and human resource among others. In addition, the system allows for a client's medical history to be readily available in all, if not in most clinics in the country." (ref: Min of Health)

What is BHIS

Belize Health Care Information System (BHIS) can only be accessible at the work station of the approved user in all government healthcare facilities. This system helps all healthcare services to be operational, less costly to both provider and patient in terms of time and repetitive visits, the issuance of medication and perhaps repeating examinations especially if not provided at the

institution and overall improved effectiveness and efficiency at the health care facilities. This centralized healthcare system provides an updated electronic–record of the patient to the healthcare officers for adequate diagnoses and prescription. This system connects government with health institutions particularly in the event of having to deal with health trends, health outbreaks, supply usage (inventories) and human resources issues, among others. It is likewise a very important tool for evidence-based decision-making particularly by health authorities.

BHIS is comprised of various interconnected modules in addition to Electronic health record and admission and/or discharge or transfers that records the personal data of each client and the specifics of each encounter. The Clinician Order Entry module creates, dispenses, cancels and administers prescriptions. The Financial Module provides details of the cost and the prices of the supplies, services and medication of each encounter between healthcare provider and customer/patient. The Maternal Child Health module focuses on identifying high risk pregnancies. The Human Resource Module identifies jobs and job placement, employee performance and qualification. The BHIS include other modules such as HIV, laboratory testing and supply chart.

Literature Review

Jamaica NHIS

A look at the Jamaica Health Information System more specifically it is called National Health Information System (NHIS), similarities can be readily observed. The following excerpt of the Strategic Plan 2014 to 2018 states that, "Alignment of NHIS strengthening and e-Health strategic planning, while both the NHIS and e-Health are concerned with health information, the NHIS is focused on improving the access to, and the quality of, information to drive evidence-based decision-making to improve health outcomes. E-Health is focused specifically on the use of information technology to improve the efficiency and quality of health care service delivery". (Jamaica Ministry of Health, Strategic Plan 2014 to 2018). The vision and objectives of the Strategic Plan resemble those stated in the BHIS. Some similarities include: strengthen national

capacity for the planning, coordination and implementation of health information system and e-Health initiatives, expand the effective use of information technology to improve the quality, availability and continuity of healthcare, and to improve the quality and timeliness of health information for decision-making, and expand the use of information to support evidence-based decision making at all levels and sectors of the health system.

Grenada HIS

Another example of a Health Information System reviewed is the Grenada Health Information System (GHIS). From the onset, it can be said that GHIS is not fully digitized (complete) but the Ministry of Health of Grenada being the repository agency and responsible for the System, keeps adding and/or improving it as time progresses. Accordingly, the achievements to date include the implementation of a Laboratory Information System, the networking of the General Hospital, and the General Hospital medical records digitization. Other important achievements were the implementation of a National Electronic Immunization Registry and the implementation of a Medical Inventory Management System. Work still continues in terms of accessibility and redundancy of the data. The Ministry of Health is leading the effort to improve the system's reliability and backup components to ensure sustainability, to ensure that a new standard is set for how records are backed up and what recovery measures must be in place to ensure high availability. The digitization of the records will bring a paradigm shift from the old-fashioned manual system which is time consuming to an innovative way of accessing and managing historical records. In essence, the new system will facilitate health providers will to retrieve older historical records for better decision-making when treating patients.

Kenya HIS

Our research led us to examine the Health Information System Policy of the Republic of Kenya which states that: "The role of the Health Information System (HIS) in the health system is not

just routine collection of health service data and dutiful conveyance of the same to higher levels of the health care system, but to facilitate evidence-based decision-making at all levels especially at the point of collection". (Kenya HIS Policy). Some of the Policy Objectives include among others: health information for evidence-based decision making, accountability and empower citizens to make healthy choices, the collection of sufficient, relevant, reliable and quality health statistical data pertaining to the health status of the nation, health services coverage and utilization, the production and dissemination of timely, easily understood health and health related information for evidence based decision making by managers at various managerial levels within the health sector and reporting by all health related statistical constituencies through the use of standardized data collection and reporting tools.

Bahamas HIS

The Bahamas Health Care System uses the Electronic Health Records (EHRs) that are digitalized patient charts consisting of their medical history and treatment plans that are secured and readily accessible to authorized users. Information from all healthcare professionals who provide care for a patient is created, managed, and stored in a digital form. EHRs make sharing this patient information across providers and facilities easier. They keep track of patient diagnoses, pharmaceuticals, immunization history, allergies, medical images, and laboratory tests. They can also provide evidence-based resources needed for physicians to make medical decisions (What is an Electronic Health Record, 2013). In the primary care setting, EHRs identify patients that are in need of a screening for an illness, vaccinations, or a checkup, and track the status of key health indicators. This health information technology can then be used to send out reminders to patients for upcoming appointments, preventative care screenings and other procedures. Unlike Electronic Medical Records (EMRs) that are a record of a patient's medical history, EHRs are interoperable between multiple healthcare settings, and more detailed reports of the overall health of a patient. Patients may also receive a print out of their medical records for personal use. EHRs are also administratively beneficial for reducing medical errors, accurately coding diagnosis and procedures, easier billing transactions, and improving provider productivity. It is financially beneficial for reducing the costs to maintain paper charts, and lowering the medical

costs of duplicated tests. Lastly, a benefit to the healthcare system is the government's ability to track health status and identity populations of patients in various islands who are contributing to negative health trends. Furthermore, that data can be used for public health purposes to manage chronic diseases on a population level, trace outbreaks of disease, identify populations contributing to negative health trends, track population health status, and for research.

St. Lucia Health System

Health Information System in St. Lucia name is CELLMA" at the Owen King European Union (OKEU) Hospital, the Turning Point Rehabilitation Centre and the National Mental Wellness Centre.

Cellma is a modular software which supports the philosophy of "one patient, one record," and is a precursor to the establishment of the National Health Information program. A one-stop digital solution benefits everyone in the healthcare space including patients, healthcare professionals, technical experts and decision makers alike. CELLMA, will assist tremendously in improving efficiency at the various health facilities. Services, which (CELLMA) institutions provide, are Physiotherapy, Dialysis, and National Mental Wellness Centre Pharmacy etc.

India Health System

The India Health Care System deals with resources, devices, methods and institutions required to optimize the acquisition, storage, retrieval, and use of information in public health and health care. This System is similar to the Belize Health Information Belize. The information system is a health domain, it is essential to identify changing requirements and continuously improve system design. It enables the patient to access more health information, the providers to improve the quality of care, and empowers the health administrators for decentralized planning and management.

The various sub-domains of health informatics include Hospital Information System, Human Resource Management Information System, Health Management Information System, Geographical Information System, mobile specific program monitoring system, and mobile health.

1. Interoperability: Presently, most of the information systems are developed in silos, causing redundancy/ ambiguity of information exchange/sharing. To uniform use of common terms and common methods for sharing information, interoperability allows user to extract required information from multiple sources through a single query.
2. Use of information: The challenge for the health information system is to bring together data production with data. It supports users in synthesizing information regarding service delivery, preventive care, epidemics, clinical Management, alert/early warnings, Program Management, planning process, health situation, trend analyses, reporting, supervision and monitoring.
3. Monitoring and Evaluation: Well-designed evaluations provide the information that information system designers need to insure a system's performance, usability, security and functionality. Among other uses, evaluations are helpful in permitting system developers to develop and implement new health information systems, to inform public policy decisions, and even to understand how the public can use health information to make more informed healthcare decisions.

The World Health Organization

The World Health Organization (WHO) is a specialized agency of the United Nations responsible for international public health. Its main objective is "the attainment by all peoples of the highest possible level of health." It is headquartered in Geneva, Switzerland. The WHO's broad mandate includes advocating for universal healthcare, monitoring public health risks, coordinating responses to health emergencies, and promoting human health and well-being. It provides technical assistance to countries, sets international health standards and guidelines, and collects data on global health issues through the World Health Survey. (Wikipedia)

According to WHO, health information systems serves multiple users and a wide array of purposes that can be summarized as the generation of information to enable decision-makers at all levels of the health system to identify problems and needs, make evidence-based decisions on health policy and allocate scarce resources optimally. Expectations of a country health information system Health information systems serve multiple users and a wide array of purposes that can be summarized as the generation of information to enable decision-makers at all levels of the health system to identify problems and needs, make evidence-based decisions on health policy and allocate scarce resources optimally.

Examining various HIS of different countries, the goals and objectives are stated in different ways in many cases and countries but the initiatives have been similar in context. The importance of a Health Information System has been underscored in all cases aforementioned. The common denominator in all three examples include: the reliability of data, improved management of data and enhanced patient service delivery. The WHO summarized is very succinctly "as the generation of information to enable decision-makers at all levels of the health system to identify problems and needs, make evidence-based decisions on health policy and allocate scarce resources optimally". I think it is important to have reliable and sound data for the adequate case management/treatment by the health provider and for the patient to be diagnosed and treated properly. The shift from the manual system to a digitized system is the future in our Health construct.

Belize Health Information System is a unique system, therefore; the study will take the theoretical approach of effectiveness and successfulness. BHIS success is based on prior on IS studies particularly the Delone and Mclean IS success Model. In the point of view, health systems across the country have appointed CISOs to oversee cyber security efforts, assist with data management and drive new technology implementation. While the role can vary from one organization to another, many CISOs featured on this list are experts in healthcare cyber security and manage teams who specialize in keeping patient and provider data safe.

This list highlights the outstanding efforts of CISOs across the country, many of whom have extensive IT leadership experience. They have received professional recognition from health IT societies, advised on health IT initiatives and held leadership roles for professional development organizations. (Dr. Laura Dyrda)

A poison control center (PCC) is vital to patient care, especially when dealing with the opioid epidemic. However, health information exchange (HIE) software and infrastructure at PCCs are largely inconsistent and mostly nonexistent. In 2017, PCCs tallied 650,000 cases of unintentional poisoning and drug overdoses, and the CDC reported over 70,000 drug overdose deaths. PCC, which is largely publicly funded call centers operated by registered nurses and pharmacists, play an important role in emergency treatment and poison exposure surveillance. Since 31 percent of the patients who call are forwarded to a healthcare facility, such as an emergency department, the PCC is somewhat of and middleman between the patient and provider, providing health information and recommendations for poison treatment. (Christopher Jason)

Under the Mental Care System through Belize Health Information System, services are provided for our mental patients. The North Central Health Care (NCHC) has selected to implement its electronic health record (EHR) at three multi-specialty behavioral health care facilities across Wisconsin. Through this agreement, NCHC will use Cerner's industry-recognized technology to provide physicians, therapists and nurses with near real-time patient information to help drive efficiencies and improve care. (Cerner Corporation)

Positive effects of the Belize Healthcare Information Systems include the use of alerts and reminders to users/decision-makers connected to the system, a greater ability to track and monitor infectious disease outbreaks on a timely basis, and countrywide support for programmes for example the prevention of mother-to-child transmission of HIV. In other words, to prevent the spread of HIV from mother to child the parent is advised not to breastfeed the child, because it attacks the immune system and can be passing on certain body fluids through breastfeeding. The system creates a network between Government with citizens, hospitals, clinics, labs and

pharmacies. Additionally, it also stores other health information apart from only patients. Some examples of system use include, Directors of a Hospital may require specific information to make evidence-based analysis and decisions and the information that maternal and child health nurse may need regarding a vaccination for a child. This system is designed to meet these different requisitions.

The DeLone and McLean six distinct dimensions of Information System success: system quality, information quality, use, user satisfaction, individual impact, and organizational impact adds to this body of knowledge (2003). Based on this framework, they classified the empirical studies published in seven highly ranked IS journals between January 1981 and January 1988. Overall, the Delone and Mclean (1992) module has significantly impacted IS success for many users and the quality of service has improved the health system of Belize.

Methodology

Methodology is the systematic, theoretical analysis of the methods applied to a field of study. It comprises the theoretical analysis of the body of methods and principles associated with a branch of knowledge.

The method that was used is the Quantitative method (surveys) because it is the best for measuring, ranking, categorizing, identifying patterns and generalizing. We did some research on the system and asked questions to staff such as how often they use BHIS, who all inputs information to the system etc. Also, the data gathered will be analyzed to determine the success of the Belize Health Information System. The question will be answered on the employee's use of Belize Health Service Information System (BHIS).

The employee's individual responses to the questionnaire will be strictly confidential and used solely for the research. We used three (3) different hospital employees namely, Southern Regional Hospital, San Ignacio Community Hospital and Punta Gorda Community Hospital to answer the questionnaire in this research. The questionnaire is divided into eight (8) sections and forty (40) questions were asked. All the items were measured using a 7-point Likert Scale with anchors ranging from strongly agree (7) to strongly disagree (1).

Base on those sections the data collected and put in excel in a Table and in a Histogram form. Then the averages will be found and put on a histogram to see where employees strongly agreed or disagreed. The data gathered from the questionnaire will be put on a table then the average will be calculated and put on a histogram to see which section of the eight had the most agreement.

Research Design

For this Research we take a quantitative approach to ensure the validity of the research information. We utilized the Bailey and Person (1983) seven item scale with several adjustments to fit the context of BHIS. Bailey and Person's instrument is the standard instrument for data collection in the IS field, therefore it has been selected to conduct surveys. Each of the seven constructs were measured using the Likert Scale ranging from one (1) to seven (7), with one categorized as strongly disagree and seven as strongly agree.

Table showing construct with the sources

Constructs	Source
Information Quality	Bailey and person (1983)
System Quality	Alshibly (2011)
Services Quality	Change et al (2009)
Complementary Technology Quality	Teece, D.J. (1988)
User Satisfaction	Seddon and Yip (1992)
Use	Balaban et al (2013)
Perceived Net Benefit	Alshibly (2011)

Sampling and Data Collection

The data was collected from a sample of forty (40) employees from three (3) different hospitals namely San Ignacio Community Hospital, Southern Regional Hospital, and Punta Gorda Community Hospital were given a survey form and all of them were returned to us. As a result, the method for this sampling is 'random sampling'. The characteristics of the respondents can be found below in table 1.

Table 1:

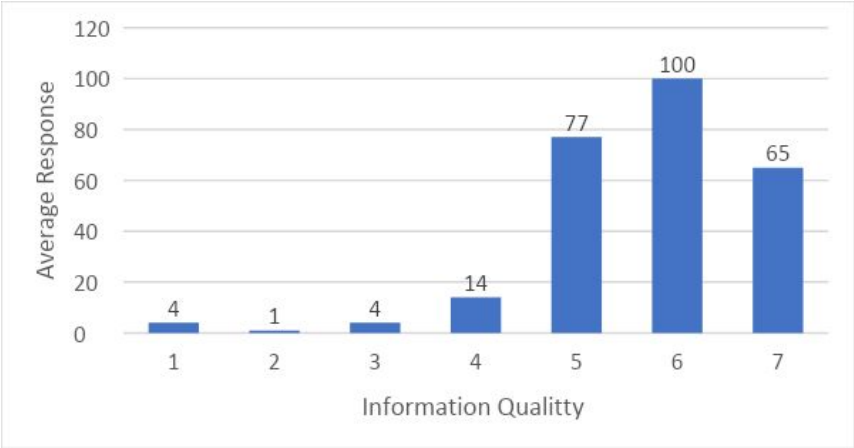
Characteristics of the respondents		
Characteristics	**Number**	**Percentage**
Gender		
Females	28	70 %
Males	12	30%
Age		
Less than 25 years	4	10%
26 – 35 years	21	52%
36 – 45 years	8	20%
46 – 55 years	5	13%
Over 55 years	2	5%
Use of BHIS System		
Daily	35	94%
2 – 3 times	0	0
Once a week	1	3%
Monthly	1	3%
Working Experiences		
Less than 5 years	13	34%
5 – 10 years	9	24%
10 – 15 years	6	16%
More than 15 years	10	26%

Data Analysis and Results

Due to the small amount of the sample size it was impossible to get an accurate hypothesis. We analyzed the data that was collected and graphs are provided for a more effective visual result of our findings. We have collected data from forty (40) employees from three hospital. We have merge each section to give a more accurate amount and to evaluate the efficiency of the BHIS system and provides information that is exactly what you need.

Information System Section

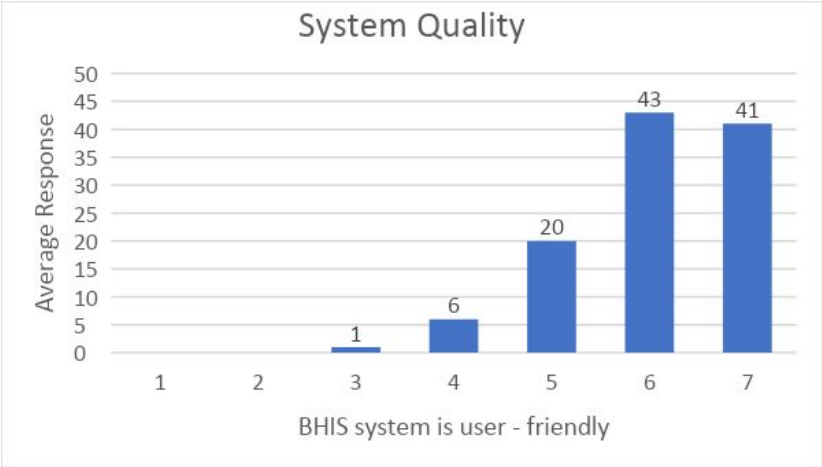
Figure 1 Illustrates the scores for the response.



The graph is showing the response for the Information Quality section. The results showed that majority of the reposes are above average, indicating that BHIS provides information accurate and is up to date. Three persons did not answer the questions.

System Quality Section

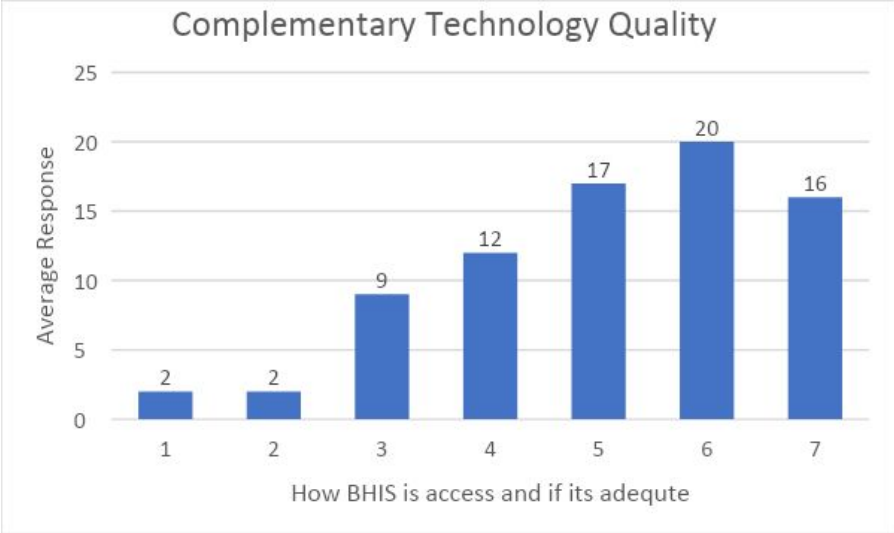
Figure 2 Illustrates the scores for the response.



The graph illustrates the average response for the System Quality is shows that the persons agree that BHIS is easy to use and user friendly while three didn't answer the question.

Complementary Technology Quality Section

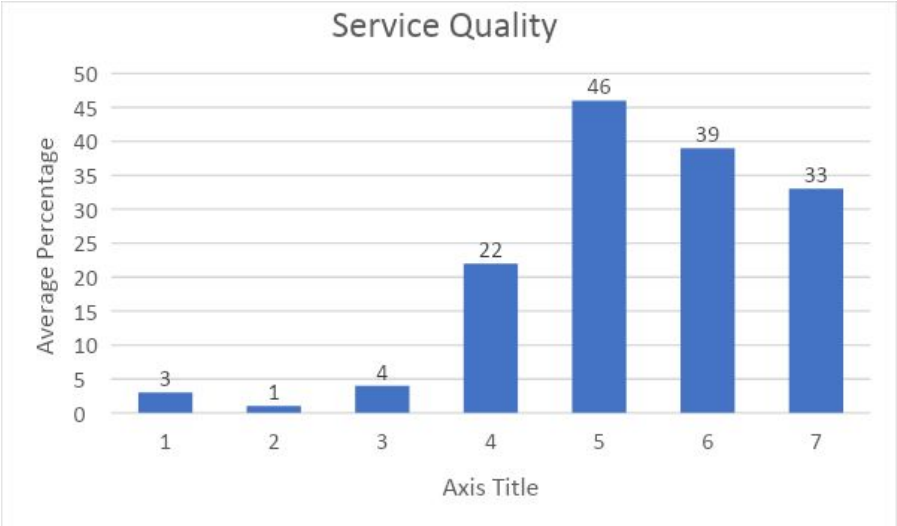
Figure 3 illustrates the scores for the response.



The graph illustrates the average response for the Complementary Technology Quality is showing that the persons agree that BHIS is easy to access and very adequate while three didn't answer the question it still shows that the users are satisfied with the system.

Service Quality Section

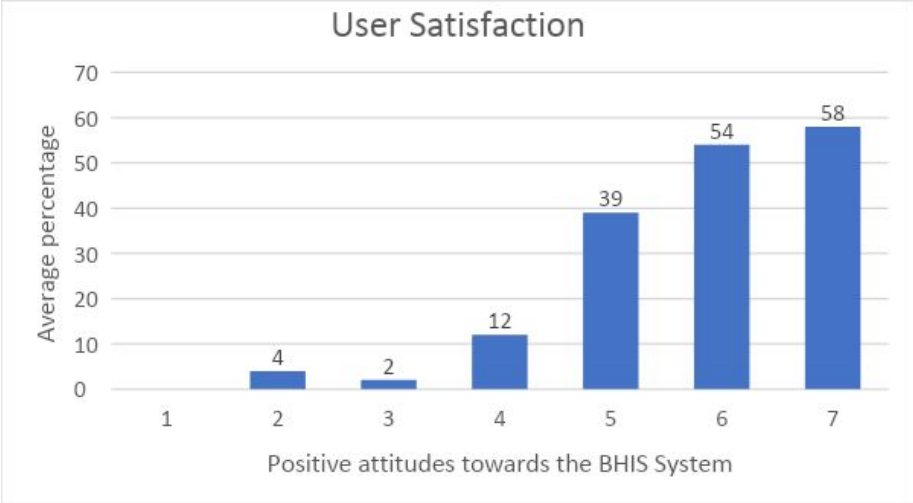
Figure 4 illustrates the scores for the response.



The graph illustrates the average response of the staff and he majority of the respondents are fairly satisfied with the service quality of BHIS. Three respondents indicated a low score for this dimension, stating that the software support staff takes a while to solve the problem. Three employees didn't answer the question.

User Satisfaction Section

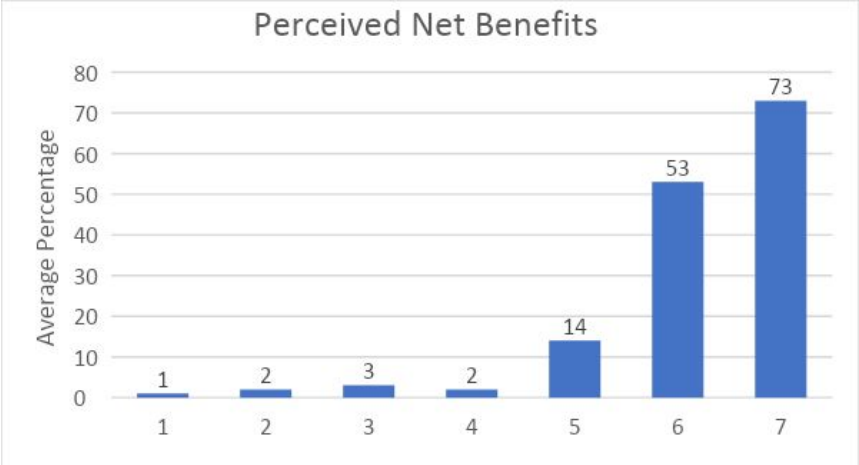
Figure 5 illustrates the scores for the response



The graph illustrates that most of the users agreed that BHIS has met their expectations and that they are satisfied with the Information System and helps them while doing their daily work at the hospitals. Three employees didn't answer the question.

Perceived Net Benefits Section

Figure 6 illustrates the scores for the response



The graph illustrates that more than half of the respondents agree that BHIS helps them improve their job performances, as well as their productivity. They agree that using BHIS enhances recruitment and performance management. Three employees didn't answer the question.

The system is owned by the Ministry of Health, Government of Belize, to consider any adjustments and problems feel free to contact them. This research was based upon Delone and Mclean (1992) Information System Success model. Its six major factors helped us identify the successes and failures of the Belize Health Information System (BHIS).

Discussion

One San Ignacio Community Hospital employee was interviewed to find out if he feels comfortable as a user of the BHIS System and if the system helps with his work:

Overall opinion: The Belize Health Information System (BHIS) is an excellent tool for patient health management for the reason as follows:

1. BHIS is user friendly

2. Patient personal information is recorded under an identity BHIS number unique to that patient...

3. All health information is recorded in regards to diagnoses, treatment, lab results etc...

4. BHIS is connected country wide to all Gov. Health facility.

5. With the patient BHIS number the patient can seek health assistant at any Gov. Health facility.

6. Doctors can see medical history and treatment.

The person has been employed at SICH as pharmacist and will have 3 years' experience using the BHIS. This tool has help me to conduct my duties efficiently as for the reasons as follows:

1. BHIS allow us to work faster. (Manual is time consuming)

2. Doctors from all wards use BHIS to input prescriptions and we dispense in a timely manner for all inpatient and outpatient.

3. All dispensed medication is recorded in BHIS and see the patient history and determine patient compliance in chronic illness.

4. BHIS allows doctor to input refills for chronic illness (example: diabetic patient) and pharmacist monitor patient to pick up refills in a timely manner monthly.

5. All wards can order supplies from pharmacy using BHIS and we supply them in a timely manner.

6. Since all is recorded in the BHIS, this allow us to do monthly, quarterly, yearly reports easier. In regards of pharmaceuticals, medical supplies and patients.

In conclusion, BHIS is an excellent tool for health management that allow us to provide efficient patient health care.

Conclusion

This research is based upon Delone and Mclean (1992) Information System Success model. Its six major factors helped us identify the successes and failures of the Belize Health Information System (BHIS) at the different hospitals. From the surveys collected, it is noted that the BHIS is deemed to be successful for the hospitals. All factors that were considered are: information quality, system quality, complementary technology quality, service quality, user satisfaction and computer self-efficacy measure all have a final result of satisfaction. These factors contribute to the perceived net benefit of the system which also resulted high. The system allows its users to retrieve the information in a timely manner and also provide them with the information needed to complete their job. No interviews were conducted to understand BHIS's benefits at the different hospital we also need to find out what are the set-backs that they may encounter while using the system.

From the data, presented particular leaning from the graphs it can be concludes that Belize Health Information System (BHIS) in Belize is effective and moderately successful.

Although literatures from previous researchers were review, Belize Health Information System survey adds to what is; ascertained and to provide a better perspective of the system. Recommendation to make the Belize Health Information System more successful is to provide training to more Health Care staff that is authorized to use the system. This includes the facilitations of trainings done during orientation (at each health facilities) or individually. Lastly the Belize Health Information System should use the system as a network globally to enhance their services.

Limitation and Future Work

One major limitation of this research is the fact that some respondents took a long time in returning the questionnaire. Moreover, some personnel that are not health care providers had some issues with the questionnaire they did not understood clearly what meant by some of the question on the questionnaire so we had to be in person to explain.

The sample size used for this research is not a true representation of the Health Care providers, from more Health facilities; alter the questionnaire structure if it would be possible.

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Appendix A

Purpose

This research is required for the CMPS3012 MIS course at University of Belize University. This questionnaire asks for information about yourself and how often you use the Learning Management System Moodle. The data gathered will be analyzed to determine the success of Moodle at our University.

Please answer each question based on your use of Moodle. Your individual responses to the questionnaire will be strictly confidential and used solely for this research.

Instructions

This is a survey, not a test; there are no right or wrong answers. Please tick the boxes to mark your answers.

1. Background Information	**Answers:**
Please indicate your gender:	Male ☐ Female ☐
Please indicate your age:	<25 ☐ 25-35 ☐ 36-45 ☐ 46-55 ☐ >55 ☐
Please indicate how long you have been using the BHIS system	1st Year ☐ 2nd Year ☐ 3rd Year ☐ 4th Year☐
Please indicate your working experience:	<5 ☐ 5-10 ☐ 11-15 ☐ >15 ☐

Indicate your agreement with each statement by rating it from (1) strongly disagree to (7) strongly agree.

2. Information Quality	**Disagree ----------Agree**

IQ1: The BHIS system provides information that is exactly what you need	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
IQ2: The BHIS system provides information you need at the right time	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
IQ3: The BHIS system provides information that is relevant to your class	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
IQ4: The BHIS system provides sufficient information	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
IQ5: The BHIS system provides information that is easy to understand	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
IQ6: The BHIS system provides up-to-date information	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
IQ7: The BHIS system provides sufficient information	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
3. System Quality	**Disagree ----------Agree**
SQ1: The BHIS system is easy to use	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
SQ2: The BHIS system is user-friendly	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
SQ3: The BHIS system provides interactive features between users and the system	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
4. Complementary Technology Quality	**Disagree ----------Agree**
CTQ1: The computer (desktop, laptop) you normally use to access BHIS is adequate	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
CTQ2: The computer (desktop, laptop) you normally use to access BHIS has a fast and reliable internet connection	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
5. Service Quality	**Disagree ----------Agree**
SV1: The support staff keep the BHIS system software up to date	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
SV2: When users have a problem the BHIS system support staff show a sincere interest in solving it	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
SV3: The BHIS system support staff respond promptly when users have a problem	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
SV4: The BHIS system support staff tell users exactly when servic will bel be performed	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
6. User Satisfaction	**Disagree ----------Agree**
US1: Most of the users have a positive attitude of BHIS	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐

the Moodle system function.	
US2: You think that the utility of the BHIS system is high.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
US3: The BHIS system has met your expectations.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
US4: You are satisfied with the BHIS system.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
7. Use	**Never ----------Often**
U1: Your frequency of use of the BHIS system is high	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
U2: You depend upon the BHIS system	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
U3: You were able to complete a task using BHIS even when there was no one around to tell you what to do	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
U4: You have the knowledge necessary to use the BHIS	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
8. Perceived Net Benefits	**Never ----------Often**
NB1: The BHIS system helps you improve your performance	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
NB2: The BHIS system helps you save costs	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
NB3: The BHIS system helps you achieve your goals	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
NB4: Using the BHIS system improves assessment and teaching	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
NB5: Using the BHIS system at hospitals increases your productivity	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
NB6: Overall, using BHIS enhances workers performance	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐

Please return this survey to the person who gave you the form.

Thank you for your participation.