

UNIVERSITY OF EDUCATION, WINNEBA

**EFFECT OF MANAGEMENT INFORMATION SYSTEM IN THE
SERVICE DELIVERY (A CASE STUDY OF UNIVERSITY OF
EDUCATION WINNEBA, KUMASI CAMPUS)**



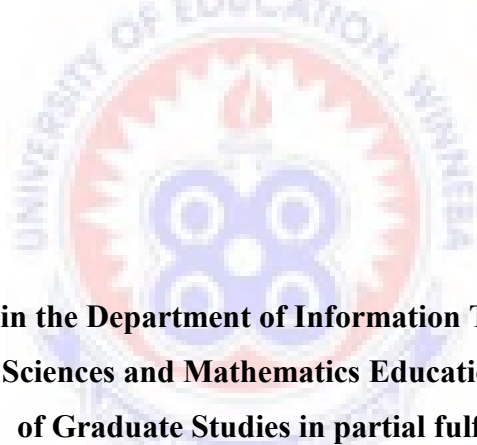
SOLOMON ADASAH NKRUMAH

MASTER OF SCIENCE DISSERTATION

UNIVERSITY OF EDUCATION, WINNEBA

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DELIVERY (A CASE STUDY OF UNIVERSITY OF EDUCATION
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SOLOMON ADASAH NKRUMAH



**A dissertation in the Department of Information Technology Education,
Faculty of Applied Sciences and Mathematics Education, submitted to the School
of Graduate Studies in partial fulfilment
of the requirements for the award of the degree of
Master of Science
(Information Technology Education)
in the University of Education, Winneba**

MAY, 2021

DECLARATION

STUDENT DECLARATION

I, **SOLOMON ADASAH NKRUMAH**, declare that this dissertation, with the exception of quotations and references contained in published works which have all been identified and duly acknowledged, is entirely my own original work, and has not been submitted, either in part or whole for another degree elsewhere.

SIGNATURE.....

DATE.....

SUPERVISOR'S DECLARATION

I hereby declare that the preparation and presentation of this dissertation was supervised in accordance with the guidelines for supervision of dissertation as laid down by the University of Education, Winneba.

NAME OF SUPERVISOR: **DR. SAMUEL ADU GYAMFI**

SIGNATURE.....

DATE.....

DEDICATION

This piece of work is dedicated to my mum, Hagar Antwi, my son Nana Yaw Boadu, siblings, my supervisor Dr Samuel Adu Gyamfi and to the loving memory of my late sweet grandmother, Nana Ama Twumwaa May her soul rest in the bosom of her creator.



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ABSTRACT

The aim of the research was to assess the effect of management information system in the service delivery with emphasizes on the health information system at the Kumasi campus clinic of the University of Education Winneba. The study sought to achieve its purpose through three objectives by examining the implementation and use, factors enabling or constraining the implementation and use and impact of the implementation and use of health information system on service delivery by the University of Education Winneba, Kumasi campus clinic among both staff and students. The study sought to measure its objectives by adopting a quantitative and qualitative approach with a cross-sectional exploratory design by gathering data through the use of questionnaire from a sample size of 30 respondents (5 clinic staff, 5 other university staff and 20 students). The data was analysed using Statistical Package for Social Sciences (SPSS) software and Microsoft Excel. The overview of the main results disclosed that the HIS (MEDREC) is used by all students and staff of the university, with documents being fully maintained using HIS and almost all respondents recognized wanting to continue using MEDREC. The key findings indicated that, management benefits a lot from the HIS through quality of patients' records, attending to patients simultaneously, quality requisitions, faster and easier booking of appointment, no discrimination, reduction in waiting time and avoidance of harmful delays, respectful and responsive healthcare, end user satisfaction of the system among others. The HIS is however burdened with problem of procurement of the hardware infrastructure, end user inability, billing issues, redundancy issues, waiting time and missing data/information issues. The research therefore concludes that the university should support and sustain the HIS and that concrete measures should be taken to curb evolving difficulties faced by the use of the HIS.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

The problem of management information system as an important tool to achieving organizational objectives is challenging to managers of any organization especially the modern-day institutions. No organization can realize its goals and objectives without a conscious effort using a well-organized management information system. All businesses share one common asset, regardless of the type of business. It does not matter if they manufacture goods or provide services. It is a vital part of any business entity, whether a sole proprietorship or a multinational corporation. That common asset is information. Information enables us to determine the need to create new products and services. Information tells us to move into new markets or to withdraw from other markets (Encyclopedia of Management, 2012). The essence of this study is to show the relevance of management information system to management and to ascertain whether it has helped in facilitating decision making or management and to determine the extent to which it has enabled planning, control and operational function of an organization. An information system is a work system whose processes and activities are devoted to processing information, i.e., capturing, transmitting, storing, retrieving, manipulating, and displaying information.

Thus, an information system is a system in which human participants and/or machines perform work (processes and activities) using information, technology, and other resources to produce informational products and/or services for internal or external customers (Alter, 2008). The information system stores documents and revision histories, communication records and operational data. The trick to exploiting this

recording capability is organizing the data and using the system to process and present it as useful historical information. Manager can use such information to prepare cost estimates and forecasts and to analyse how manager actions affected the key company indicators (Markgraf, 2017).

Management Information System (MIS) is basically concerned with the process of collecting, processing, storing and transmitting relevant information to support the management operations in any organizations. According to Heidarkhani et al. (2013), management information system is kind of organizational information computer systems, that take internal information from operating processing system and summaries them to meaningful and useful forms as management reports to use in performing management duties. According to Asemi et al., (2011), management information system is one of the major computer-based information systems. Its purpose is to meet the general information need of all the managers in the firm or in some organizational subunit of the firm. According to Babu & Sekhar (2012), management information system is a collection of people, tools, procedures and software to perform various business tasks at various levels in the organization.

According to Nowduril & Al-Dossary (2012), management information system is a computer-based information system that provides for management-oriented reporting based on transaction processing and business operations of the organization. According to Hasan et al (2013), management information system is type of information systems that take internal data from the system and summarized it to meaningful and useful forms as management reports to use it to support management activities and managerial decision making. According to Al-Mamary et al. (2014), management information

systems basically concerned with converting data from internal sources into information which is then communicated to managers at all the levels, in all functions to make timely and effective decisions for planning, directing and controlling the activities for which they are responsible.

Management Information System provides information that organizations require to manage themselves efficiently and effectively because MIS is a key to controlling, planning and decision making for management through transaction processing of systems for the data. Services constitutes significant part of business turnout and investments. In rendering these services, MIS is employed to do the services, which represents a significant portion of organisation expenditure. Creating business value is the goal for making such investments. But in order for any investment to have yielded a positive result on business value, extra revenues need to be created or overall expenses lessened. Thus, when appraising investments in services that have the possibility to contribute to the betterment of business accomplishment, the interactions of costs among the diverse business processes and activities need to be weighed. This research is intended at assessing the effect of management information system in the health care service delivery at the University of Education Winneba, Kumasi campus clinic.

A health information system (HIS) refers to a system designed to manage healthcare data. This includes systems that collect, store, manage and transmit a patient's electronic medical record (EMR), a hospital's operational management or a system supporting healthcare policy decisions (Brook, 2020). Health information systems also include those systems that handle data related to the activities of providers and health organizations. As an integrated effort, these may be leveraged to improve patient

outcomes, inform research, and influence policy-making and decision-making. Because health information systems commonly access, process, or maintain large volumes of sensitive data, security is a primary concern. Information systems are increasingly important for measuring and improving the quality and coverage of health services (Lippeveld, 2000).

The global shift from curative to preventive care, from hospital care to community and public health care, from centralized to decentralized health care, from a specific project approach to a comprehensive sectoral approach, has necessitated the restructuring of fragmented health information systems into single comprehensive health and management information systems. The restructuring of health information systems has become an important trend in the entire developing world since the adoption of primary health care as a global strategy for achieving the 'health for all' goals (Campbell, 1997). Health Information System (HIS) is a comprehensive software for patient's information integration for sending and exchange comprehensive patient's information between wards and other medical centres in order to expedite the process of patient care, improve quality, increase satisfaction and reduce costs (Aghazadeh, 2012).

Use of Hospital Information Systems is one concern in the health sector because of their increasing needs of the growing complexity of health management processes and also due to the significant diversity and innovation in the supply system (Ahmadi, 2014). Meanwhile, these systems are very important in diagnosis especially, if the patient suffers from allergy to a special kind of medicine such as allergy to the aesthetic, or has other kinds of diseases; therefore, documented data in HIS are very important to protect patient's safety from crucial flutes during diagnosis and surgery.

The aim of HMIS is to streamline the complex processes in a hospital so that the hospital could provide a better healthcare services for its patients (Anisah & Hanim, 2015). Electronic Health Record (EHR) systems enable hospitals to store and retrieve detailed patient information to be used by health care providers, and sometimes patients, during a patient's hospitalization, over time, and across care settings, EHRs can help hospitals monitor, improve, and report data on health care quality and safety (Edwards, 2015).

1.2 Statement of the Problem

The use of Information and Communication Technology (ICT) and its associated facilities have grown rapidly in the provision and delivery of healthcare services over the last few decades. Paper-based records are fast giving way to electronic health records (EHR) in most developed countries and crawling gradually into the developing countries. The EHR is designed to alleviate the limitations associated with the paper record system and help improve the quality of care delivered (Meum, 2011; Tang, 2006). Notwithstanding the tremendous growth in the adoptions or implementation of electronic health records, most of these projects have been recorded to have survived partially or fully at the pilot phase and have been repealed at the full implementation phase (Adjorlolo, 2013). A study conducted by More (1990) revealed that, the implementation of large-scale information technology projects such as EHRs were associated with a 30% or higher failure rate. This challenge can be said to be even higher in developing countries (Vargneses, 2004). Organizational and human factors are noted to contribute immensely to this challenge and not limited to technological factors (Gagnon, 2006). In a study conducted on an EHR trail in Cameroon, insufficient training of personnel, lack of funding, insufficient leadership, and organizational issues, among others, were identified to have led to the failure of the system (Kamadjeu, 2005).

In view of these issues, studies on the evaluation of ICT applications and their implementation have gained dominance in the healthcare industry. This dominance is to advocate the successes and failures of implemented projects so as to prevent the reinvention of some of the factors contributing to the failure of these projects (Stoop & Berg 2003).

In some of these studies, performing an initial or pre-evaluation of the ICT applications as well as considering the institutions' readiness before the adoption and implementation of ICT-related projects were proposed as measures to reduce the risk of failure (Adjorlolo, 2013).

However, most healthcare institutions in Africa are noted to have failed to conduct an initial assessment of the institutions' readiness before the implementation of ICT applications, which contributes to the failure rate recorded (Adjorlolo, 2013). Lack of readiness assessment coupled with other factors such as lack of users' participation in the design and adaption of ICT applications has heightened the challenge of 'Usability' during the implementation phase of the ICT-projects. Usability, which is described as "the characteristics of human-computer interaction in a system" is often unattained in the implementation of most ICT systems (Tang et al., 2006).

The implementation of EHR is on the ascendancy in the health care system of Ghana, as some major hospitals have resorted to the implementation of EHR to help improve their record keeping systems as well as their healthcare delivery systems. However, the challenges of ICT implementation as recorded in the literature are likely to be realised if appropriate measures are not adopted in such implementations. Hence, the need for an evaluation of such implemented systems in UEW-K.

1.3 Purpose and Objectives

The purpose of this study is to assess the use of health information system in the management of health services at the University of Education Winneba, Kumasi campus clinic. The specific objectives are as follows;

1. To investigate how health information system was implemented and used at the University of Education Winneba, Kumasi campus clinic.
2. To examine the factors enabling or constraining the implementation and use of health information system at the University of Education Winneba, Kumasi campus clinic.
3. To examine the impact of the implementation and use of health information system on service delivery by the University of Education Winneba, Kumasi campus clinic.

1.4 Research Questions

Based on the objectives, the study seeks to find answers to the following research questions:

1. How is the health information system implemented and used at the University of Education Winneba, Kumasi campus clinic?
2. What are the factors enabling or constraining the implementation and use of health information system at the University of Education Winneba, Kumasi campus clinic?
3. What is the impact of the implementation and use of health information system on service delivery by the University of Education Winneba, Kumasi campus clinic?

1.5 Significance of the Study

This research can be useful to different stakeholders in both government and academia. For the government, this study can provide a platform for policymakers in the health department to re-design policies and programs. This will help in promoting the implementation and compliance with the use of HIS among the entire health workers. The study may also enlighten the health care workers on the importance of the use of HIS. This will not only ensure quality of care but also promote productivity and better service delivery. Besides, it may also enlighten health care providers on the best practices in health services delivery. This will ensure safety, efficiency and cost savings for both the provider and recipient of services. This work may help academic formulate theories that will help understand the impact of HIS among workers on quality care. It can also provide them with the knowledge and data on how to use the HIS. In perspective of this, academic journals and other literature resources may be available to the academics on the impact of HIS on quality of care.

1.6 Scope

The study used University of Education Winneba, Kumasi campus clinic as a case study. This research was open to students and workers of the university as a whole and health care provider using HIS at the clinic. This was because those were the providers and recipients of the HIS. Having knowledge on the use of HIS, they could contribute in ensuring quality of care in the clinic.

1.7 Limitations of Study

1. **Financial constraint-** Insufficient monetary resource tends to impede the efficiency of the researcher in getting the relevant materials, literature or information and in the process of collecting data (questionnaire, interview and internet).
2. **Time constraint-** The researcher will concurrently pursue this study with his work as a teacher which is far from the institution that he is doing the research on. This therefore will reduce the time dedicated for the research work.



CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter reviews existing and relevant literature in relation to the research questions. The rationale for this chapter is to uncover and understand what other scholars or researchers have done with regards to HIS implementation and use. The chapter also, provides the theoretical framework and conceptual framework for the study. It also presents the historical development of HIS in the world and Ghana.

2.2 Management

Vance (1959) defined Management as simply a process of decision making and control over the action of human being for the purpose of attaining pre-determined goals. Again, Dalton (1970) defined management as that process by which managers create, direct, maintain, and operate purposive organizations through systematic, coordinated, cooperative human effort. Also, the father of scientific management Taylor (1911) said Management is the art of knowing what you want to do in the best and cheapest way. From the above definitions, the author observed that management basically aims at accomplishing goals and objectives through the efforts of people.

2.2.1 Information

In MIS, information is the processed data which is used for informative purpose or decision making. So, we can define information as the data that has been processed into a form that is meaningful and helpful in decision making (Khan & Khan , 2011). According to O'Brien & Marakas (2007), Information as data that have been converted into a meaningful and useful context for specific end users.

On the other hand, information is stimuli that has meaning in some context for its receiver. When information is entered into and stored in a computer, it is generally referred to as data. After processing (such as formatting and printing), output data can again be perceived as information.

2.2.2 System

The third important element of MIS is system, which is an interrelated set of elements that function as a whole. So, we can define system as “an organized or complex whole; an assemblage or combination of things or parts forming a complex unitary whole” (Khan & Khan, 2011). Backlund (2000) also defined system as a set of interacting units with relationship among them.

According to Longman Dictionary, a system is a group of related parts that work together as a whole for a particular purpose. A system is a group of components that interact to achieve some purpose. The system is capable of converting the collected data from the routine user and machine interactions in to the effective information which later on is used by the decision makers to make efficient decisions. In the management information system, the most important entity is system itself which is set of defined and interrelated components which are generally described as all of the direct or indirect complex components or elements that are related in a casual network. Within any peculiar clip period, all of these complex constituents are related in more or less stable manner with at least some other constituents (Thierauf, 1984). So, a well-developed and interactive system is one which provides best and useful information to the managers at all levels.

2.2.3 Information Systems

In a general sense, the term information system (IS) refers to a system of people, data records and activities that process the data and information in an organization, and it includes the organization's manual and automated processes (Paul, 2010). Also, Information systems are the means by which organizations and people, utilizing information technologies, gather, process, store, and use and disseminate information (UKAIS, 1997).

Again, a simple definition might be that an information system is a system in the organization that delivers information and communication services needed by the organization. This can be expanded to describe the system more fully. The information system or management information system of an organization consists of the information technology infrastructure, application systems, and personnel that employ information technology to deliver information and communication services for transaction processing/ operations and administration/ management of an organization. The system utilizes computer and communications hardware and software, manual procedures, and internal and external repositories of data. The systems apply a combination of automation coming human actions and user machine interaction (Davis, 2000). Information systems should best interact and communicates with the end user in order to provide the accurate required information (Knight & Silk, 1990).

Therefore, IS is a set of components which interact to produce information, which include hardware, software, data, procedures, and people, whereas these components can be found in every information system (Kroenke, 2007). The main elements of IS consist of hardware, software, data, procedures, and people. Hardware refers to computers, storage disks, keyboards, and communication devices while software is

relevant to word-processing programs. Data or information is included texts, words, sentences, and paragraphs in reports. Furthermore, procedures refer to the methods for using the program and involved activities. The last element is people. The important role of the five components is that IS is not only computers, programs, and communication devices, but it also focuses on the assembly of hardware, software, data, procedures, and people; in other words, information system means a system of communication between people (Davies, 2009). Moreover, Gurbaxani & Whang (1991) claimed that there are many roles of information systems in an organisation, for example to increase an operation's efficiency, to process business transactions, to provide decision support, to monitor and evaluate employees' performance, and to maintain documentation and communication channels.

2.2.4 Management Information Systems

Lee (2000) defined MIS as “a system or process that provides information needed to manage organizations effectively”. Additionally, Baskerville & Myers (2002) broadly define MIS as “the development, use and application of information systems by individuals, organizations and society”. Becta (2005) describes an information system as “a system consisting of the network of all communication channels used within an organization”. In their study, Laudon & Laudon (2005) defined MIS as “the study of information systems focusing on their use in business and management”.

Waston et al. (1987) describes management information system (MIS) as ‘an organizational method of providing past, present and projected information related to internal operations and external intelligence. It supports the planning, control and operation purposes of an organization by providing unvarying information in the right time frame to assist the decision makers. Telem (1999) defines MIS as ‘a management

information system designed to match the structure, management task, instructional processes, and special needs of the school'. O'Brien (1999) referred MIS as 'a term given to the discipline focused on the integration of computer systems with the aims and objectives of an organization'.

2.3 Concept of Management Information Systems

MIS has been described as a pyramidal structure representing the different levels of management in an organisation or system (Figure 2.1). In this pyramid, the bottom layer consists of information for transaction processing and status inquiries. The next higher level consists of information resources in support of day-to-day operations and control. The third level consists of information system resources to aid in tactical planning and decision making for management control. The top level consists of information resources to support strategic planning and policy making by higher level of management. Each level of information processing may make use of data provided by the lower level. Even new data can also be introduced.

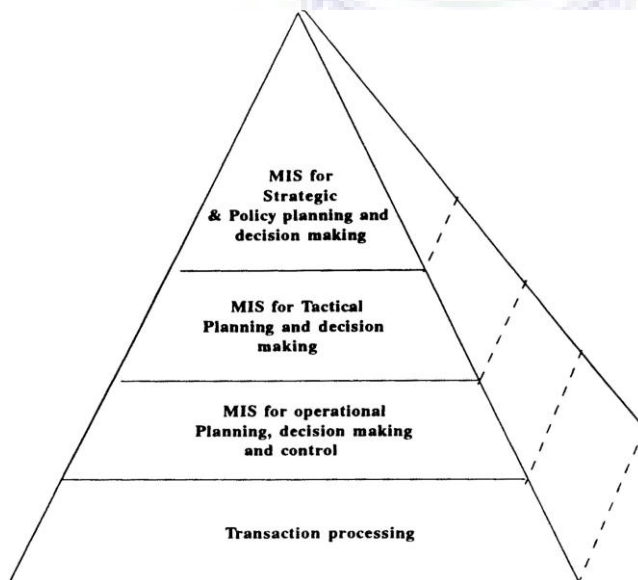


Figure 1: The pyramidal structure of the MIS (Head V.R. 1967)

2.3.1 Benefits of Management Information Systems

MIS makes a major difference for the business organizations. It furnishes various benefits such as:

- 1) effective and efficient coordination between Departments
- 2) quick and reliable referencing
- 3) access to relevant data and documents
- 4) use of less labour
- 5) improvement in organizational and departmental techniques
- 6) management of day-to-day activities
- 7) day-to-day assistance in a Department and closer contact with the rest of the world.
- 8) provides a valuable time-saving benefit to the workforce (Lahar et al., 2015).

2.4 Adoption of Information System

The most popular models in the field of information systems success, and technology adoption such as the technology acceptance model and information system success model focus on the technology factors of the successful implementation of information systems. In addition, there are another model called computer usage. The theoretical grounding for this model mainly comes from technology acceptance model (TAM) social cognitive theory (SCT), theory of reasoned action (TRA), and theory of planned behaviour (TPB). This model focuses on people factors (computer experience, computer anxiety, and self-efficacy) and organizational support. Moreover, there are another model called personal computing acceptance. This model focuses on the organizational factors (Intra-organizational Factors, Extra-organizational Factors). This study developed integrated model for successful adoption of management information

systems that link three factors (technological, organizational, and people) (Yaser, 2015).

2.4.1 Technology Acceptance Model

The Technology Acceptance Model, developed by Davis is one of the most influential research models in studies of the determinates of information systems and information technology acceptance to predict intention to use and acceptance of information systems and information technology by individuals. In the Technology Acceptance Model, there are two determinants including perceived ease of use and perceived usefulness (Chen, 2010). Perceived usefulness (PU) - was defined by Davis (1989) as "the degree to which a person believes that using a particular system would enhance his or her job performance".

De Lone (1992) performed a review of the research published during the period 1981–1987, and created taxonomy of IS success based upon this review. In their 1992 paper, they identified six variables or components of IS success: system quality, information quality, use, user satisfaction, individual impact, and organizational impact (Petter, 2008). From De Lone & McLean study, technology acceptance model, and literature review we adopt taxonomy of MIS success measures. In this study we identified six variables or components of MIS success: MIS quality, information quality, top management support, perceived usefulness, decision maker's satisfaction and quality of managerial decision making. In this study we assume that the system quality affects on information quality, and there is direct relationship between information quality and managerial decision making. In addition, we replacing use by usefulness, because the management information systems success measure is the benefits or useful of use.

2.5 Perception of MIS

It has always been the assumption that the implementation of information systems will bring a business competitive advantage. After all, if installing one computer to manage inventory can make a company more efficient, wouldn't installing several computers to handle even more of the business continue to improve it?

In 2003, Nicholas Carr wrote an article in the *Harvard Business Review* that questioned this assumption. The article, entitled "IT Doesn't Matter," raised the idea that information technology has become just a commodity. Instead of viewing technology as an investment that will make a company stand out, it should be seen as something like electricity: It should be managed to reduce costs, ensure that it is always running, and be as risk-free as possible (David, 2014).

2.6 Effectiveness of MIS

De Lone (1992) identified different factors influencing the success of Management information system in ensuring the success of decision support systems including system quality, quality of information, the satisfaction of the user, and impact of the individual. Management information systems are reported to have a number of benefits in relation to the support which they provide for enhancing the activities of decision support systems. The main role of management information systems begins from the definition of the problem on to which later stages of actions are based on.

Mintzberg (1976) mentioned two important areas in problem definition phase. One of these areas, known as "decision recognition" is believed to start the process of decision support by revealing relevant problems, threats and etc. As to the second phase, known as "diagnosis", is mainly concerned with the analysis and reviews of the previously defined problem and threat in "decision recognition" sphere. This is a crucial aspect of

operation in management information systems. The role of management information systems is even becoming vital in capturing and storing information for decision-making purposes. In this case, information may be obtained from different sources including internal and external. Therefore, available information is crucial for identifying problems and threats and further opportunities as well. To be more precise, the information may be defined and analysed in relation to political, legal, economic, technological and social factors which are considered to be crucial in analysing changing consumer behaviour and market environment. Information is considered to play an important role in every organization. The use and application of information are significantly related to its value. Most of the past researches show a positive link between quality of information and firm success (Ahmed, 2016).

2.7 Hospital Information System (HIS)

The advancement of information and communication technology has had major impacts on the various sectors of the economy of Ghana (Xue, 2008; Kuo, 2015). The healthcare sector is one of the industries that have witnessed massive application of information and communication technology (Aghazadeh, 2012; Staggers, 2001). One of the key concepts in healthcare that has received attention from practitioners, researchers and scholars is hospital information system. According to Tachinardi (1994), hospital information system has evolved into useful and indispensable tools in healthcare management. Grandia (2017) note that hospital information system has assumed a vital role in the delivery of healthcare since the 1970s propelling hospital managers to invest huge sums of money into it.

In the views of Ahani (2016), effective hospital management information system is a pre-requisite for the delivery of cost effective and quality healthcare to clients as it has become an integral component in clinical and non-clinical healthcare services. The importance of hospital information system in healthcare delivery is premised on the need to deliver timely and quality services to the growing number of people visiting health facilities (Premkumar, 2013).

According to Ahani (2016), the term “hospital information system” has been defined differently by several scholars with the aim of providing a clear understanding of it. Simply put a hospital information system is a network designed to support the flow of information between departments (Sneider, 1987). Vegoda (1987) defined hospital information system as an integrated system which facilitates healthcare by increasing the user’s knowledge and reducing uncertainty allowing rational decisions to be made from the information provided. Degoulet (1997) also defined HIS as a computerized-based system designed to ease medical and administrative information and to facilitate healthcare delivery.

Olusanya (2015) termed hospital information system as an automated application of information management system to manage the administrative, clinical and financial aspects of a hospital to assist the monitoring and controlling of activities in the hospital and enable timely accessibility of patient and departmental information.

Adebisi (2015) termed hospital information system as a set of automated system used to manage patients’ information and for the administration of the hospital as a whole. To the authors, hospital information management is made up of data collection, data processing, data storage and report generation to reduce time wastage in healthcare delivery and ultimately improve efficient running of the hospital.

From the above definitions, it can be deduced that a hospital information system is a specialized system specific for its use in a particular hospital taking into consideration the process of dissemination of information to enhance healthcare service delivery. Hence, the main goal of hospital information system is to integrate health information to meet the needs of patients, research, improve quality of care, reduce costs, and automate tasks such as reporting test results, and entering physician's order (Hekmat, 2016). Given the importance of hospital information system, its implementation and use have potential benefits to the healthcare sector (Thakare, 2014).

According to Schaper (2007), HIS is essentially a computer system that has the capacity of managing hospital information by allowing healthcare providers to do their job effectively and efficiently. HIS has been in existence for long, although it was utilized for managing only hospital bills and inventory (Schaper, 2007). However, all these have changed in recent time as hospital information system now include clinical, financial and administrative applications. A clear understanding of HIS in modern times is very paramount since HIS include many applications for addressing the needs of various departments in a hospital.

According to Thakare (2014), HIS in recent time helps to manage data or information related to departments such as laboratory, dental, maternity, claims processing, paediatrics etc. The hospitals that are using HIS have quick access to reliable information illustrating details the demographics of patients. Vital information such as financial system of the hospital, distribution of medication and even diet of patients. The monitoring of drug usage in the facility and improvement of its effectiveness is easier with the availability of these information. Hence, as many as 200 disparate systems have been combined into the hospitals' HIS (Adebisi, 2015).

Advancement in technology has increased HIS innovations within the hospital environment. However, Fei (2016) argued that HIS becomes useless when it confuses the employees of the hospital. The software must be user friendly and should include training by the vendors in order to make easier its use by hospital staff. For a HIS to be effective, it should be patient centric, medical staff centric, affordable and scalable. This will lead to numerous benefits such as delivery of quality patient care, enhancing information integrity, reducing transcription errors, optimizing report turnaround times and better financial management among others. Flexibility of the system is required in order to accommodate hospital growth since technology (Fei, 2016).

2.8 Evolution of Hospital Information System – World

Haux (2006) reveals that data management in hospitals has shifted from mainly paper-based processing and storage to an improved computer-based processing and storage and hence the development of hospital information system in hospitals. They are based on the following phases: a move from paper-based data collection, processing and storage to computer-based data collection, processing and storage. In addition, a move from departmental information system to institutional information system; integration of patients and health consumers information with health and administrators; application of hospital information system data for patient care delivery, administrative purposes, health care planning and clinical research. A move from technical hospital information system challenges to strategic information management; a move from purely alpha-numeric data in hospital information system to images; increase in new technologies such as ubiquitous computing and sensor-based technologies.

Grandia (2017) and Collen (1994) acknowledged that the evolution of hospital information system dates back to the early 1960s where expensive and complicated mainframe and storage devices were shared by hospitals to manage their accounting functions.

Northern Virginia Community College (2014) points out that early introduction of hospital information system was used to serve the purpose of billing as cost-based reimbursement was the order of the day. This became necessary as the hospital was expanding and administrative and financial functions were gaining importance in the delivery of healthcare. During this period hospital attendance increased due to the passage of the Medicare and Medicaid legislations and hospitals have to prepare bills for reimbursement (Staggers, 2011).

Barnett (1999) and Ahani (2016) indicate that the integration of hospital information system was first done through the application of technology in Chemistry laboratory test reporting system and the Bacteriology test reporting system in the hospitals in 1968. These views were supported by Staggers (2011) when he indicated that hospital information system was first applied in the healthcare sector to manage acute care in the late 1960s through computer-based patient record to support management decision making. In the views of Tachinardi (1994), hospital information system was initially designed to support administrative functions before integrating it into medical function to manage clinical data. Most of the institutions that developed and utilized hospital information system in their operations in the 1960s were mostly teaching hospitals (Collen, 2015).

In the 1970s, the application of hospital information system increased. The improvement in information technology resulted in the development of smarter and smaller computers than the main frame computers used in the 1960s though hospital information system were still being shared among healthcare providers (Grandia, 2017) and (Northern Virginia Community College, 2014). The financial functions played by hospital information system were improved to include administrative functions as well as automation of clinical departments. This resulted in the reduction in health care delivery cost (Northern Virginia Community College, 2014).

Staggers (2011) pointed out that due to the reduction in computer technology and advancement in computing systems in the 1970s, many physicians started using hospital information system to address the healthcare needs of their clients.

The 1980s witnessed the marketing of hospital information system by vendors based on the success of the hospital information system in the 1960s and 1970s (Collen, 2015). Hospital information system gained international attention in the 1980s when many countries especially in Europe initiated to shift from paper-based healthcare delivery to the automation of the healthcare delivery processes in the hospitals (Aghazadeh, 2012). In the United States hospitals, many clinical functions were integrated with improved information systems, with advanced database systems, with local area networks and the application of a large mini- and microcomputers (Collen, 2015).

Tremendous growth in hospital information system was experienced in the 1990s. The application of hospital information system to resolve challenges in the various departments in hospitals in the 1990s (Grandia, 2017).

The number of computers used in hospitals increased with many departments charged with the responsibility of processing their own data (Northern Virginia Community College, 2014). Aghazadeh (2012) noted that massive changes and improvement in medical technology and hospital information system occurred in the in 1990s.

In the 1990s, data storage technologies improved dramatically. The level of technological expertise among hospital staff also increased with improved changes in healthcare service delivery. The billing system for insurance reimbursement technology saw an improvement over the technology applied in the 1980s (Grandia, 2017). In the views of Grandia (2017), in the 1990s, hospitals had access to robust computing systems and networks with the creation of the integrated delivery network for data capturing and reporting. Collen (2015) indicated that the application of hospital information system among academic institutions reduced, while patronage by commercial vendors increased in the mid-1990s. The main design requirement requested by users was the interoperability of the hospital information system.

Grandia (2017) indicated that the use of hospital information system for financial management gained more prominence in the 21st century. Also, the application of the hospital information system for healthcare billing for reimbursement also intensified. The clinical application of hospital information system also increased for effective decision making. Northern Virginia Community College (2014) pointed out that in the 2000s, hospital demand for data in decision making increased exponentially. The demand for high volume of data and analytical information were increased, prompting hospitals to employ mainframe computers in the management of hospital wide applications. In the views of Collen (2015), exchange of information among hospitals

became paramount as healthcare experts intensified their efforts to improve global health status. Open system architectures and interconnection standards were used to exchange information among hospitals and hospital information system multi-vendor. Aghazadeh (2012) indicated that the rising demand of patients and industrial expectation has increased the use of hospital information system in the delivery of healthcare services in the 21st century.

2.9 The Emergence of Hospital Information System - Ghana

According to Blois (2005), hospital information system evolved in Ghana through the Ministry of Health (MOH) legal and policy framework. The challenges within the health system in Ghana led to the drafting of a policy framework. The purpose was to ensure effective use of ICT for healthcare management and development. Further, the working document for MOH (2008), the use of ICT in healthcare was to ensure that data and information are synchronized from diverse departments of the Hospital. Therefore, diverse hospitals started using ICT in Ghana in order to ensure quality healthcare delivery. Greenes and Brinkley (2004), argued that ICT in modern times have been broadly used to help doctors, nurses and other specialists to give superior care to health in both administrative and medical fields. Hospitals therefore used ICT in practically every aspect of health structure – public health, hospital management, healthcare range, medical records, pharmacological history, clinical sessions, etc.

According to MOH (2009), standard of the health offices in the country have significant number of challenges in relation to IT applications. These include problem of sight and sound gadget, imaging and printing framework, correspondence and web framework. Further, the predominant of ICT in the 1990s have not been fully consolidated. Unmistakably, from a couple of healing facilities with a local area network (LAN), the

vast majority of the health awareness suppliers have repressed their LANs to the front office and drug constituent of their offices (MOH, 2009). The LANs are often used to backing the mechanisation of drug administrations. Sight and sound frameworks are included for playing back medicinal and nonmedical documentaries.

According to Ministry of Health (2009), different programming is utilized as a part of the administration of doctor's facility activities. The degree to which these methods are grasped by data frameworks varies from clinic to healing centre and from action to movement. In light of this, hospital information system gained grounds through electronic applications in the hospitals after the 2000s. Through these health information systems, the implementation of ICT, the adoption of E-Learning became paramount among nurses, doctors and majority of health professional in Ghana. The advancement in technology identified unique characteristics of every hospital making it vital for the use of hospital information system in Ghana in recent times of which the University of Education Winneba, Kumasi campus clinic is no exception.

2.10 Features and Functions of Hospital Information System

Aggelidis (2008) note that a successful hospital information system has seven main features:

- Ensuring system quality: the whole system must function effectively and efficiently.
- Ensuring information quality: information generated by the system must meet international and national standard.
- Ensuring service quality: the healthcare delivered must be of high quality and must improve the health status of the patients.

- Ensuring information usage: the application of information must meet the needs and demand of the hospital.
- Ensuring user satisfaction: the HIS must meet the requirement of the user.
- Ensuring individual impact: the individual staff work must be effectively impacted by the hospital information system.
- Ensuring organizational impact: the entire work flow in the hospital must be positively impacted by the hospital information system.

Hospital information system has become a key component in the healthcare delivery system within the health sector. The relevance of HIS is measured by the functions it performs in the delivery of healthcare services. Quintegrasolutions (2006) asserts that the functions of HIS is divided into five main components namely: patient administration, clinical management, resource management, financial management and management information system. Further, the study by Quintegrasolutions (2006), provided some important functions of hospital information system. These include diagnostic function, information management, insurance reimbursement, transfer information, inventory management, and clinical function.

Premkumar & Kalpana (2013) also summarizes the functions of HIS into: Storage and monitoring of patient's condition to collect, process and store data for managerial and statistical analysis in health research. Management and Data Flow to support automation of transfer of patients' data among departments and hospitals, graphically diagnose images generated from the database of the hospital and communication among department. Financial management to facilitate efficient financial administration.

2.11 Conclusion

Through the MIS, the information can be used as a strategic arm to counter threats to business, make business more competitive, and transform organization through integration. In our paper we have explained the basic concept and the pyramid structure of MIS and various types of information management systems such as Transactional Processing System, Management Reporting System, Decision Support System and Executive Support System. We have also explained five basic steps involve in designing and developing of an effective MIS in an organization. We have described the economic impact of MIS in an organization. In a nutshell, MIS is a management tool to help company management make informed decision for their business based on information gathered from all business departments. A good MIS also makes an organization seamless by removing all the communication barriers (Khan & Khan , 2011).



CHAPTER THREE

METHODOLOGY

3.1 Introduction

According to Tromp and Kombo (2006), research is defined as the process of arriving at a dependable solution to a problem through planned and systematic collection analysis and interpretation of data. This chapter outlines the research methodology that was employed in this study. The research methodology highlighted the overall approach taken in the research in terms of the research design, the target population and the sample designs. The chapter further explains data collection instruments and data analysis process.

3.2 Research Paradigm

Research paradigm plays a vital role in the study of any discipline within the social or natural sciences. Various definitions have been given by various scholars regarding research paradigm. According to Collins and Hussey (2008), research paradigm is a philosophical yardstick for conducting a research.

3.3 Choice of Research Paradigm

The aim of this study is to understand how the implementation and use of management information system enables or constrains management of health services at the University of Education Winneba, Kumasi campus clinic. Based on the definition for the research paradigm, the appropriate paradigm used for the study was the interpretive research paradigm. Interpretive research is a research paradigm that is based on the assumption that social reality is not singular or objective, but is rather shaped by human experiences and social contexts (ontology), and is therefore best studied within its

socio-historic context by reconciling the subjective interpretations of its various participants (epistemology). (lumenlearning.com, n.d.) The rationale for selecting this paradigm is that the researcher cannot consider himself as being independent throughout the process of this study. This is because interpretive research encourages the researcher to be the main data collection instrument as this enhances the consistency of data and support engagement of respondents.

Further, this allowed the researcher to explore hiding reasons behind the use of management information system at the University of Education Winneba, Kumasi campus. The researcher adopted this approach because it allowed him to reconcile the subjective interpretation of management information system implementation and use by respondents at the University of Education Winneba, Kumasi campus. From a positivist research paradigm point of view this would not have been possible because it would affect the objectivity of the research conducted.

3.4 Research Methodology

In order to investigate how management information system is implemented and used at the University of Education Winneba, Kumasi campus, there is the need to apprehend the experiences and roles of key decision makers and policy implementers of the University of Education Winneba, Kumasi campus. The qualitative research method is used due to its suitability. According to Anderson (2018), qualitative research is defined as a research method that focuses on obtaining data through open-ended and conversational communication. Its suitability is with regards to getting to know the experiences of key decision and policy makers and current insight into how management information system is implemented and used at the University of

Education Winneba, Kumasi campus. Further, since diverse departments and units of the University of Education Winneba, Kumasi campus are involved in the implementation and use of the management information system, the qualitative method offers the best method. This is because, the qualitative method offers the best platform in situations where events can be interpreted, described and explained by different actors in different departments and units of the University of Education Winneba, Kumasi campus. Despite the fact that the study utilized interpretative approach which is in line with qualitative study, the method provides opportunity for respondents with in-depth views and experiences on issues to bring them out and hence aids in conducting detailed search about a given phenomenon.

3.5 Research Design

Cooper & Schindler (2003) defines research design as the blue print for the collection measurement and the analysis of data. This study used a cross section survey which was suitable for my research. This design was considered appropriate since this study established the effects of the impacts of Management Information System in the service delivery of the university of education Winneba, Kumasi campus. The study proposed to consider this design since the research was designed to obtain pertinent and precise information status of the phenomena. It described data and characteristics about the population or phenomenon being studied. Descriptive designs are used in preliminary and exploratory studies to allow the researcher to gather information, summarize, present and interpret for the purpose of classification.

3.6 Research Strategy

Saunders et al. (2009), defined research strategy as “the general plan of how the researcher will go about answering the research questions”. On a similar note, Bryman (2008) identified research strategy as “a general orientation to the conduct of research”. Research strategy, according to Remenyi et al. (2003), provides the overall direction of the research including the process by which the research is conducted. Saunders et al. (2009) mentioned that appropriate research strategy has to be selected based on research questions and objectives, the extent of existing knowledge on the subject area to be researched, the amount of time and resources available, and the philosophical underpinnings of the researcher. The research strategy for this dissertation was established by adopting a way which the research objectives can be answered. The researcher chose quantitative research in addition to qualitative research methods. Creswell (1994) defines quantitative research as an enquiry into social or human problem based on testing a hypothesis or a theory composed of variables, measured with numbers, and analysed with statistical procedures in order to determine whether the hypothesis or the theory holds true.

3.7 Population of the Study

According to Burns & Grove (1993) a population is defined as all elements (individuals, objects and events) that meet the sample criteria for inclusion in a study. The study population of this research consisted of all Staffs and students of University of Education Winneba, Kumasi campus. The target population of the study consisted of selected staff and students of the university. The population for this research included five clinic staff, five other university staff and twenty students.

3.8 Sampling techniques and Sample Size

Sampling is a key component of any investigation and involves several considerations. The aim of most investigations is to obtain information about a population. A census or sample of the population is taken for analysis. The sampling techniques used for this study were purposive and convenience sampling techniques. Purposive sampling technique was used to select staff and students of the university who use HIS one way or the other. Convenience sampling was used to select a representative number of the university clinic staff, students and other university staff. The sample size for the study was 30 staff and students. The selection of the sample was based on chance selection and the readiness and availability of the respondents. A total of 30 questionnaires were administered in order to ascertain the perceptions of both staff and students with respect to the impact of HIS in service delivery of the university clinic. In this study, a sample size of 30 was considered adequate for the study. According to Pallant (2007), a sample size of 30 and above do not violate or cause major problems in statistical measures even if the responses are not normally distributed.

3.9 Data Collection Method

The study relied on both primary and secondary data. Primary data was collected with the use of questionnaires and secondary data was also obtained from external sources such as the internet, Journals and other documentations. The purpose of sourcing for secondary data was to help in the formation of problems, literature review and construction of questionnaire.

3.9.1 Primary Sources

Primary sources provide a first-hand account of an event or time period and are considered to be authoritative. They represent original thinking, reports on discoveries or events, or they can share new information. Often these sources are created at the time the events occurred but they can also include sources that are created later. They are usually the first formal appearance of original research. (www.library.unsw.edu.au, n.d.) The study was conducted using the case study method of research. Self-administered questionnaires and informal interviews were the techniques used in gathering data.

3.9.2 Secondary sources

The researcher gathered data from the university clinic. Data was also gathered from the websites, journals, books, newspapers, magazines of different institutions along with different related studies about impact of MIS within tertiary institutions to supplement the research.

3.9.3 Data Collection Instrument

A questionnaire was selected as the main data collection tool. A questionnaire is a printed self-report form intended to elicit information that can be found by the written answers of the respondents. The information obtained through a questionnaire is similar to that obtained by an interview, but the questions tend to have less depth (Burns and Grove, 1993). Data was collected with the aid of questionnaires to evaluate the staff and student's knowledge and views on the subject matter and how it affects service delivery in the department. The questionnaire was designed to meet the goal of the study. It was adopted from previous works by Anichebe & Agu (2013) but the

researcher designed it to suit the objectives of the study in order to solicit answers that would meet the objectives.

Questionnaires were distributed by the researcher to staff and students to complete. The data was collected over a period of two weeks. Before the questionnaires were administered, the researcher sought permission from the department and interviewed a few staff of which the researcher derived the research topic and objectives. The researcher interviewed some staff to know the activities of the department. From that, the questionnaires were designed for the respondents. The researcher first did a pre-test of the questionnaire to ensure that the objectives were being met. The purpose of the pre-test activity is to ensure that the questionnaires are meaningful, easily understood and appropriate for the main fieldwork. The activity enabled the researcher to become more familiar with items of the questionnaires and prepare them accurately for the main work. After corrections were made, the questionnaires were distributed to staff and students.

3.9.4 Validity and Reliability

To enhance data reliability by the researcher, the researcher organized and documented the data collected. To ensure validity, the researcher ensured that the questionnaires were simple, easy to understand and straight forward with multiple choices to give respondent opportunity to answer the questions accurately within their understanding. Questionnaires were also designed based on the research topic and research questions related to the study. The researcher also carried out a pilot study to test the validity of the questionnaire to ensure that it measures what it intends to measure and the reliability of the questionnaire. The pilot study conducted confirmed that the questionnaire presented would be able to collect sufficient and reliable information necessary to draw

evidence on the subject of the study. It can be concluded that the results from the response from the questionnaire for the study is reliable and valid.

3.10 Pre-test of Questionnaires

The study pre-tested the questionnaires with key literature such as Oballah et al. (2015) and Anichebe & Agu (2013) as well as some experts. The underlined factor of this exercise was to determine the level of understanding of the items in the questionnaire and to ascertain face validity of the data collection tool. Also, it was to find out whether the feedback from the pre-test provides the type of information needed or whether the respondents were misinterpreting any of the questions. After this exercise, some of the items in the questionnaire were deleted and others were improved upon.

3.11 Ethical Considerations of the Study

There was the need to ensure that the study did not contravene the ethical issues. Hence, the following measures were taken: The research questions were framed such that inconvenience and embarrassment were not caused to the participants in the research. Department of information technology education staffs and students were assured of their utmost confidentiality with regards to information provided. Data obtained were treated with confidentiality. Those who took part in the study were not coerced but did so voluntarily. The consent of the respondents was obtained before they participated in the research. As much as possible, the researcher exercised a great deal of circumspection and objectivity throughout the research period.

3.12 Data Analysis

Sullivan (2007) opined that data analysis can be the most challenging and interesting aspect of research. It refers to deriving meaning from the data that had been collected in a study. Data analysis assumes many forms. Quantitative data analysis involves the use of statistical methods to assemble, classify, analyse and summarize the data to derive meaning. As indicated earlier, the author conducted field research to collect data from the department of information technology education of UEW-K using questionnaires. After the data collection, data reduction was conducted to select, arrange, refine, focus and summarize the data for onward analysis. The data collected was transformed into a form appropriate for manipulation and analysis. The data collected from the questionnaire was edited to guarantee wholeness, consistency and accuracy. Data collected were analysed through the use of Statistical Package for Social Sciences (SPSS) software and Microsoft Excel. In analysing the data, frequency and descriptive tables were used as analytical tools. Quantitative explanations were made of quantitative data to give meaning to them as well as explain their implications. From these, appropriate conclusions and recommendations were made from the findings of the research.

CHAPTER FOUR

RESULTS OF THE STUDY

4.1 Introduction

This chapter of the study provides the data analysis and interpretation based on information obtained from thirty (30) respondents who were students and staff of University of Education Winneba, Kumasi campus. The analysis and interpretation were conducted in line with the stated research objectives and questions. The chapter is organised into three sections. The first captures the case organisation. The second captures descriptive analysis of respondents' information in the university. The third section presents the result in congruence with the posited study objectives.

4.2 General Information on the Respondents

First section of the questionnaire asked for the background information of the respondents. The respondents consist of students and staff of the university. The section asked for the ages, gender, position in the university, how long the respondents has been in the university and their level of education. The results are presented below:

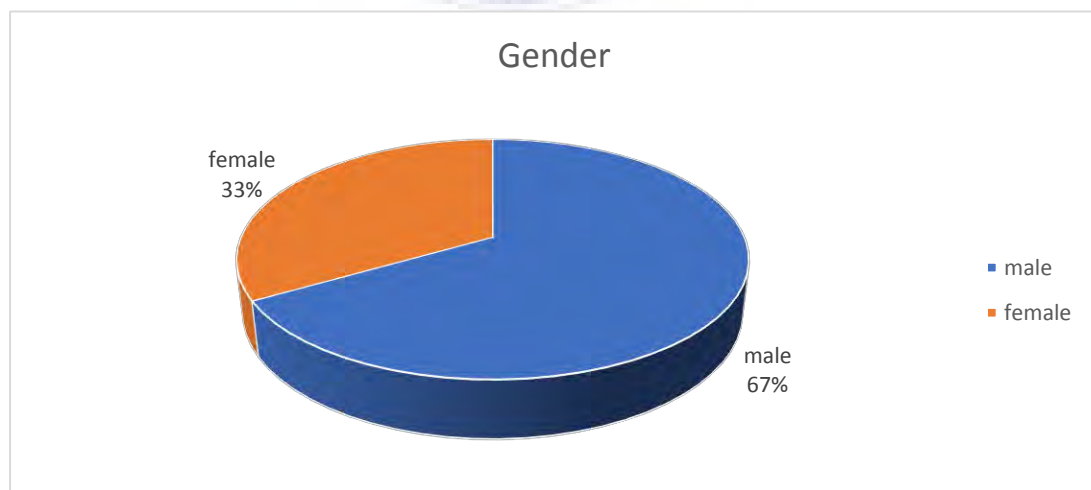


Figure 2: Gender

Source: Research Data, 2020

From the above figure 2, it shows the gender of the respondent for this study. It is clear that a majority of the respondents are male which represents 67% and female represents 33% of the total respondents.

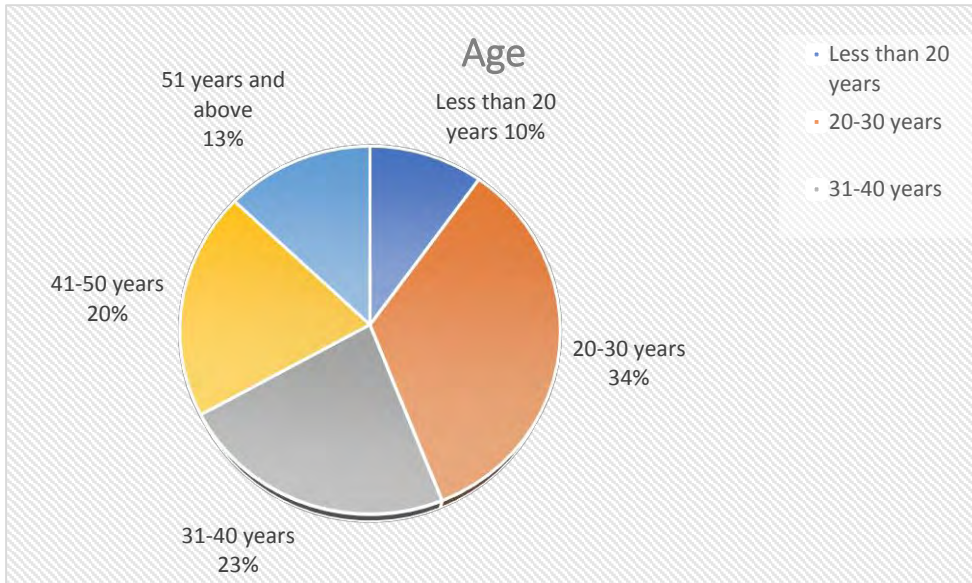


Figure 3: Age

Source: Research Data, 2020

It can be seen that out of the total sample size 30, 10% are less than 20 years, 34% are between the ages of 20 to 30 years. Respondents between the ages of 31 to 40 years are 23%, 41-50 years are 20% and those above 51 years constitute 13%.

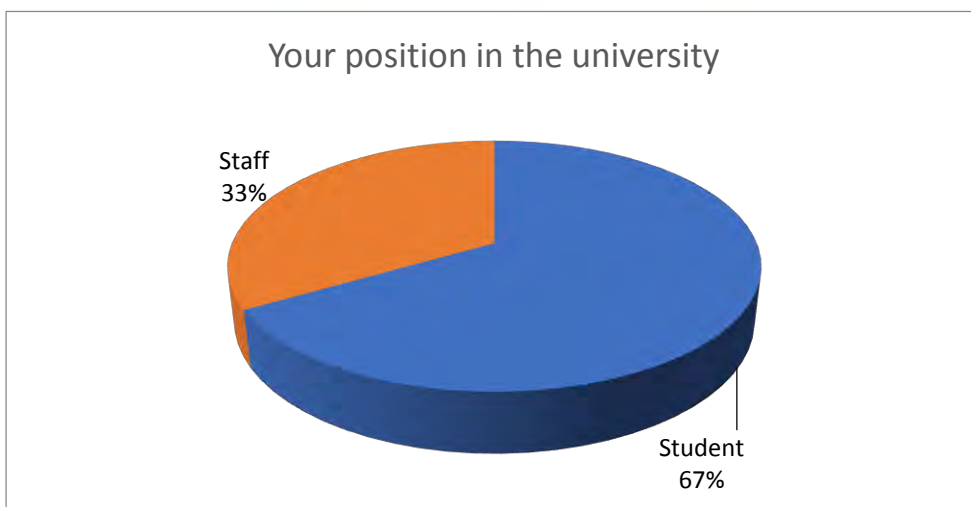


Figure 4: Position

Source: Research Data, 2020

It can be seen from the figure 4 above, that 67% of the respondents for this study were students from the university and 20% were staff.

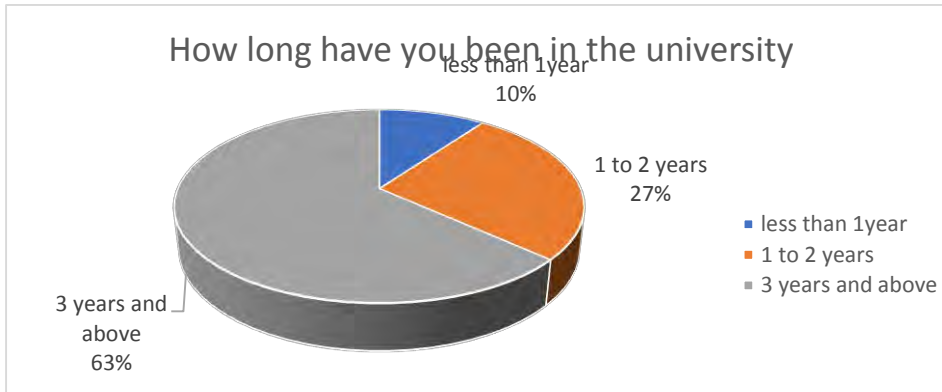


Figure 5: Duration

Source: Research Data, 2020

In determining the duration of respondents at the university, the researcher asked how long have respondents been in the university. As clearly shown in the figure 5 above, 10% of the respondents indicated that they have been at the university less than 1 year, respondents who have spent between 1 to 2 years where 27%. The figure shows that 63% of the respondents were those who have spent more than 3 years in the university.

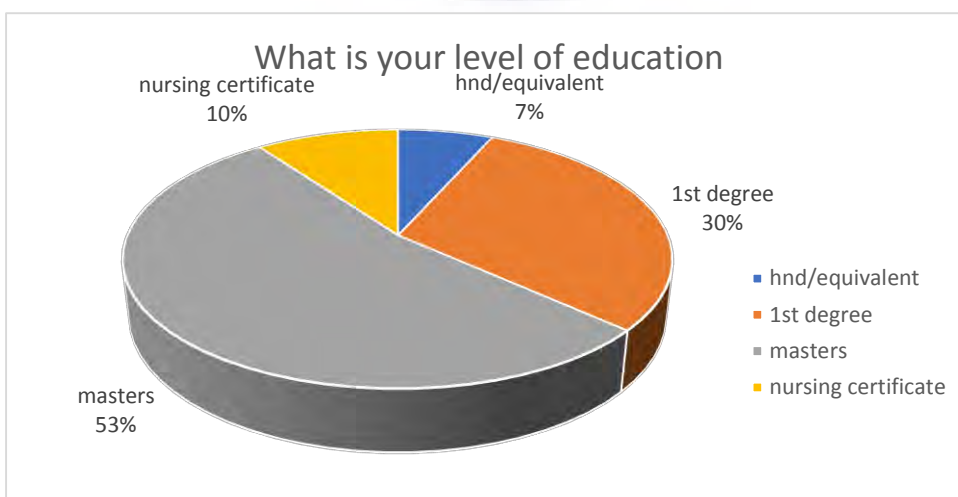


Figure 6: Educational level

Source: Research Data, 2020

In this study, 53% of the respondent have masters degree, 30% have 1st degree. Respondents having nursing certificate were 10% and those with HND/equivalent were 7%, as shown in the figure 5 above.

4.3 Infrastructure Management

Table 1: Infrastructure Management

Variables	Indicators	Frequency	Percent
There is a common network computing information infrastructure that is readily accessible to everyone in the university thus improving service quality to the public	Disagree	1	3.3
	Neutral	1	3.3
	Agree	25	83.3
	Strongly agree	3	10.0
	Total	30	100
It is easy to locate data wherever it is needed enhancing service reliability	Neutral	2	6.7
	Agree	25	83.3
	Strongly agree	3	10.0
	Total	30	100
	Considerations of both security and accessibility are taken into account in making data placement decisions thus improving service quality	Disagree	
Agree		2	6.7
Strongly agree		23	76.7
Total		5	16.7
Total		30	100
The Clinic I S provide appropriate data to the people performing different organizational functions in the right time	Disagree	4	13.3
	Agree	24	80.0
	Strongly agree	2	6.7
	Total	30	100

From the table 1 above, respondents who indicated that they disagree that there is a common network computing and information accessible to everyone in the university were 3.3%, 1 respondent indicated neutral which represent 3.3%, 3 indicated that they strongly agree while the rest representing 83.3% indicated that they agree.

The table 1 above also shows that 10% of the respondents indicated that it is easy to locate data wherever it is needed enhancing service reliability. The other 83.3% affirms this by indicating agree while a few of the respondent indicated neutral which represent 6.7% of the total respondents.

In considering both security and accessibility that are taken into account in making data placement decisions thus improving service quality, respondent who strongly agreed were 5 which represent 16.7% of the total respondents. 76.7% indicated agree and 6.7% also indicated disagree.

The researcher checking if appropriate data to the people performing different organizational functions in the right time, 4 of the respondents disagreed which represent 13.3%, those who agree where 24 representing 80%. Respondent who strongly agree were 2 which represent 6.7% of the total respondents as indicated in the table 1 above.

4.4 Accessibility of the System

Table 2: Accessibility of the System

Variables	Indicators	Frequency	Percent
Does the University provide regular and structured training to its staff and students on accessibility and policy of MIS use	Yes	23	76.7
	No	7	23.3
	Total	30	100.0
Does the clinic have online OPD where one can fill basic information before visiting the facility	Yes	24	80.0
	No	6	20.0
	Total	30	100.0
If yes, how accessible is it	Not difficult	25	83.3
	Difficult	4	13.3
	Very difficult	1	3.3
	Total	30	100.0
How do you access your medical results	Manual	29	96.7
	Email	1	3.3
	Total	30	100.0
Is there a defined process in place to coordinate the implementation of information security policy, measures and programs?	Yes	26	86.7
	No	4	13.3
	Total	30	100.0
Are relevant user accessibility requirements and policy specifically defined and documented in the University.	Yes	25	83.3
	No	5	16.7
	Total	30	100.0
Policies, procedures and guidelines	Poor	3	10.0
	Average	3	10.0
	Good	24	80.0
	Total	30	100.0
Data Encryption	Poor	3	10.0
	Average	3	10.0
	Good	22	73.3
	Very good	2	6.7
	Total	30	100.0
Firewalls	Average	7	23.3
	Good	23	76.7
	Total	30	100.0

Intrusion Detection Systems	Poor	1	3.3
	Average	3	10.0
	Good	25	83.3
	Very good	1	3.3
	Total	30	100.0
Intrusion Protection Systems	Poor	2	6.7
	Average	8	26.7
	Good	17	56.7
	Very good	3	10.0
	Total	30	100.0
User Awareness training programs	Very poor	1	3.3
	Poor	1	3.3
	Average	2	6.7
	Good	25	83.3
	Very good	1	3.3
Total	30	100.0	
User Authentication Systems/ logical Access Controls (username & password, biometrics, tokens)	Poor	2	6.7
	Average	2	6.7
	Good	24	80.0
	Very good	2	6.7
	Total	30	100.0
Incident management process	Very poor	1	3.3
	Poor	2	6.7
	Average	5	16.7
	Good	20	66.7
	Very good	2	6.7
Total	30	100.0	
Physical Security /Access control Systems	Very poor	1	3.3
	Poor	2	6.7
	Average	3	10.0
	Good	21	70.0
	Very good	3	10.0
Total	30	100.0	

In the table 2 above the researcher sort to find out how the system is accessible to the users. In this study respondents were asked if the university provide regular structured training to its staff and students on accessibility and policy of IMS use, 23 of the respondents representing 76.7% said yes and 7 respondents representing 23.3% said no

as shown in the table 2 above. The respondents were also asked if there were an online OPD to fill basic information, 24 of the respondents representing 80% said yes while 20% of the respondents said no.

Respondents were asked, to what degree is the system accessible, 25 of the respondents representing 83.3% indicated not difficult, 13.3% indicated difficult, and 3.3% indicated very difficult. Out of the total respondents 29 of them representing 96.7% indicated that they manually access their medical results and 1 representing 3.3% indicated access is done through email.

From table 2 above, respondents were asked if information security policy, measures and programs were defined. Table 2 clearly show 26 respondents representing a majority of 86.7% indicating yes while a few of the respondents representing 13.3% indicated no. It was further indicated by 25 of the respondents saying yes, that user accessibility requirements and policy are specifically defined and documented in the university, this represents 83.3%, the others indicated no which represent 16.7% of the total respondents.

A number of the respondents indicated that policies, procedures and guidelines are poor, and that represent 10%, those indicated average are also 10%, 24 of them representing 80% indicated that policies, procedures and guidelines are good. In respect to data encryption, 3 of the respondents said it is poor, representing 10% of the total respondents, those who indicated average are 3 representing 10%, 2 indicated very good and 22 indicated good representing 73.3%.

From the table 2 above, respondents responding to the firewalls of the system, 23.3% indicated average and the other 23 representing 76.7% indicated good.

From the table 2 above 3.3% of the respondents said the system is having poor intrusion detection system, 3 respondents representing 10% indicated average, 1 person indicated very good representing 3.3% and 25 respondents indicated good representing 83.3%.

Respondents further indicated that intrusion protection systems are poor were 2 which represents 6.7%, those who indicated very good were also 3 representing 10%. Again, 8 respondents indicated average 26.7%. The others indicated good which also represents 56.7%.

Respondents who indicated that user awareness were very poor and poor were 3.3% respectively. 2 indicated average representing 6.7% and the majority indicated good representing 83.3% and 3.3% also indicated very good. It is shown in the table 2 above, respondents who indicated the user authentication system/ logical access controls were poor, average, and very good where 6.7% respectively. 80% indicated very good. The above table 2 shows respondents respond to incident management process, respondents who indicated very poor where 3.3%, those who indicated poor and very good were 6.7% respectively and those indicated good were 66.7%. Respondents who indicated very poor that physical security/ access control systems were 3.3%, those who indicated poor were 6.7%, average and very good where 10% respectively while 70% indicated good.

4.5 System Quality

Table 3: System Quality

Variables	Indicators	Frequency	Percent
The system is easy to use and flexible.	Strongly agree	23	76.7
	Strongly disagree	7	23.3
	Total	30	100.0
The system responds quickly enough	Strongly agree	26	86.7
	Strongly disagree	4	13.3
	Total	30	100.0
The system is always up and running.	Strongly agree	26	86.7
	Strongly disagree	4	13.3
	Total	30	100.0
The system includes almost all the services provided to patients within the facility	Strongly agree	27	90.0
	Strongly disagree	3	10.0
	Total	30	100.0
The system acquires radiology results.	Strongly agree	28	93.3
	Strongly disagree	2	6.7
	Total	30	100.0
The system analyses patient's laboratory results and improved the speed of access to results.	Strongly agree	26	86.7
	Strongly disagree	4	13.3
	Total	30	100.0
The system ease of medical reporting.	Strongly agree	26	86.7
	Strongly disagree	4	13.3
	Total	30	100.0
Overall, the (HIS) is satisfactory.	Strongly agree	27	90.0
	Strongly disagree	3	10.0
	Total	30	100.0

From the table 3 above, the researcher wants to find out the system quality, respondents who strongly agree that the system is easy to use and flexible were 76.7% and those who strongly disagree were 23.3%.

The above table also shows that most of the respondents who strongly agree that, the system responds quickly enough were 86.7%. 13.3% also strongly disagree. 86.7% of the respondents strongly agree that the system is always up and running while the 13.3% strongly disagree.

Majority of the respondents representing 90% strongly agree that the system includes almost all the services provided to patients within the facility. 93.3% of the respondents indicated that the system acquires radiology results while the other 2 representing 6.7% strongly disagree. Respondents who strongly agree that the system analyses patient's laboratory result and improve the speed of access to result were 86.7%, and those who strongly disagree were 13.3%.

It is clear from the table above that, respondents strongly agree that the system ease of medical reporting were 86.7% and the other few were 13.3% who strongly disagree. Respondents who indicated they strongly agree that the system is satisfactory were 90%, the remaining 10% indicated that they strongly disagree.

Table 4: Safety Quality

Variables	Indicators	Frequency	Percent (%)
Patients records in [the system] are always complete.	Strongly agree	28	93.3
	Strongly disagree	2	6.7
	Total	30	100.0
Patients records in [the system] are never missing.	Strongly agree	26	86.7
	Strongly disagree	4	13.3
	Total	30	100.0
Patients records in [the system] are always correct and accurate.	Strongly agree	27	90.0
	Strongly disagree	3	10.0
	Total	30	100.0
The system helps in protecting the confidentiality of private patient information.	Strongly agree	22	73.3
	Strongly disagree	8	26.7
	Total	30	100.0
Overall, (HIS)Meeting of security and privacy requirement.	Strongly agree	25	83.3
	Strongly disagree	5	16.7
	Total	30	100.0

From the table above, 28 respondents indicated that they strongly agree that the system keeps a complete record of patients always, they represent 93.3% out of the total respondent, while 2 of the respondents representing 6.7% also indicated strongly disagree. The respondents who said they strongly agree that patients record in the system are never missing where 86.7%, while strongly disagree is 13.3%.

With respect to patients' records, respondents who strongly agree that patients' records are always correct and accurate in the system were 90% and the remaining were those who strongly disagree, they represent 10%. Respondent who strongly agree that the system helps in protecting the confidentiality of private information were 73.3% and those who strongly disagree were 26.7%.

Finally, from the table 4 above respondents who indicated strongly agree and strongly disagree that the system meets the security and privacy requirement were 83.3% and 16.7% respectively.

Table 5: Information Quality

Variables	Indicators	Frequency	Percent
The system had improved access to patients' medical information.	Strongly agree	25	83.3
	Strongly disagree	5	16.7
	Total	30	100.0
The system had improved access to patients' medical information.	Strongly agree	25	83.3
	Strongly disagree	5	16.7
	Total	30	100.0
Information output from [the system] is detailed enough.	Strongly agree	26	86.7
	Strongly disagree	4	13.3
	Total	30	100.0
Information in (HIS) is current and up to date	Strongly agree	25	83.3
	Strongly disagree	5	16.7
	Total	30	100.0
Information output from [the system] is suitable for use.	Strongly agree	22	73.3
	Strongly disagree	8	26.7
	Total	30	100.0
The system had made accessing patient demographic information easier than before.	Strongly agree	25	83.3
	Strongly disagree	5	16.7
	Total	30	100.0
The system had improved the speed of access to radiology results.	Strongly agree	26	86.7
	Strongly disagree	4	13.3
	Total	30	100.0
Information in computerized health information system helps correct diagnosis of patients and follow-up process.	Strongly agree	25	83.3
	Strongly disagree	5	16.7
	Total	30	100.0

From the table above, 83.3% of the respondents strongly agree that the system had improved access to patient's medical information, others indicated otherwise, they constituted 16.7% of the respondents. 86.7% of the respondents strongly agree that information output from system is detailed, while 13.3% of the responds strongly disagree.

Respondents who strongly agree information in the system is current and up to date and those who strongly disagree that information output from the system is suitable for use were 83.3% and 16.7% respectively. 73.3% of the respondents strongly agree that information output from [the system] is suitable for use. While 26.7% indicated otherwise.

The above table again shows that 25 respondents representing 83.3% strongly agree that the system had made accessing patient demographic information easier than before. While 5 respondents representing 16.7% also strongly disagree that the system had made accessing patient demographic information easier than before. Again, 86.7% of the respondents strongly agree that the system had improved the speed of access to radiology results. While 16.7% of them strongly disagree.

Finally, 25 of the respondents representing 83.3% also strongly agree that information in computerized health information system helps corrects diagnosis of patients and follow up process. Respondents who strongly disagree were 16.7%.

CHAPTER FIVE

SUMMARY, CONCLUSION AND IMPLICATIONS/RECOMMENDATIONS OF THE STUDY

5.1 Introduction

This chapter of the study discusses the findings by making inferences from the analysis of the data obtained from respondents. Various inferences were made by the researcher to describe the findings in relation to literature. The findings of the study were discussed in line with the slated research objectives and questions.

5.2 Summary

The result of the study discussed are summarized as follows:

Most of the staff and student of the university think that the MIS system with regards to health delivery is good. Again, majority of the staff and students believe that it is easy to locate data wherever it is needed and enhances service reliability.

Secondly, most of the staff and students believe that the availability of the online OPD helps them to fill their basic information before going to the OPD especially during student's medical examination. Again, they stated that accessing that service to is not difficult.

Furthermore, they believe that the system has security features such as data encryption, firewalls and intrusion detection system and makes the data in the system safe.

Also, the staff and students believe that the system is always up and running and response quickly enough when accessing information.

Lastly, they think patients records in the system is always complete and are always correct and accurate. Also, the system protects the confidentiality of patients records.

5.3 Conclusion and Implications

The effective implementation and use of Health Information System (HIS) successfully is really significant with regards to the University of Education Winneba, Kumasi campus clinic. The expectation is that the successful implementation and use should have the capacity of increasing legibility, reduction in material errors, limit costs and improve the quality of healthcare. From the findings, it was clear that the University of Education Winneba, Kumasi campus clinic have implemented successfully the HIS called MEDREC. This has contributed significantly with regards to quality of healthcare diminishing the previous challenges associated with the use of the manual system.

In meeting the objectives of the study, the research sort to find out how the health information system implemented and used at the University of Education Winneba, Kumasi campus clinic. The findings in relation to this objective were discussed based on (1) implementation of HIS and (2) uses of HIS. With regards to the implementation of Health information system, the study found out that the clinic implemented the HIS on 1st February, 2019 called MEDREC. The recognition and existence of the MEDREC in the clinic indicate the critical evaluation process conducted by clinic management in order to adopt a software that has less challenges than the manual system. By implication, the existence of the MEDREC premised on the need to deliver timely, effective and quality healthcare service through decisions of management to the growing number of people attending to the facility. This is in congruence with the study by Oyeyemi and Wynn (2014), who discovered that the demand for HIS are in high demand to handle the ever-growing population health needs, help health practitioners with timely services delivery and precision. However, the implementation of the MEDREC was found to be easy, effective and ensured equitable distribution of modules

across all departments of the clinic. The effect of the MEDREC software on service delivery was found to be positive and reliable. This suggests that the MEDREC implementation has been very effective towards the achievement of quality healthcare service delivery by management of the clinic.

With regards to the use of the HIS at the University of Education Winneba, Kumasi campus clinic, the study discovered that, the manual system previously was time wasting. However, the MEDREC was found to be without difficulties. The process of use included education and training, and access and use. This process allowed staff to be conversant with the software and its use in order to deliver quality of service. By implication, it is evident that, HIS is being used by all staff within the University of Education Winneba, Kumasi campus clinic. This is because all staff including management went through thorough training and education at both group and individual levels. The researcher found out that the system has different components such as online OPD, Appointment, Laboratory, records etc. With the appointment system, students can log into the student's portal using their credentials and the system automatically books appointment for the patient. Again, the doctor can input into the system the number of people he can attend to at any point in time.

The second objective of the study was to investigate factors enabling or constraining the implementation and use of health information system at the University of Education Winneba, Kumasi campus clinic. The findings in relation to this objective were discussed based on (1) enabling factors and (2) constraining factors. With regards to enabling factors, the study found significant factors that propelled the effective implementation of the system (MEDREC). These factors included effective collaboration between staff and developer of the system, replacement of the manual

system with the MEDREC, and economical and cost saving nature of the MEDREC. This shows that strategic alliance called collaboration was very important in enabling the effective implementation of the MEDREC. By implication, management were highly critical in saving cost and providing the best for the clinic. The replacement strategy adopted shows the visionary nature of the clinic management with regards to HIS in the University of Education Winneba, Kumasi campus clinic provided enabling and constraining factors which helped to understand the performance or success of the clinic.

The third objective of the study was to examine the impact of the implementation and use of the health information system on service delivery by the University of Education Winneba, Kumasi campus clinic. The study discovered that the manual system failed to exert significant impact on the goals and service delivery by the University of Education Winneba, Kumasi campus clinic. However, the MEDREC implementation and use has helped the University of Education Winneba, Kumasi campus clinic achieve its mandated goals. The MEDREC has been effective with regards to information transmission, record keeping, consumption pattern and tracing of medication, reduction in medical errors, effective treatment of patients on timely basis and identification of challenges within the system. The implementation and use of HIS at the University of Education Winneba, Kumasi campus clinic created a unique breadth and scope in effective health system management resulting in strong primary health care services.

5.4 Recommendations

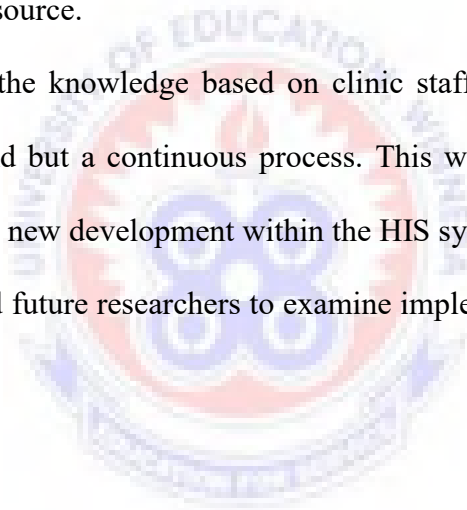
My findings revealed that the implementation and use of HIS (MEDREC) was successful. The researcher makes the following recommendations.

First, since you cannot access the system when you have not signed in to the clinic Wi-Fi, I recommend that a component such as the appointment component be added to the OSIS such that students can book appointment anywhere he/she is.

Again, for effective evaluation to be achieved by the clinic, it is recommended that the clinic should adopt data standards which are essential step in ensuring data validation of the system. Consequently, this will ensure quality, accuracy and reliability of information or data source.

Further, improving the knowledge based on clinic staff using HIS through training should not be an end but a continuous process. This will ensure regular and timely education of staff on new development within the HIS system.

Lastly, I recommend future researchers to examine implementation difficulties of HIS in Ghana.



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APPENDIX

UNIVERSITY OF EDUCATION WINNEBA, KUMASI
DEPARTMENT OF INFORMATION TECHNOLOGY EDUCATION



QUESTIONNAIRE

This questionnaire is part of a project work required by the University of Education Winneba as a partial requirement for the award of a Master of Science in Information Technology Education degree. The questionnaire is designed to solicit your independent views on “*effect of management information system in the service delivery (a case study of university of education Winneba, Kumasi campus)*”.

All information provided shall be treated as confidential and used strictly for Academic purpose. Please answer the following questions freely without indicating your name.

PART 1: BACKGROUND DATA

1. Your Gender?
Male [] Female []
2. What is your age?
Less than 20 [] 20-30 years [] 31-40 years [] 41-50 years []
51 years and above []
3. Your position in the university?
Student [] Staff []
4. How long have you been in the university?
Less than 1 year [] 1-2 years [] 3 years and above []

5. What is your level of education?

SHS [] 1ST Degree [] Master's Degree [] Nursing cert. []

Other, please specify.....

PART 2: INFRASTRUCTURE MANAGEMENT
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6. Below are statements on the influence of infrastructure management on service delivery at the campus clinic. On a scale of 1-5 (where 1= strongly disagree, 2= disagree, 3= neutral, 4= agree and 5= strongly agree) please rank your level of agreement with each statement.

	1	2	3	4	5
There is a common network computing and information infrastructure that is readily accessible to everyone in the clinic thus improving service quality to the public					
It is easy to locate data wherever it is needed enhancing service reliability					
Considerations of both security and accessibility are taken into account in making data placement decisions thus improving service quality					
The Clinic IS provide appropriate data to the people performing different organizational functions in the right time					

PART 3: ACCESSIBILITY OF THE SYSTEM


7. Does the University provide regular and structured training to its staff and students on accessibility and policy of IMS use?
Yes [] No []
8. Does the clinic have online OPD where one can fill basic information before visiting the facility?
Yes [] No []
9. If yes, how accessible is it?
Not difficult [] Difficult [] Very difficult []
10. How do you access your medical results?
Manual [] Email []
11. Is there a defined process in place to coordinate the implementation of information security policy, measures and programs?
Yes [] No []
12. Are relevant user accessibility requirements and policy specifically defined and documented in the University?
Yes [] No []

13. How effective are the following in reducing interruptions to business/work processes in your organization? Use the scale 1-5 where 5= very good, 4= good, 3= average, 2= poor and 1= very poor. Please tick the appropriate box.

	1	2	3	4	5
Policies, procedures and guidelines					
Data Encryption					
Firewalls					
Intrusion Detection Systems					
Intrusion Protection Systems					
User Awareness training programs					
User Authentication Systems/ logical Access Controls (username & password, biometrics, tokens)					
Incident management process					
Physical Security /Access control Systems					

PART 4: SYSTEM QUALITY

14. Please indicate the extent to which you agree or disagree with each of the statements and circle the appropriate number based on the scale: 7–strongly agree, 1–strongly disagree.

7–strongly agree, 1–strongly disagree.	1						7
The system is easy to use and flexible.	1	2	3	4	5	6	7
The system responds quickly enough.	1	2	3	4	5	6	7
The system is always up and running.	1	2	3	4	5	6	7
The system includes almost all the services provided to patients within the facility (e.g. laboratory, radiology, surgery and billing).	1	2	3	4	5	6	7
The system acquires radiology results.	1	2	3	4	5	6	7

The system analyses patient's laboratory results and improved the speed of access to results.	1	2	3	4	5	6	7
The system ease of medical reporting.	1	2	3	4	5	6	7
Overall, the (HIS) is satisfactory.	1	2	3	4	5	6	7
SAFETY QUALITY							
Patients records in [the system] are always complete.	1	2	3	4	5	6	7
Patients records in [the system] are never missing.	1	2	3	4	5	6	7
Patients records in [the system] are always correct and accurate.	1	2	3	4	5	6	7
The system helps in protecting the confidentiality of private patient information.	1	2	3	4	5	6	7
Overall, (HIS)Meeting of security and privacy requirement.	1	2	3	4	5	6	7

INFORMATION QUALITY							
The system had improved access to patients' medical information.	1	2	3	4	5	6	7
Information output from [the system] is detailed enough.	1	2	3	4	5	6	7
Information in (HIS) is currency and up to dating.	1	2	3	4	5	6	7
Information output from [the system] is suitable for use.	1	2	3	4	5	6	7
The system had improved the timeliness of access to patient information.	1	2	3	4	5	6	7
The system had made accessing patient demographic information easier than before.	1	2	3	4	5	6	7
The system had improved the speed of access to radiology results.	1	2	3	4	5	6	7
Information in computerized health information system helps correct diagnosis of patients and follow-up process.	1	2	3	4	5	6	7

Thank you very much for your cooperation!