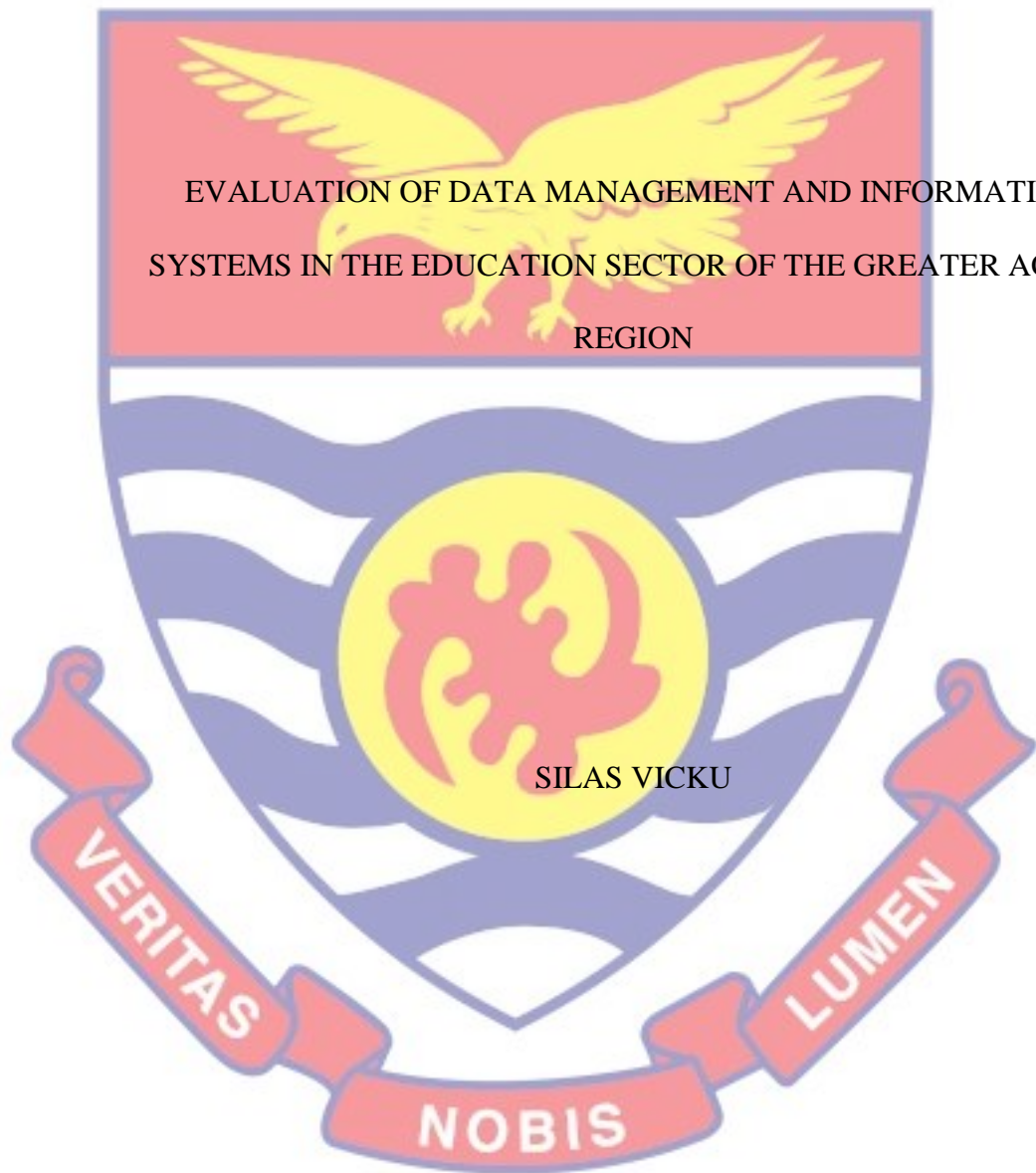


UNIVERSITY OF CAPE COAST



2022

UNIVERSITY OF CAPE COAST

EVALUATION OF DATA MANAGEMENT AND INFORMATION
SYSTEMS IN THE EDUCATION SECTOR OF THE GREATER ACCRA

REGION

BY

SILAS VICKU

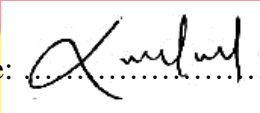
Dissertation submitted to the Department of Data Science and Economic
Policy of the School of Economics, College of Humanities and Legal studies,
University of Cape Coast in partial fulfilment of the requirements for the
award of Master of Science degree in Data Management and Analysis.

OCTOBER 2022

DECLARATION

Candidate's Declaration

I do hereby declare that this dissertation is the result of my own original research and that no part of it has been presented for another degree in this university or elsewhere.

Candidate's Signature:  Date:

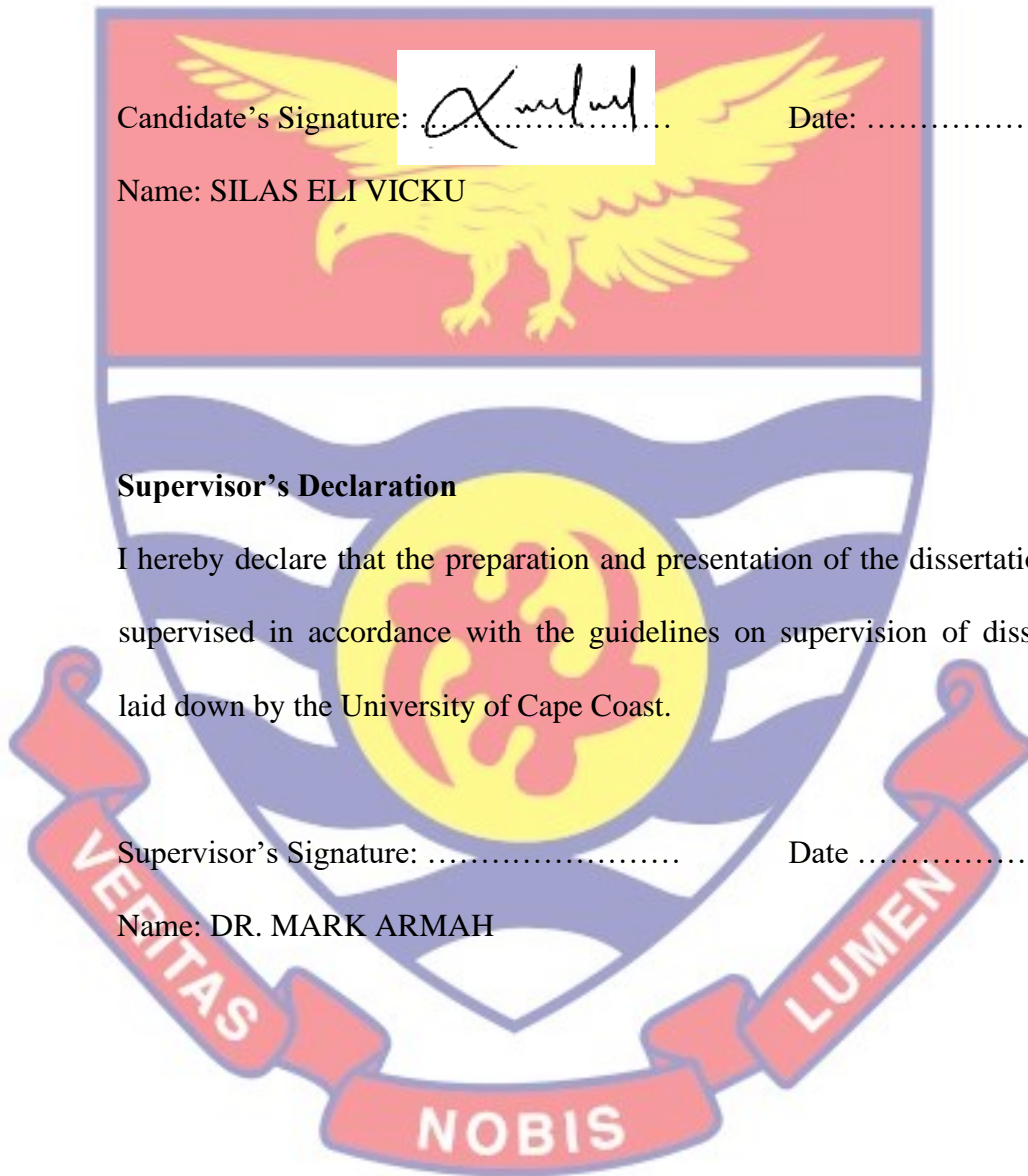
Name: SILAS ELI VICKU

Supervisor's Declaration

I hereby declare that the preparation and presentation of the dissertation were supervised in accordance with the guidelines on supervision of dissertation laid down by the University of Cape Coast.

Supervisor's Signature: Date

Name: DR. MARK ARMAH



ABSTRACT

The research investigated the managerial expertise and credentials of EMIS managers, as well as the ways in which stakeholders make use of EMIS for the purposes of planning, policy creation, and strategic development. A descriptive research design was used to carry out the investigation in this study. A strategy known as intentional sampling was utilized in order to choose members of the sample population. Participants in the study were regional, metropolitan, and municipal directors of education, in addition to their 4 frontline deputy directors. A total of 56 people were included in the sample group. According to the findings of the study, EMIS offices are present in the Regional and District Education Offices of the Greater Accra Region, EMIS' fundamental objectives are being realized, and the Ministry of Education views the Yearly School Census as the most crucial source of information on the situation of each school. Another issue found out was that EMIS does not have its own official webpage. In addition, EMIS users are often individuals who are familiar with it; as a result, familiarity with EMIS influences its application. Users who are part of a family are underrepresented in EMIS. According to the findings of the study, EMIS should have a website that is dedicated to it and has a good reputation where users, patrons, scholars, and stakeholders may go to find educational content.

KEY WORDS

Educational Management Information System (EMIS)

Evaluate

Policy Formulation

Planning

Data

Database



ACKNOWLEDGEMENT

My utmost gratitude goes to God Almighty for His grace and mercies.

I also acknowledge with immense gratitude the role of my supervisor, Dr. Mark Armah, for his guidance and direction throughout this work.

To all my Master of Science, Data Management and Analysis program cohort, who in various ways played vital roles during my studies, I say a big thank you.



DEDICATION

To my wife, Alice Nyantakyiwaa and my beautiful baby girl Adelyn Nhyira

Elikplim.



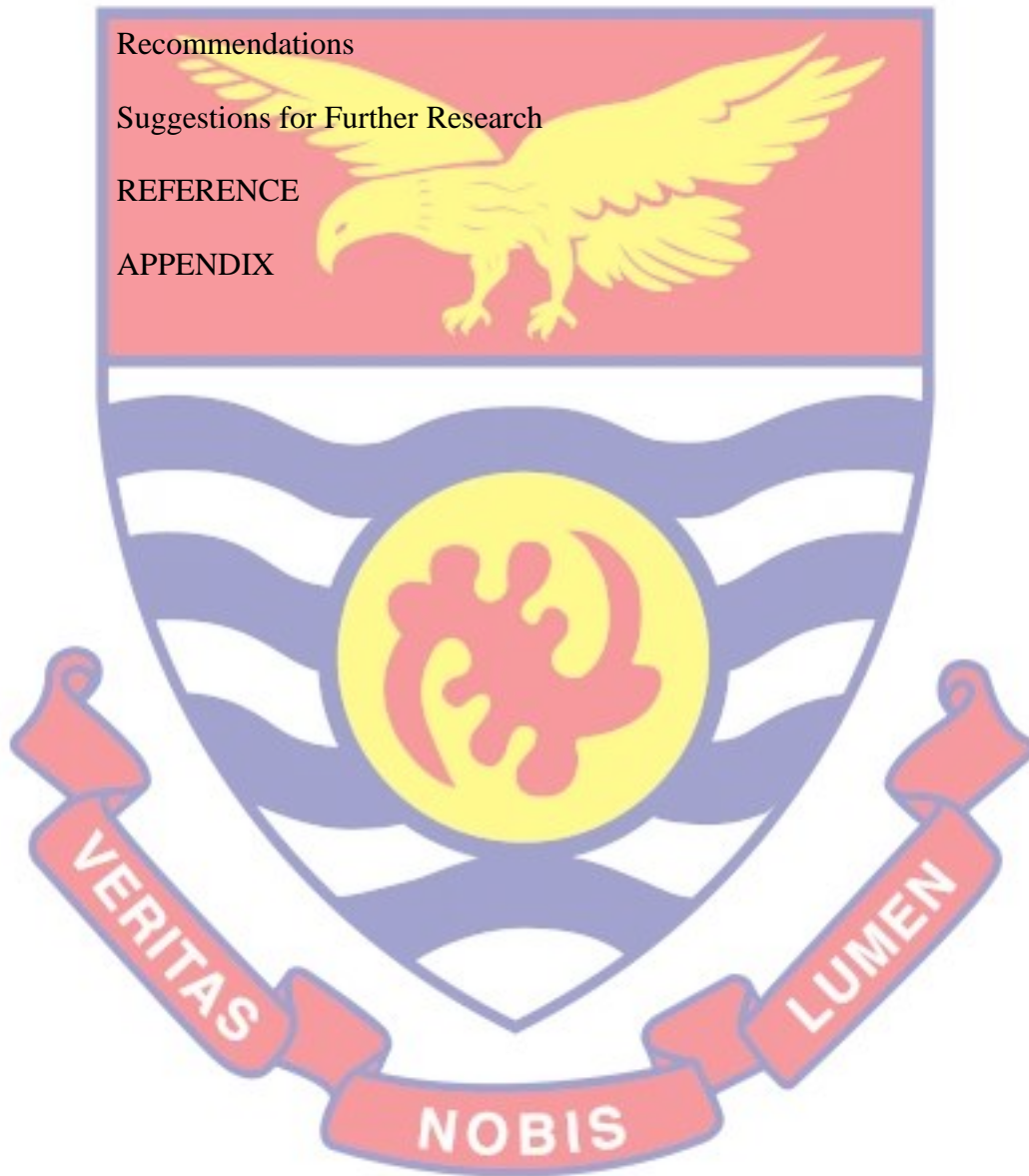
TABLE OF CONTENTS

DECLARATION	ii
ABSTRACT	iii
KEY WORDS	iv
ACKNOWLEDGEMENT	v
DEDICATION	vi
LIST OF TABLES	x
CHAPTER ONE: INTRODUCTION	
Background to the Study	1
Purpose of the Study	7
Research Objectives	7
Research Questions	7
Significance of the Study	7
Delimitations of the Study	8
Limitations of the Study	8
Organization of the Study	9
CHAPTER TWO: REVIEW OF RELATED LITERATURE	
Introduction	10
Theoretical Review	10
System Theory	10
Conceptual Review	13
Databases	13
Advantages of Databases	14
History and development of EMIS in Ghana	18
2.4 Strengths and Advantages of EMIS	21

Setbacks of EMIS	23
Studies on databases in education and other fields	27
Summary of literature review	30
CHAPTER THREE: METHODOLOGY	
Introduction	33
Research Design	33
Population	34
Sample and Sampling Procedure	35
Instruments	36
Data Collection Procedure	38
Data Analysis	38
Chapter Summary	39
CHAPTER FOUR: RESULTS AND DISCUSSION	
Introduction	40
Demographics of Respondents	40
Knowledge of EMIS by Respondents	42
Assessing the Main Uses of EMIS by Stakeholders	44
Refresher/In-Service Trainings for EMIS Officers	53
Chapter Summary	55

CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Introduction	57
Overview of the Study	57
Key Findings	58
Conclusions	59
Recommendations	59
Suggestions for Further Research	60
REFERENCE	61
APPENDIX	70



LIST OF TABLES

Table	Page
1 Sample size distribution	36
2 Distribution of Respondents by offices and locations	40
3 Distribution of Respondents by their positions held in the Ghana Education Service (GES)	41
4 Distribution of Respondent by Gender	42
5 Knowledge of respondents about importance of EMIS	43
6 Main Uses of EMIS by Directors of Regional/Metropolitan/ Municipal/District Education Offices	45
7 Cross tabulation of the distribution of EMIS Office Respondents' positions and their Office locations	50
8 EMIS Office Respondents according to their qualification in computing	51
9 Distribution by EMIS Office Respondents according to their qualification in computing	52
10 Refresher/In-service Training for EMIS Officers	53
11 A crosstab of the highest academic and professional qualification of the EMIS officers	54
12 Office Equipment in the EMIS Offices	55

CHAPTER ONE

INTRODUCTION

Background to the Study

Most countries create an education database based on the results of irregularly conducted school censuses and/or surveys. These data are often raw, fragmented, and unanalysed, and are published in hefty statistics yearbooks. Policymakers and other actors in management and planning, on the other hand, require data that is simple to understand and evaluate. These should be backed up by in-depth analyses of the system's operation, which aid in policy formulation, planning of relevant actions, and monitoring and evaluation of the latter. Because information needs vary and are becoming more complex, a solid information system should be as comprehensive as possible. It should address all information needs and areas, with the goal of not only collecting, storing, and processing data, but also assisting in the creation, management, and assessment of educational policies (Viennet & Pont, 2017).

Data and information systems are the integration of components for collection, storage and processing of data, of which the data taken is used to provide relevant information and add up to the knowledge of the organization.

Ghana Education Service implemented data and information management systems like the Educational Management and Information Systems (EMIS) and the Management and Information Systems (MIS) to address these issues. As the name suggests, Education Management Information Systems (EMIS) is designed to help educators and administrators make better decisions, analyse policy options, organize curriculum and

instruction, and monitor student progress at all levels of the educational system. Data and information are provided to education leaders and managers at all levels in a full integrated way through a collection of people, technologies, models and methodologies that work together to offer accurate and timely data and information to assist them carry out their obligations at all levels of the education system (Chilonga & Lis, 2019).

EMIS was founded in 1988 in the Ministry of Education as part of educational reforms at the time (Pajibo & Tamanja, 2017). More formalized effort building the EMIS happened in the 1990s, according to Malcam (2012), when the Ghanaian government began to implement the policy of free compulsory universal basic education (fCUBE). The EMIS Project was initiated by the Ministry of Education in January 1997, with technical assistance from Harvard University (during the first and second stages) and funding from the World Bank and the Ghanaian government. The initiative aimed to offer enough and trustworthy statistics and details for policy development, planning, and execution of diverse educational programs and projects in Ghana. A three-phase growth strategy was implemented after that: the Pilot, Capacity Development & IT Facilities Development, and Finally Development & Growth. The Education Management Information System (EMIS) is generally available in all of the Ghana Education Service's districts, municipal, metropolitan, and regional offices. "The EMIS crew has installed an EMIS program on every computer used for data entry in the 168 districts" (Chung, 2009). This management system's main function is to enhance the emergence of policy, operational planning, and ensuing target superintending

through intermittent stakeholder review. It also includes calculating levels of disadvantage and financial allocations.

Despite its severe hurdles, EMIS has been able to tell some success stories. "Ghana's EMIS is an example of good practice in Africa for decentralized planning and budgeting, supporting reforms at many levels,"

according to one of them (Infodev, 2006). Additionally, the Education Management Information System (EMIS) gives the Ministry of Education the ability to collect census data on primary schools for a period of seven years (1997 to 2003). Donors and planners have also made use of the data provided by EMIS in order to distribute resources for teaching and infrastructure. EMIS made it possible to generate five years' worth of annual school population data in a timely manner from 1997 to 2001. Additionally, it enabled the creation of essential education benchmarks and policy analysis, as well as the familiarization of education officials with the application of data for planning and decision-making (Infodev, 2006).

As both an administrative tool and a database management system, EMIS is able to give real-time statistics for each school district on a variety of factors, including the percentage of teachers who lack enough training, the percentage of students who pass Science, Math, and English, the layout of classrooms, the availability of water, and the amount of available space. When evaluating and measuring variables, this also helps in assessing the degree of disadvantage that each variable has. This strategy lends credence to iDISC Technology and Information assertion that incorporating ICT-based administration solutions into a company's operations can lead to improved

operational efficiencies. These tools might make it possible to do more accurate tracking of the performance of each organization.

However, there are still obstacles to overcome in terms of dedication, improvement of capabilities, and distribution. Donors and planners typically have excessive predictions about what can be completed in a short period of time, and they overlook the challenges that EMIS presents. Despite the fact that data validation should be vital in an environment where policymakers and decision-makers are educated by data, EMIS is currently plagued by challenges relating to logistics, such as automobiles, or data tracking and authentication. It should be prioritized again because every educational institution should be more sensitive to economic needs and demands in order to increase work force space, which can only be accomplished with reliable academic information. Because the ambition of connecting all EMIS work places has yet to come true, data entered at various offices is delivered to the EMIS command center in the computers where it was entered. This scenario highlights difficulties such as rapid scrutiny and the certainty of EMIS data in data transit to and from the headquarters, highlighting the critical necessity for an internet-based EMIS.

Chung (2009) remarked in his exposition that “the existing EMIS application does not run in a network mode. All components of EMIS are installed on every computer used for data entry—even in Head Office or larger Districts where computer network could be supported”. He carried on to indicate that “According to interviews, the District EMIS team does not perform any data quality checks on their school data. The district heads are

supposed to check all the forms accuracy—but, according to interviews, this is seldom done”.

EMIS appears to be non-existent and unpopular among Ghana's key education players today. A quick look at the management structure and data collection flow chart reveals how EMIS can use the data it collects from all, examining agencies, teaching and learning organization and other non-academic agencies to increase the receptivity of the educational system according to the economy's needs and demands and revamp the personal management space. As a case study, this research will investigate how professional and equipped the administrators of EMIS are and also how stakeholders use EMIS in planning, policy formulation and strategizing.

EMIS plays an important role in helping the Ministry of Education and Science to formulate strategic policies, develop operational plans and monitor subsequent progress towards pre-defined targets. The EMIS unit works in conjunction with the Policy, Budgeting, Monitoring and Evaluation (PBME) Division to carry out these activities. The relationship between two is simple, namely EMIS provides data to the PBME and the PBME undertakes the analysis and produces performance and monitoring reports for the Ministry. The EMIS unit and the PBME reports to Ghana Education Services (GES), the largest operational unit within the Ministry of Education and Science. It is estimated that GES takes around eighty per cent of the Ministry's budget for education.

Statement of the Problem

The Educational Management Information System (EMIS) plays a significant role in decision-making since it can monitor irregularities in the

system, determine a course of action, and implement that course of action to bring the system back in check. It is impossible to place enough emphasis on the significance of EMIS in the educational systems that we use today. While some of these academics focused their attention on the difficulties inherent in the EMIS deployment process, others evaluated the significance of the system.

A limited number of Ghanaian researchers have made an effort to investigate the role that EMIS plays in the administration of the country's educational system. Researchers such as Ampofo (2020) looked into the difficulties associated with the student management information system in Ghana. Wolf, Aber, Behrman, and Tsinigo (2019) researched the impact that EMIS has had on the educational system in Ghana as well.

The management information systems help to provide the necessary information to make decisions with the effectiveness and efficiency, and as far as accuracy, comprehensiveness and timeliness in the providing information increase the efficiency of those decisions, which leads to improved performance (Al Tai, 2005). The system of Management Information System shows that communication is needed to carry out the managerial functions and for linking the organizations with its external environment. Management Information System provides communication link that makes the activities and responsibilities surrounding management or managers possible.

Other researchers such as (Edzii (2017); Infodev (2006)) conducted case studies on decentralizing EMIS in Ghana. However, none of these studies to the best of the researcher's knowledge has examined how well equipped the managers of EMIS are in terms of knowledge and resources and also, how EMIS is used by stakeholders in mapping strategies especially in today's

digitized world. This study therefore seeks to be a timely intervention in closing such gap in literature. The study will therefore contribute to literature by making stakeholders aware of the inadequacies in skills and resources relating to using EMIS to effectively manage the education system of Ghana.

Purpose of the Study

The study's purpose was to evaluate data and information systems in the education sector of the Greater Accra Region.

Research Objectives

The study specifically sought to:

1. assess how Regional/Metropolitan/Municipal/District Directors of Education use EMIS for planning, policy making, and mapping initiatives.
2. evaluate how qualified and well equipped the administrators of EMIS are.

Research Questions

To achieve the above stated objectives, the study sought to find answers to the following questions.

1. How does EMIS help Regional/Municipal/District Directors of Education plan, make policies, and map out strategies?
2. What is the level of qualification and competence of EMIS's managers?

Significance of the Study

The conduct of this study is significant in three areas. For practice, policy and future researches.

This work will help educational stakeholders to identify or create structures to help improve EMIS. Moreover, this study will provide a framework regarding how best to maximize data obtained from EMIS so that it will improve upon data and information in the country. Furthermore, this work will help find out how equipped and qualified the current structure of EMIS is in discharging its responsibilities. Finally, this study will also contribute immensely to students, experts, and academia for future works in Ghana.

Delimitations of the Study

The study will be confined to the Greater Accra Regional education office, metropolitan and municipal education offices, some selected second cycle institutions and basic schools etc. The study will also be delimited to the evaluation of data and information systems and strategies the institutions can adopt to manage the situation at hand and making some recommendations for addressing this problem.

Limitations of the Study

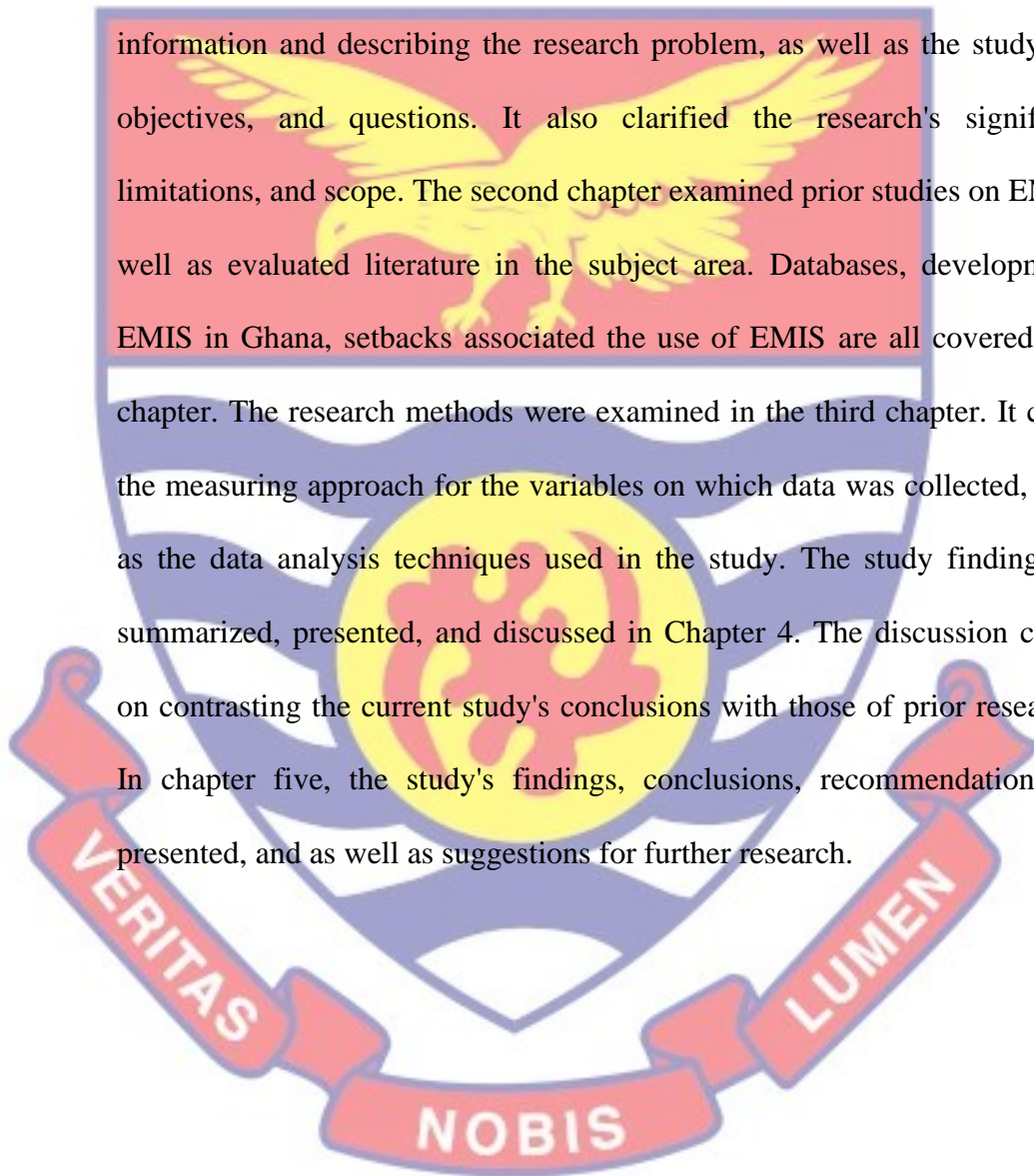
Because there hasn't been a lot of research done on this topic, finding related literature proved tough. The data was obtained via primary sources (preliminary interviews and observations). Also, most of the respondent may not be very receptive because of the concern for privacy and confidentiality of their responses.

Lastly, due to time and financial resource constraint, the researcher has decided to limit the research to some selected educational institutions. It is the researcher's fervent hope that other researchers will also research further into

the same problem by extending their research work to other institutions in Ghana.

Organization of the Study

The research was organized into five distinct chapters, as follows. The study's first chapter focuses on the introduction, providing background information and describing the research problem, as well as the study's aim, objectives, and questions. It also clarified the research's significance, limitations, and scope. The second chapter examined prior studies on EMIS, as well as evaluated literature in the subject area. Databases, development of EMIS in Ghana, setbacks associated the use of EMIS are all covered in this chapter. The research methods were examined in the third chapter. It covered the measuring approach for the variables on which data was collected, as well as the data analysis techniques used in the study. The study findings were summarized, presented, and discussed in Chapter 4. The discussion centered on contrasting the current study's conclusions with those of prior researchers. In chapter five, the study's findings, conclusions, recommendations were presented, and as well as suggestions for further research.



CHAPTER TWO

REVIEW OF RELATED LITERATURE

Introduction

This chapter focuses mostly on reviewing the relevant literature for the investigation. The primary goal of the review is to highlight areas that need further investigation and to give a framework that will serve as a benchmark for comparisons and contrasts linking the study with those of other researchers and authors. This chapter covers a variety of topics, including databases, the history and development of EMIS in Ghana, the benefits and advantages of using EMIS, the limitations of using EMIS, and the prospects for the future of EMIS. A synopsis of the research that was done on databases used in education and other fields.

Theoretical Review

System Theory

Systems thinking posits that an information system be viewed as a system, with data as the input and data analysis processes that transform them into information and knowledge as the output. The basic premise is that the general systems theory concepts underlie the information systems development (Ahituv & Neumann, 1986; Bell & Wood-Harper, 2003; Benyon, 1990). Truex, Baskerville and Travis (2000: 56) confirm these systems thinking paradigm in ISD when they maintain, “information systems development and information systems development method are completely merged in systems development literature”. Khazanchi and Munkvold (2000: 31) concur when they define a system as “a collection of interrelated components that work together for a common purpose” (cf. Benyon, 1990: 2;

O'Brien, 1991:11) and refer to an "information system as a collection of interrelated components (hardware, software, procedures, people and databases) that work together". Laudon and Laudon (1998) take it a step further when they emphasize that an information system "consists of three basic activities – input, processing, and output – that transform raw data into useful information. Feedback is output that is fed back to appropriate people or activities" (Laudon & Laudon, 1998: 6). Although systems theory approach is highly technology focused, it is included in this study to give structure to the information systems development model. It was in this regard that O'Brien (1991: 11) declares that "the knowledge of systems concepts is vital to a proper understanding of the technology, applications, development, and management of information systems".

Numerous authors have examined how the general systems theory approach has been applied to ISD (Bell & Wood-Harper, 2003; Benyon, 1990; Checkland, 1999; Oz, 2002; Skidmore & Eva, 2004).

ISD is not a one dimensional and linear action where only technical considerations are taken into account. Human perspectives (culture, behaviour, values, experience and emotions) have a major impact on the information systems analysis, design, development, implementation and maintenance. Warren and Adman (1999: 224) regard the systems-based approaches as an alternative to information systems development, because of the inability of the "traditional, 'rational', 'hard models' to cope with the increasingly complex and turbulent organisational world, with its conflicting human perspectives".

There is a vast body of literature that outlines the general systems theory (Ahituv & Neuman, 1986; Bell & Wood-Harper, 2003; Benyon, 1990;

Checkland, 1999; Jackson, 2004; von Bertalanffy, 1968). In this approach the organisation is conceptualised as a total system, therefore understanding the systemic inputs, transformation processes, the outputs, the numerous linkages between system objects and interrelated and interacting subsystems in context of the organisational operations are essential to comprehend the issues relating to information systems development.

Bell and Wood-Harper (2003): 1) emphasise the systems theory principles when they described the information system in terms of the transformation of inputs (data) into information and eventually into knowledge. They refer to the stereotypical definition of positivism/reductionism, which they regard as “fixed, knowable, measurable and, therefore predictable. If it is not these things, then it is not worth knowing” (Bell and Wood-Harper, 2003:21). Similarly, they applied the systems approach on the phases of ISD. They proposed the following steps in designing the information system which are closely aligned with the phases identified by Ahituv and Neumann (1986), namely 1) discover what the information problem is, 2) discover what is the setting for the problem, 3) what resources and constraints are evident, 4) what are the major information components of the problem, 5) structure the problem into a model, 6) design model solutions for the problem, 7) test and cost the model, 8) implement the model as appropriate, and 9) monitor and evaluate the result (Bell & WoodHarper, 2003 : 15).

O'Brien (1991:11-12) also applies the systems concept when he views the information system “as a system that accepts data resources as input and processes them into information products as output”. He further emphasises

the systems approach by including two more systems characteristics, feedback and control. For O'Brien (1991:11) "feedback is data or information concerning the performance of a system" and "control is a major system function that monitors and evaluates feedback to determine whether the system is moving toward the achievement of its goal". The following sections

explore the shortcomings of the previous approaches.

Conceptual Review

Databases

In this innovation era, databases and database technologies have become increasingly significant. In a highly competitive environment of today, database technology has the potential of assuming even greater importance. For the purpose of utilizing decision-making software of this kind, many businesses in today's modern world are constructing what are known as "data warehouses" (Vaisman & Esteban, 2014).

A database is a collection of data that is conceptually tied to one another and can be of any size or complexity (Toby & Jagadish, 2011). According to Coronel & Morris, (2016), databases give users the ability to store, manage, and change data, which can take the shape of either textual or quantitative information. The fundamental idea is to use keyword searches to find information. Databases are also defined as a collection of data organized in such a way that it can be accessed, retrieved, and used (Shelly, Cashman & Vermaat, 2007). They also agreed that databases can be divided into two categories.: manual and computerized (digital) databases. Data is stored on paper and kept in a filing cabinet in a manual database, however in a computerized database, Data is saved on a storage device, such as a hard drive,

in a computerized format. They asserted once more that computerized metadata structures are supported by database management system that allows users to build, access, and regulate databases. Access, Oracle Database, Paradox, MySQL, Star Office Base, and Visual FoxPro are examples of database application software (Berg, Seymour, & Goel, 2013).

Advantages of Databases

Most organizations will invest a significant amount of money to convert their databases from manual to computerized databases in order to improve and streamline their management processes. Computerized databases provide a number of potential advantages over traditional file processing methods (manual). A database strategy has nine key advantages, according to McFadden et al (1999). They include being independent from program data, having less data redundancy, having advanced data consistency, having enhanced information sharing, having increased software development efficiency, having standard regulation, having improved quality of the data, having enhanced information accessibility and responsiveness, having reduced program maintenance, had minimal data redundancy, and had data accessibility. In spite of the fact that Link and Prade (2019) concur that the database approach lessens the amount of data that is redundant, they also came to the conclusion that it does not eliminate redundancy entirely but rather gives the designer the ability to aptly control the kind and level of redundancy that is present. In a system that takes the form of a sales database approach, for instance, each order table has a distinct figure representing a customer to denote the connection that exists between orders and customers. The design goal of the database strategy is to consolidate data files that were originally

autonomous (and redundant) into a separate, workable arrangement, and to store each ideal piece of information in the repository in just one site.

On the other hand, Nalini and Anbu (2016) believe that Metadata can help you get rid of redundant data by storing just one replica of data that can be duplicated by several people, saving both financial resources and actual storage capacity.

According to Adawy, Nor, and Mahmuddin, (2018), we can considerably reduce the chances of inconsistency by reducing or regulating data redundancy. We can't have disagreements on saved values if a student's address is only stored once, for example. Additionally, when each value is stored in a single location, updating data values is substantially easier. In conclusion, we avoid wasting storage space by not storing redundant data.

The database strategy of McFadden et al. (1999) has a fourth advantage: enhanced data exchange. Because a database is supposed to be a company-wide resource, permission to use it may be provided to specific users.

According to McFadden et al (1999), the database method improves application development productivity. The database technique has the advantage of reducing the cost and time required to develop new applications. They went on to say that there are two primary reasons why database apps can be produced considerably faster than traditional file applications. The essence of their proposal was that, in the event of a problem or modification, an application that has already been designed and implemented will not need to be recreated; instead, without needing to be concerned with file layout or low-level insertion specifics, the software engineer may concentrate on the exact

instructions required for the new application. Various indigenous and international organizations have used database application software to computerize their manual databases and information systems. For example, in Malaysia, Tuan Haji Mohd Yusof bin Muda pjk built eSekolah, an application for school administration that leverages Microsoft Access to transform the old approach to the incorporation of information management into a software content eSekolah subsequently became a great hit within school administration circles.

The Internal Revenue Service (IRS), rural banks, and universities have all shifted to the administration of their operations through the use of electronic databases. The University of Cape Coast, for instance, switched from using the Agyenkwa database to the Online Students Information System so that it could more effectively manage student records (OSIS). The University of Education Winneba utilizes OSIS as well in order to efficiently maintain student records. The E-School Administrator, which is also a database administration program, is used at the PEC School in Nsawam, which is located in Ghana. According to Fisher, Lauría, & Chengalur-Smith, (2012), Introduction to information quality database administration is plagued by low data quality. The database technique offers a variety of technologies and techniques for enhancing validity of the data. The tools are designed to evaluate the information's quality. in the current systems and compare it to the criteria of the data warehouse. Integrity constraints are one of the tools and methods that database designers can use to improve data quality (Chu, Ilyas, Krishnan, & Wang, 2016). Integrity limitations imposed by the database management system can be established by database designers.

Another option is to employ a data warehouse. Cleaning up operational data before it is deposited in the data warehouse is one of the goals of the data repository context (Plantin, 2019). Data quality relates to the amount of data that is relevant, exact, helpful, in context, comprehensible, and timely (Zaveri et al., 2016). According to Chen, Hailey, Wang, and Yu (2014), the seven major findings from the study were the precision of the information, the timely of the outcome, the reliability of the information, the completeness of information, the usefulness of the information, and the precision of the information. Because information quality and data quality are synonymous, the terms have been used interchangeably by a number of authors (Shankaranarayanan & Blake, 2017). Many end-users, including managers, have been shown to be unaware of the data warehouse's data quality (Fisher, Lauría, & Chengalur-Smith, 2012). The data warehouse's data quality is generally poor, and there are numerous anticipated setbacks. Because of erroneous data, organizations with management strategies would be unable to function correctly (Mahanti, 2019). Chen, (2018) acknowledge that, as an element of a management approach of the present day, leaders are aware that better leveraging information is the only way to survive and acquire a competitive advantage in today's market. Data quality must be the foundation for leveraging information. There have been some data quality surveys. Barata & Cunha, (2017) for example, discovered that quality management methods and quality information flows are linked. Information flows and technology also play a role in achieving high-quality results with low faults. Quality information can be collected through quality administrative methods, quality information systems, and standard output (Ferdousi, Baird, Munir, & Su,

2018). All of the cited authorities have done extensive study on repository data quality setting, but not a bit of their findings have focused on data quality in educational management information systems or datasets

History and development of EMIS in Ghana

All levels of education can benefit from the use of EMIS to help make decisions about education policy, analyze it, plan for and monitor it, as well as manage it. Education leaders, administrators, and decision-makers at all levels can use this system to collect the data they need to do their jobs more effectively because of the collaboration between the people involved, the technology they're working with, the models they're using, the methodologies they are using, and the laws and regulations they are following. As a component of Ghana's overall educational overhaul, the nation's Ministry of Education established the Educational Management Information System (EMIS) in the year 1988 (Fletcher, 2012). As EMIS was being developed at national and subnational levels, numerous organizations, including the World Bank, USAID, SIDA, the EU, the German Agency for Technical Cooperation (GTZ), DFID, and the International Institute for Educational Planning (IIEP), as well as French Cooperation, were engaged. These organizations included: The International Monetary Fund (IMF), is the organization that has assumed leadership among these other international financial institutions; Ghana is one of the organizations that would benefit from this. The majority of the money for the EMIS project in Ghana has been supplied by the World Bank in conjunction with the Ghanaian government (Thompson & Casely-Hayford, 2008). The development of Ghana's EMIS may be broken down into three distinct stages. Following is a list of the three distinct phases that EMIS went

through in Ghana (Quansah, Ankoma-Sey, & Aheto, 2017). The first step is known as the Phase of Experimentation, the second stage is known as the Phase of Capacity-Building and the Development of IT Infrastructure, and the third phase is known as the Phase of Enhancement and Progression.

Later in the late 1990s, after the EMIS had been established in 1988 and free obligatory universal basic schooling had been implemented, the government began working on further developing the EMIS. The pilot or first phase was the first step of EMIS development, which progressed from more organized attempts. Twenty-six districts and ten regional centres were selected at this phase to conduct a school-based educational survey. The provision of hardware and software materials was one of the actions that took place during the pilot phase.

Other projects were carried out during that time, such as providing employees working with EMIS with training in fundamental applications of information technology (including the use of spreadsheet and basic data entry). The primary objective of this phase was to enable regions to gather data from institutions and input it into their respective systems (Infodev, 2006).

The second phase of the EMIS project was intended to give an uplift to the process of capacity-building as well as the expansion of IT systems. They provided assistance to the Ministry of Education and Sports throughout the course of a seven-year term (1997–2003) in order to collect data from the survey on basic schools. During this phase, census forms for various parts of the educational system were developed and ultimately finished. These parts include questionnaires for high schools, technical and vocational institutions,

and colleges of education, among others. The training of educational authorities in the process of data collecting, as well as their understanding of how the data produced may be used in educational planning and reform, was a notable achievement of this phase.

The third phase was called Augmentation and Progression. It was planned to last four years and achieve particular goals. Key problems that were considered were attempts to expand on earlier developments and address some of their shortcomings. EMIS's subsequent stages were marred by lack of support, engagement and use. As a result, it was critical for the ministry of education to instil a feeling of ownership in the process and guarantee that the data gathered was put to its intended use. The problem arose because GES employees were in charge of data gathering, validity, data input, and analytics. In brief, they were in charge of every step of the process, including the district-level analysis of collected data. As a direct consequence of this, other MOES units did not feel as though they owned the data that was produced as a result of those interactions. During the subsequent phase, known as the enhancement and growth phase, it was intended to establish a variety of EMIS data collection and processing sub-units. Within each sector, each sub unit was in charge of EMIS. Non-Formal Education (NFED), for example, had to gather data for their sector while GES was still in charge of EMIS. District offices, rather than head-office GES workers, were to be in charge of this process under the revised growth plans (Quansah, Ankoma-Sey, & Aheto, 2017). All of these actions were designed to boost a person's sense of ownership.

In addition, EMIS' coverage was to be expanded in the third phase, both in terms of the types of data collected and the geographic area covered. In order to meet the additional data requirements for HIV/AIDS, new questions were added to the surveys as part of the data type expansion. It was also a goal to strengthen the capacity of 50 district offices and 10 regional offices. The requisite software, hardware, and different capacity-building efforts were expected to be delivered to these offices. Data collection and analysis are carried out by a wide range of administrative bodies, from the national to regional to municipal. These bodies have been given training to help them better take control of their data collection and processing operations. In order to support the process, there were to be four officers recruited and trained (Infodev, 2006).

Strengths and Advantages of EMIS

EMIS in Ghana can be seen as a model of best practice in terms of planning and design. There is a definite link between the evolution of EMIS and the history of education policy (Infodev, 2006). The aforementioned constitutes an advantage for EMIS in Ghana. As a division of the Ministry of Education in Zimbabwe, the Educational Management Information System (EMIS) is accountable for the promotion and utilization of data for the formulation and management of policy, decision-making, and education-based monitoring and review (Aldarbesti & Saxena, 2014). EMIS has a relatively minor impact on the planning process on all three levels in Nigeria: federal, state, and municipal. To draw the wrong conclusion, however, that administrations do not use EMIS to influence public policy at any level would be a mistake (Cambridge Education, 2006) [Cambridge Education]. The

circumstance in Ghana is not significantly dissimilar. Improvements are also being made in other parts of the education system, especially in the non-formal and higher education, and EMIS is helping to promote these developments. Through the implementation of non-formal education, Ghana is able to move closer to achieving both the Millennium Development Goals (MDGs) and the Education for All (EFA) goals (Infodev, 2006).

According to the Ghana Basic Education Sector Improvement Project (P000975), which took place from 1996 to 2001, the data collected by EMIS was utilized for a variety of objectives, including the formulation of sectoral policy and the deployment of resources by the government. Additionally, EMIS data was utilized in Ghana's application to the Education for All Fast Track Program. Data from EMIS was utilized in the Bank's follow-up project known as Education Sector Plan (EdSEP) to select and prioritize districts. If the project's EMIS hadn't been formed, Ghana wouldn't have been capable of developing the documentation for a sensible strategy to achieve the EFA and developments in enrolment and learning outcomes in early schools. This would have prevented Ghana from being able to meet its goals of achieving the EFA (FTI). The capacity of the government to coordinate its donor efforts was improved with the assistance of the International Development Association (IDA). EMIS aids the various educational offices and the government in allocating resources fairly. The regional education Annual Review sessions frequently captured this. EMIS serves as a data bank for a variety of schools, districts, municipal, metropolitan, and regional organizations because it is both a management tool and a database. Unlike the

time-consuming and traditional retrieval of information through files, information can be obtained with a single click of a button.

Setbacks of EMIS

EMIS data accuracy has long been the subject of controversy. According to interviews conducted by Chung (2009), the District EMIS division does not undertake any data quality control on their school data. Per the interview sessions, the district heads are required to double-check all of the forms for legitimacy. Infodev (2006) also addressed concerns about data quality, particularly in regard to the quality of classroom instruction. Teachers' opinions of increased workload connected with the continuous assessment process were compared to the quality of EMIS data. Data collection for EMIS was seen as more labour that didn't pay well, resulting in poor data quality. Again, it was claimed that school census activities provide little benefit to head teachers, and that some teachers may be inclined to under-report due to the added burden (Chung, 2009).

Evidence from Nigeria, Ghana, and Mozambique, according to Powell (2006), demonstrated that Heads of schools were reluctant to spend time filling out papers that would only be utilized by the Ministry to trace development toward national agenda. For similar reasons, authorities operating at the district or state level in the aforementioned countries were unable to recognize the value of collecting forms.

A web-based EMIS will be much appreciated by educational stakeholders in the twenty-first century. Officials from various EMIS offices used to bring their computers to their EMIS head office to submit data acquired and inputted, and vice versa. Such advancements could endanger the

computers and the information they contain. Because EMIS is not web-based in Ghana, it is impossible to access and verify some information. E In the twenty-first century, educationists will have a high level of appreciation for an EMIS that is web-based. It used to be the case that officials from different EMIS offices would bring their computers to the head office of their respective EMIS office in order to present data that had been gathered and entered, and vice versa. These kinds of breakthroughs can put computers and the data they store in jeopardy. Accessing and verifying some information is not available in Ghana's EMIS system because it is not a web-based system. After the data has been input, the EMIS clerks wait for the EMIS workers from head office to visit their site so that they can collect and consolidate the data (Chung, 2009). In the beginning, the EMIS database was developed using Microsoft Access; however, because it was unable to store a large amount of information, it was changed to Oracle, which is also a program that is hosted on the internet. A web-based EMIS has been proposed for some schools with internet connection because it might eliminate errors in handwriting and provide better time management because the heads complete three copies of the forms in their own handwriting (Fletcher, 2012). MIS clerks wait for EMIS workers from head office to come to their site to gather and consolidate data after it has been entered (Chung, 2009). EMIS database was originally designed with Microsoft Access, but couldn't hold a lot of data, so it was switched to Oracle, which is also an application that runs on the internet. Some schools that have access to the internet believe that a web-based EMIS would be advantageous since it has the potential to reduce handwriting errors and assure time management because the heads fill out three copies of the

questionnaires in their own handwriting (Fletcher, 2012). Furthermore, a web-based EMIS can help you save money by reducing the amount of paper you use. Majority of management hardware and software also act as databases. This is also true of EMIS. ICT-based solutions are very useful for guaranteeing the accuracy and consistency of information gathered and disseminated (BECTA, 2000).

Fabiano (2017) expressed concern that, despite its many potential applications, the internet poses some access and data security concerns. The difficulty for him was figuring out how to make data accessible while also safeguarding database integrity and individual privacy rights. Even if one agrees with Cassidy's concerns, EMIS may be able to obtain a dedicated website for itself, complete with the appropriate security standards.

Staff turnover and a lack of capacity were important issues during the first two rounds of EMIS development. Data collection from the schools was supposed to be done at the regional level during the first phase, then entered into their computer system, but this was hampered by staff turnover and a lack of capacity, so data was still input at the central level.

After they were trained, there was a large turnover of workers in the second phase. The EMIS office employees attracted significantly higher-paying jobs in the private sector as soon as they learned basic IT skills. This was exacerbated by the fact that data entry, data processing, and report preparation all took a long time (Fletcher & Aheto, 2011). By the time the reports were shared, they had become irrelevant to critical consumers due to these limits. Cassidy (2005) claims that the circumstance in Latin America and the Caribbean are very comparable to one another. Employees who retired or

switched positions were replaced in two ways: by employees who used gained technical skills and knowledge to obtain work in other disciplines, primarily outside of education but periodically within education as well. He proceeded by stating that it is necessary for a nation to have the ability to plan for pension turnover or changes in status. Such shifts typically follow patterns that can be predicted, and it was significantly more challenging to find suitable replacements for those who left their jobs suddenly. In order to deal with such turnovers, there must be procedures in place to deal with contingencies.

It's possible that EMIS's software is one of its main weaknesses. Although population data was collected for a couple of years in some regions during the starting of the project, it was almost impossible to analyse time series data since the data was housed on multiple databases. Nevertheless, the initial database management system was conflicting with databases that were utilized by other systems, which was a problem that was connected to the initial problem. In addition, because each field used a unique coding system, it was not able to cross-reference any of this data with the data included in EMIS. As a direct consequence of this, the system was also unable to access data from other organizations or integrate that data. For example, because the West Africa Examinations Council (WAEC) and the Ghana Statistical Service each utilize their own unique database system, it is impossible for the two institutions to integrate their respective datasets (Infodev, 2006).

For the time being, EMIS' database is StatsEdu SQL Server 2000. According to Chung (2009), the EMIS software is in a bad state, with a short-term trajectory indicating that it will collapse in a few years. To keep the EMIS software from collapsing, additional resources will be needed.

Studies on databases in education and other fields

There aren't a lot of research that look into databases in the educational system. This is because the use of databases in educational settings is frequently taken for granted (Connaway & Dickey, 2010). Connaway and Dickey (2010) published an important study on databases in education, although other authority has undertaken studies on databases in various disciplines. Convenience has become more important in information-seeking activities, according to Bell and Vernitski (2011). "Ease of discovery and access in getting to the information resources relevant to their needs, as well as keeping oneself informed of events and publications in their domains, is crucially important for researchers," according to their argument (Proctor, Williams. & Stewart, 2010). There are a great number of digital subscriptions resource catalogues offered by libraries, both online and offline, that can be used for current academic research. On the other hand, Low (2003) makes the observation that "students continue to Yahoo and Google their way into a big sea of material," completely unaware to the fact that subscription research databases "help to assure a degree of quality information not readily available via open Internet searches." At a similar vein, Eden and Ofre (2010) state that "university undergraduates are normally largely misinformed of the range of information resources that are available to them in their academic libraries, and instead rely on publicly accessible webpages for their research information needs." Students have lately claimed that their choices for free web resources are driven by Google's expertise ("Students in Their Own Words," 2010, para. 1, 2) and the impression that papers can be found quicker on the Web than in typical library online databases, corroborating prior

observations. In addition, students have stated that they believe that publications can be accessed quicker on the Web than in traditional library research databases. According to Bell and Vernitski (2011), online search engines are both valued and mistrusted, despite the fact that databases in education accessible via the internet offers a number of benefits such as learning management courses (LMC) and assessment objectives.

According to the findings of various database studies, the use of databases has been found to be beneficial in a variety of academic fields. In the realm of medicine, databases might be applied as drug databases at some point. According to Fox, Andrus, Hester, and Byrd (2011), an easily searchable drug database that is included on the documentation form makes it possible for properly spelled medications to be identified quickly and easily. This feature is crucial for proper data processing and data analysis. The schools need to explore whether or not there is a searchable drug database available as one of the alternatives for the documentation tools, and if there is, they need to find out who is responsible for keeping it up to date.

According to the findings of Fox et al. (2011), the database ought to be in the centre of any intervention documentation system in order to offer the most degree of adaptability possible in terms of data collection, examination, reporting, and exporting.

Database management systems are no longer restricted to being used only on PCs. This is in agreement with the findings of Hochin, Kobayashi, Tsuji, and Nomiya (2009), who unearthed that data from antiquity was also handled using computers. They found that the database management system, which is extensively used in the management of computer data, was also

implemented to handle archaeological data. This is because the database management system has been widely used in the management of computer data. Archaeological database systems have been the subject of a great number of reports (Oikawa 1997; Hachimura 1997; Yokoyama, Chiba, 2002). The general public is now able to access certain systems through the use of the internet. According to Meghini et al. (2017), an archaeological database system has been developed. This system is capable of retrieving archaeological data according to retrieval requirements and presenting the results of the retrieval in the form of lists and/or maps. According to Hochin et al. (2009), archaeological data is typically managed with the assistance of paid or open-source database management systems like ORACLE, MySQL, and SQLite. Utilizing a database management system provides a number of benefits, one of which is the query capability. By specifying a retrieval condition, users can access requested data. The users are provided with the data that satisfies the requirements for retrieval.

If databases are so useful, why don't scientists use them? is the title of the study that they conducted. According to Barrodale Computing Services Ltd. (n.d.), it would appear that the majority of scientists steer clear of using databases. In their research, the authors analyse twelve of the most prevalent reasons that scientists give for selecting flat files and/or more structured file formats such as Net Common Data Format (NetCDF) or Hierarchical Data Format (HDF) (HDF5). According to the article that was published by Barrodale Computing Services Ltd. (n.d.), various authors, such as Maier and Vance, Gray, and Buneman, have hypothesized on probable theories for why this resistance exists. These authors' works were referenced in the work of the

authors. My familiarity with file systems is far greater than my familiarity with databases; the data I've obtained in the past is all stored in files; the new data (that I work with) is delivered to me in the form of files; and files are simple to maintain and organize. Because of the nature of the work that I conduct, utilizing a database would not be beneficial in any way. Barrodale

Computing Services (n.d.) is of the opinion that scientists will find some aspects of database management systems appealing, despite the fact that their concerns are justified due to the fact that database management systems can sometimes perform poorly for scientific data. Despite this, Barrodale Computing Services appears to believe that scientists will find some aspects of database management systems enticing.

Data can be indexed so that it can be retrieved more quickly, and it can be stored in a single destination, reducing the artificial boundaries between data files. It can also be added and removed with ease as properties change or become no longer relevant. It may also be stored in a single location to eliminate these artificial barriers. with parallelism already built in, a feature that can be difficult to program for.

Summary of literature review

In conclusion, the review of EMIS revealed that databases constituted the primary source of risk. A database is a systematically compiled collection of information that is logically connected together, and it can be of any size or twist. The assessment highlighted a number of benefits, some of which were reduced instances of data redundancy, enhanced data consistency, heightened levels of data sharing, and higher productivity in application development.

Some of the database management systems that are now being utilized include eSekolah, E-School, and OSIS.

The implementation of EMIS and its use were further expanded upon within the context of the topic "History of EMIS in Ghana." Electronic Data Interchange System (EDISIS) is a system for unifying data from several sources into a single database for use in a wide range of decision-making processes including policy analysis, planning, monitoring, and management. By implication, it made reference to the EMIS project, which was initiated in 1988 and upgraded in subsequent years. The development of the EMIS in Ghana took place in three stages: the pilot phase, the capacity building and IT infrastructure development phase, and the enhancement and expansion phase. In addition, it was noted in the history that the World Bank was a significant funder of the project.

It was found that Ghana's EMIS architecture was a model of pre-eminent strategy for localized budgeting process, which assisted reforms at different phases. This conclusion was reached after taking into account the merits and advantages of EMIS. Nevertheless, obstacles still stand in the way of a successful execution, most notably in terms of dedication, capability building, and transmission of information.

EMIS data was used in a variety of ways, including for government sectoral policy and funding distribution for Ghana's EFA and FTI proposals. Using EMIS data, the World Bank's follow-up program, EdSEP, identified and targeted areas. As a result, it contributed to increased enrolment and learning outcomes in Ghana's elementary schools, allowing Ghana to benefit from the FTI. The decentralization of the EMIS system resulted in a higher use of

information at the local level, with the centre now serving as a support and quality assurance centre.

The early versions of EMIS had major capacity limitations as a result of the system's shortcomings, however the newer versions of the system have addressed these issues. A better capacity has been built in the significant sub in relationship to public institutions as a result of the implementation of a fCUBE policy. It was unable to perform a time-series analysis as a result of software issues, and the processing of data was slowed down as a result of the loss of qualified employees. In addition, during the second phase of the project, reservations surrounding the ownership of the information trumped decentralization efforts that were being made at the various EMIS offices. Teachers in general viewed EMIS as an additional duty to the principle of continuous assessment. Head teachers came to the conclusion that school census activities brought little benefit to them. The upkeep of the information technology hardware and software, the absence of web-based solutions, and the constant turnover or replacement of staff members were some of the major challenges.

In conclusion, we discussed research on databases used in education as well as other sectors. In fields such as research, archaeology, and medicine, databases are leveraged to independently manage palaeolithic data and pharmacological databases.

CHAPTER THREE

METHODOLOGY

Introduction

The procedures that were employed to carry out the study are discussed in this chapter. The following aspects are discussed in the chapter's subheadings: Population, Sampling, and Sampling Procedure are all aspects of the research. Others include, technique for data collection, Instruments, and Data Analysis.

Research Design

The study employed quantitative methodology using descriptive research design. A descriptive study is one in which the essence of a phenomenon is defined. Descriptive research studies, according to Fletcher, (2012) are studies designed to gather knowledge about the current state of affairs. According to Kemp, Hort, and Hollowood (2018), descriptive research is associated with existing situations or structures. This includes examining the substance of current conditions, actions, and attitudes, as well as opinions that are held by individuals. Mechanisms that are in the process of being developed; or patterns that are just beginning to emerge. According to McCombes, (2020), descriptive research is conducted with the intention of precisely and methodically describing a population, situation, or phenomena. These assertions are in addition to those made in the earlier contributions. Essentially, the descriptive research design will be used to collect data via questionnaires in order to explain the essence of current conditions, activities, and attitudes; hold opinions and establish trends; and then identify the factors

that influenced the current status of Educational Management Information System data knowledge and utilisation in the Greater Accra Region.

Even so, there are some drawbacks to descriptive analysis, such as the fact that it is insufficiently systematic to provide responses to research questions and cannot create a cause-and-effect relationship (Apuke, 2017).

Besides that, one of the most subtly and unavoidable shortcomings of descriptive survey is the existence of bias (Coy, 2019). To avoid uncertainty, questions must be explicit particularly when using questionnaires. Qualitative research involves collecting and analysing non-numerical data (e.g., text, video, or audio) to understand concepts, opinions, or experiences (Bhandari, 2020). In this mixed research that will be conducted, a case study on the understanding and use of an Educational Management Information System (EMIS) in the Greater Accra Region will be conducted. According to Heale & Twycross, (2018), case studies are in-depth investigations on a person, a group of individuals, or a unit that are conducted with the intention of generalizing over a number of different units. Heale and Twycross stated in addition that a case study can be defined as an in-depth, methodical assessment of a single person, group, community, or other entity, in which the researcher investigates in-depth data relating to numerous different variables.

Population

All GES workers who are directly or indirectly involved in the use of EMIS in the Greater Accra Region will be included in the target population. Teachers in senior high, junior high, and primary schools, as well as their principals, are the target demographic. Inspectorate officers, such as circuit managers, human resource officers, planning officers, budget officers,

Educational Management Information System officers and coordinators, Metro and Municipal directors, and the Greater Accra Regional Director of Education, are also included. It's worth noting that the current study had access to every unit of the target population.

Sample and Sampling Procedure

The term sampling can be defined as the process of selecting certain members or a subset of the whole population to estimate the characteristics of the population (Wang & Cheng, 2020). Sample size refers to the number of participants in a research study. (Frey, 2018) Tema Metropolis, Ga South Municipality, Tema West Municipality, the Greater Accra Regional Education Directorate and Seven schools from the Accra Metropolis and two Municipalities were purposefully sampled because they had well-established Educational Management Information System units in the Greater Accra Region, and they form a greater chunk of my population. The sample size of 56 used in this study was adopted and modified from the study of Edzii, (2017) who conducted research on decentralization of EMIS in Ghana. Table 1 shows the distribution of the study's sampled personnel.

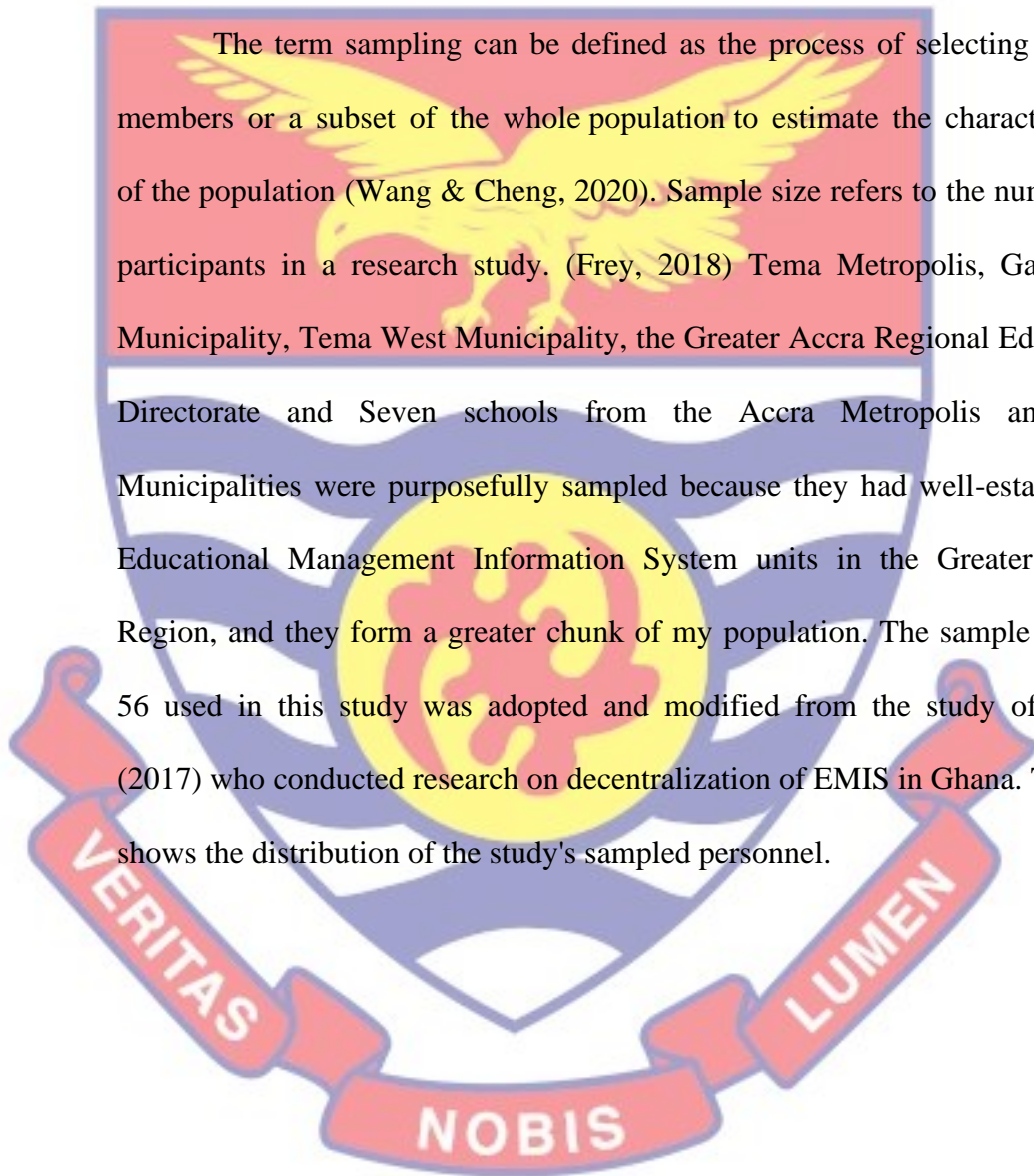


Table 1: Sample size distribution

Category	Sample size
Greater Accra Region EMIS Head	1
Greater Accra Region Director of Education	1
Greater Accra Region Education Planning Officer	1
Greater Accra Region Education Human Resource Officer	1
Metropolis/Municipality/District EMIS officials	12
Metropolis/Municipality/District Directors of Education	3
Metropolis/Municipality/District, A.D. Planning officers of Education/ Statistics/Data (EMIS Officer)	3
Metropolis/Municipality/District, A.D. Finance & Administration of Education	3
Metropolis/Municipality/District, A.D. Human Resource officers of Education	3
Metropolis/ Municipality/District, A.D. Supervision officers of Education	3
Metropolis/ Municipality/District Circuit Supervisors of Education Officers	12
Heads of Schools (Basic and SHS)	3
Total	56

Source: Field Survey, (2022)

Instruments

The study's instrument is a questionnaire that is designed primarily for it since the entire study's sample population could read and write. According

to McLeod (2018), A questionnaire is a research instrument consisting of a series of questions for the purpose of gathering information from respondents. It was important to use the questionnaire as a survey instrument because it prevents the researcher from influencing the respondent while maintaining the respondent's privacy. Other advantages of using a questionnaire include the fact that it is a quick way to collect data and is considered to be very valid and reliable if well built. It also saves time and resources, and the data collected is accurate since the options are minimal. While the questionnaire has many benefits, it also has a few drawbacks. That is, some respondents may be incapable or unable to provide the requested information because they are suspicious of the study's motives. Again, correct wording of question items is difficult since confusion of the question items may lead to misrepresentation in the study's final analysis.

The questionnaire for this study is divided into seven parts, numbered A through G. All of the participants are required to respond to questions in sections A, B, and C. In addition, they will have access to Section G in case they decide to make suggestions or provide supplementary data for the report. Question items in Sections E and F are only for respondents who are Directors of Education and all EMIS/ Statistics Officers, respectively. All of the questions are open-ended and closed-ended.

The respondents' demographic details are covered in Section A. Sections B through F are devoted to each of the study's five research questions. The question items in sections B and D were Yes, No or I don't know. Section specifically sought to elicit information from users of EMIS

and how they use it. Section D also included open-ended query items that will allow respondents to provide their own responses.

The data for Section C of the study will be collected using a Likert Scale with five responses reflecting respondents' choices. Strongly Agree, Agree, Neutral, Disagree, and Strongly Disagree were the responses, with SA, A, N, D, and SD representing Strongly Agree, Agree, Neutral, Disagree, and Strongly Disagree, respectively. Respondents will only be allowed to tick the appropriate column with a 'X' for each statement to signify their opinions.

Data Collection Procedure

All of the regional, metropolitan, and municipal directors of education, as well as the heads of all of the institutions taking part in this study were given an introductory letter.

Respondents were briefed on the purpose of the questionnaires before they were administered. Questionnaires were directly administered and collected after the respondents had completed them. In situations where respondents request that the questionnaires be obtained at a mutually agreed-upon later date, they were given serial numbers to facilitate easy tracking of the questionnaires, and upon selection, the questionnaires were quickly glanced over to ensure that all questions are answered. The instrument's entire administration and compilation period lasted approximately three weeks.

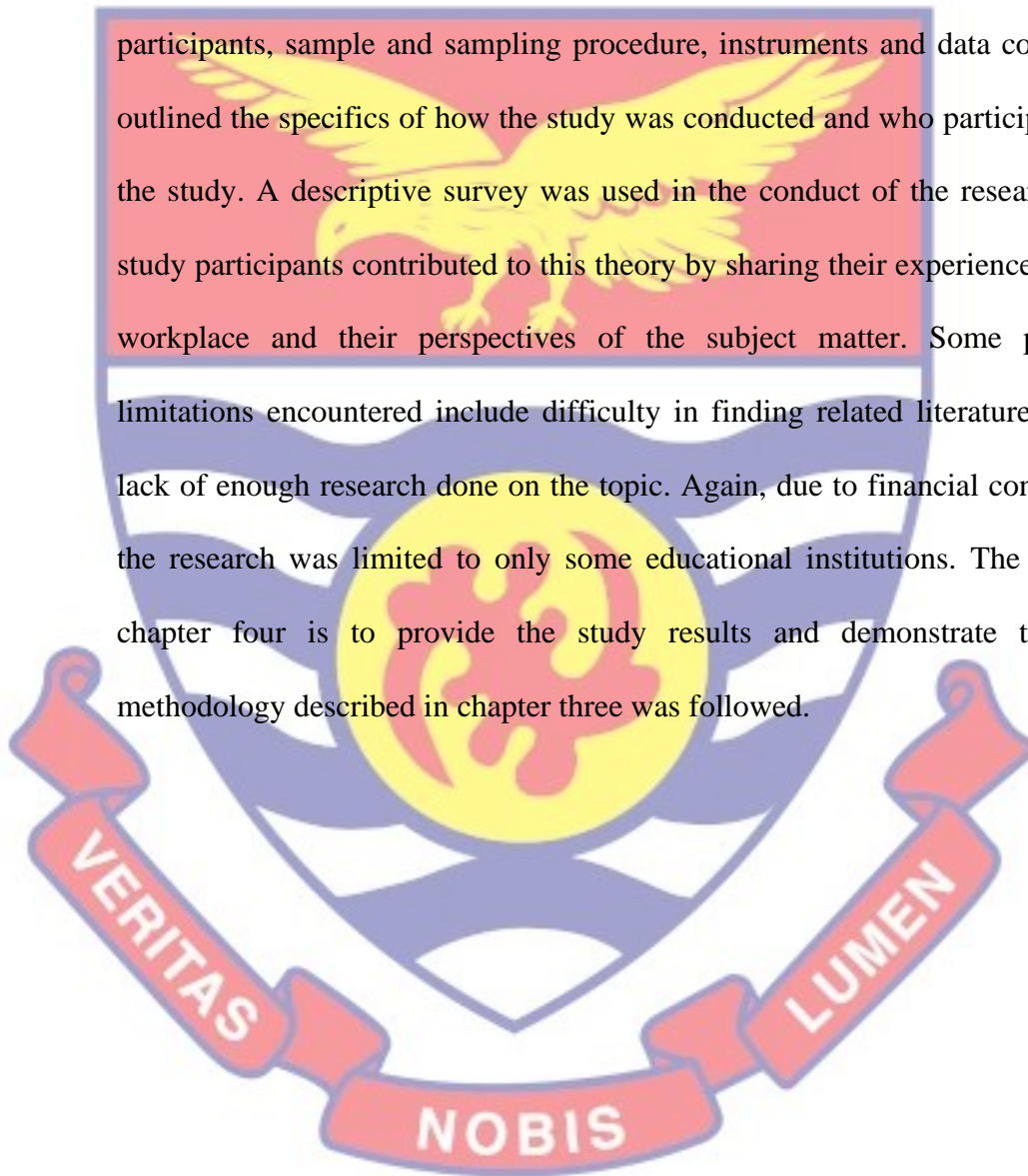
Data Analysis

The answered questionnaires were retrieved from respondents, and organized using Microsoft Excel. The data were further organized and analysed using the Statistical Package for Social Sciences (SPSS). Findings were presented and visualized using tables generated using Microsoft Excel

and SPSS. Cross tabulations were also used to draw out relationships between variables analysed in the study.

Chapter Summary

The goal of this chapter was to outline the research method used to answer the research questions. A discussion of the procedure, study participants, sample and sampling procedure, instruments and data collection outlined the specifics of how the study was conducted and who participated in the study. A descriptive survey was used in the conduct of the research. All study participants contributed to this theory by sharing their experiences in the workplace and their perspectives of the subject matter. Some possible limitations encountered include difficulty in finding related literature due to lack of enough research done on the topic. Again, due to financial constraints the research was limited to only some educational institutions. The goal of chapter four is to provide the study results and demonstrate that the methodology described in chapter three was followed.



CHAPTER FOUR

RESULTS AND DISCUSSION

Introduction

The chapter presents and discusses the study's findings. The study looked at how qualified and equipped the managers of EMIS are and also how stakeholders use EMIS in planning, policy formulation and strategizing. The first section delves into the demographics of the respondents. This was done to offer context for persons who responded to questions about knowledge on and its use. The second section contains analyses of the given responses. The Statistical Package for Social Scientists (SPSS) version 26.0 was used to analyse the data.

Demographics of Respondents

It is critical to understand the respondents' backgrounds in order to make informed decisions about EMIS awareness and use in the Greater Accra Region. The distribution of respondents by office locations and municipalities is shown in Table 2.

Table 2: Distribution of Respondents by offices and locations

Name of Metropolitan/Municipality	Location	Frequency	Percentage (%)
Accra Regional Office	Accra	5	8.93
GA South Municipality	Weija	15	26.79
Tema West Municipality	Tema	20	35.71
Tema Metropolis	Tema	16	28.57
Total		56	100.00

Source: Field Survey, (2022)

Table 2 gives a summary statistic of respondents' locations and the offices they work. Five respondents representing (8.93%) of the sample were surveyed in the Greater Accra Regional Education Office; 15(26.79%) were from the Ga South Municipal Education Office; 20(35.71%) were from the Tema West Municipal Education of whereas 16(28.57%) were from the Tema Metropolitan Education office in the Greater Accra region.

Table 3: Distribution of Respondents by their positions held in the Ghana Education Service (GES)

Position in the office	Frequency	Percentage (%)
Director	4	7.14
Regional EMIS officer	1	1.79
EMIS/Statistics Officer	12	21.43
Asst. Dir. HRM	5	8.92
Asst. Dir. Finance & Administration	4	7.14
Asst. Dir. Supervision	4	7.14
Circuit Supervisor	10	17.86
Asst. Director - Statistics (EMIS)	5	8.92
Headteachers (Primary)	5	8.92
Headteachers (JHS)	5	8.92
Headmasters (SHS)	1	1.79
Total	56	100

Source: Field Survey, (2022)

The distribution of respondents by posts held in the Ghana Education Service is displayed in Table 3. The respondents in the GES held a variety of

positions, as shown in the table, and this heterogeneity contributed to the quality of data gathered for the study.

Table 4: Distribution of Respondent by Gender

Gender	Frequency	Percentage (%)
Male	30	53.57
Female	26	46.23
Total	56	100

Source: Field Survey, (2022)

Table 4 presents the distribution of respondents by gender. Out of the 60 questionnaires distributed, only 56 were returned. Analysis of the returned questionnaires revealed that 30 of the respondents, representing 53.57% were males whereas 26 of the respondents representing (46.23%) of the sample were females.

Knowledge of EMIS by Respondents

EMIS should be known for more than just its name. This section of the analysis assessed how respondents are familiar with EMIS and its intended functions. The fact that respondents are aware of EMIS means that they are aware of its main functions and importance.

Source: Field Survey, (2022). All 58 (100%) respondents claim they have some level of knowledge about EMIS. This indicates that respondents are not unfamiliar with EMIS. It also assumes that their knowledge of EMIS extends beyond the acronym. The researcher probed further to find out how much the respondents know about the importance of EMIS. The responses of the respondents are recorded in Table 5.

Table 5: Knowledge of respondents about importance of EMIS

Item	Frequency	Yes	No	I don't know
EMIS is used for school mapping and school census	56	56(100.0%)	0(0.0%)	0(0.0%)
EMIS is of value to educational administration	56	56(100.0%)	0(0.0%)	0(0.0%)
EMIS is of value to school supply of school resources	56	50(89.3%)	3(5.4%)	3(5.4%)
EMIS is of value to governance of schools	56	54(96.4%)	2(3.6%)	0(0.0%)
EMIS is an educational management tool	56	55(98.2%)	1(1.79%)	0(0.0%)
EMIS is an educational database	56	56(100.0%)	0(0.0%)	0(0.0%)

Source: Field Survey, (2022)

Table 5 shows that respondents are familiar with EMIS beyond the term. Results presented in the table indicates that EMIS is utilized for school mapping, school census, and educational administration. This demonstrates that respondents are aware of some of the most important aspects of EMIS. Respondents' knowledge of EMIS also shows that they are involved with some EMIS operations, as the MOEs announced in 2006 in all education offices that data from school mapping would be utilized as the basis for establishing district operational plans (Infodev, 2006).

The majority of respondents 50(89.3%) believed that EMIS is beneficial to the availability of educational resources, although 3 of the respondents representing 5.4% do not believe and 5.5% unaware of the fact that EMIS is beneficial to availability of educational resources. One of the most important management jobs is to allocate scarce resources (Ministry of Education and Sports, 2005). On this basis, one can concur with Ellison (2004), who states that administrative applications of EMIS assist direct functions like teacher or fund allocation. Information on educational challenges is crucial since it affects resource allocation and determining where assistance is most needed (Infodev. 2006).

Again, the results of the analysis show that 54 out of the 56 respondents constituting (96.4%) believe that EMIS is beneficial to school governance as opposed to the 3.6 percent who disagreed. It is possible to build a link between governance and decision-making. The result of the study is consistent with the findings of Fletcher and Aheto (2012) who asserted that Management Information Systems (MIS) provide managers with frequent data so they may make decisions based on facts rather than speculations.

Research Question 1: How do the Regional/Municipal/Metropolitan Directors of Education use EMIS for planning and policy making as well as mapping strategies?

Assessing the Main Uses of EMIS by Stakeholders

The researcher further elicited from the respondents what the mainly stakeholders use EMIS for. It was found out that, although the respondents knew that Regional/ Metropolitan/ Municipal/ District Education Office

Directors use EMIS, they cited varied examples of how the system is used by Directors they are aware of. The results are illustrated in Table 6.

Table 6: Main Uses of EMIS by Directors of Regional/Metropolitan/Municipal/District Education Offices

Uses of EMIS	Frequency	Percentages (%)
For policy formulation and implementation (infrastructure, personnel and logistics)	6	10.7
Serves as database/inventory (for resources, personnel and student	8	14.3
For efficient management including training and remediation purposes	12	21.4
For planning, budgeting, monitoring and evaluation of educational indicators	14	25
For allocation of resources (infrastructure, personnel and logistics	13	23.2
Others (Reports, Annual Review reports, etc.)	3	5.4
Total	56	100

Source: Field Survey, (2022)

It was observed that 6 of the respondents, representing 10.7% know that EMIS is used for policy formulation and implementation. 8 out of the 56 respondents also opined that EMIS was used as a database by stakeholders where inventory of resources, students and personnel are stored. 12 out of the 56 respondents, representing 21.4% know that EMIS was used for efficient management of the school system. 14(25%), 13(23.2%), 3(5.4%) of the respondents indicated that the main uses of EMIS were planning (budgeting, monitoring, evaluation, resources allocation and other views (reports, annual reviews, etc.) respectively.

Table 6 shows that most respondents consider planning, budgeting, monitoring, and evaluation of educational indicators to be one of the most important uses of EMIS by Directors of Regional/ Metropolitan/ Municipal/ District Education Offices, whereas policy formulation and implementation, as well as annual review reports, are only perceived by a few respondents as important uses of EMIS by Directors of Regional/ Metropolitan/ Municipal/ District Education Offices. Director of Education reports, such as yearly review reports, are planned to be mostly generated using EMIS.

Data was collected from the Regional, one Metropolitan, and two Municipal Directors of Education in the Greater Accra Region in order to determine how they use EMIS for planning and policymaking. The research question's items were all open-ended. EMIS is used by all of the directors for planning, policy development, and strategy mapping. The following are responses from a few of the sampled Directors.

1. For the purpose of school planning, budgeting, monitoring, and assessment of educational indicators.
2. For the formulation and execution of policies.
3. Acts as a database for teachers, materials, and exams such as the Basic Education Certificate Exams and the Baseline Exams.
4. Functions as a resource inventory (helps them to know the state of the resources and how new resources should be allocated).
5. For the purposes of remediation and training.
6. To ensure effective management.

Robinson, Christensen, and Bacon, (2019) defined policy as a law, regulation, procedure, administrative action, incentive, or voluntary practice of governments and other institutions. Policy is a set of recommendations for resolving public problems and difficulties. Policies frequently provide general tactics and responses to challenges, but they can also specify more precise measures. Planning is described as the procedure of establishing what to do and how to achieve it, as stated by (Litman, 2013). Planning allows us to close the gap that exists between where we are now and where we want to be in the future. It makes things possible that wouldn't be possible under any other circumstances.

Directors of Education use Educational Management Information Systems (EMIS) to make decisions regarding the dissemination and allocation of Teaching and Learning Materials (TLMs), as well as the appropriation of teachers and funds, when it comes to policies and strategy. EMIS also helps directors determine how to distribute and provide Teaching and Learning Materials (TLMs) (Aheto & Fletcher, 2012).

When it comes to conducting initiatives like Ghana's "My First Day at School", a ceremony to welcome new students starting Basic 1 with school supplies and refreshment, the directors say EMIS is an excellent resource for data and information about student enrolment in various schools. How educational resources are allocated evenly among schools is a key topic of public concern these days. According to the Ministry of Education and Sports (2005), the capitation grant was first implemented in 40 disadvantaged districts in 2003-2004 on a trial basis.

Schools receive cash after preparing School Performance Improvement Plans with the help of EMIS data (SPIPs). EMIS is highly beneficial in the allocation of staff to the educational establishments, according to all of the Director-respondents. During yearly education review sessions, directors of education are once again allowed to give proof in the form of statistical fact.

EMIS is utilized in alternate ways by Directors of Education for the purposes of planning and decision making. These include the collection of data, the identification of disadvantaged schools or locations, the procurement of academic materials for dissemination, supervision, and assessment.

The remaining challenges include conducting workshops, enrolling new students, arranging for instructor postings and transfers, and making preparations for incoming pupils. If the Educational Management Information System (EMIS) could be used significantly by Directors of Education for policy making and decision - making in its present level, then many new improvements can be accomplished with relatively little modification.

According to (Chris, 2015) ICT use in Kenya is still confined to computer literacy training, as it is in most underdeveloped nations. If Chris is right, then the Directors of Education may use EMIS data for more than just reporting and budget allocation, and instead do further study and create forecasts based on statistical proof. In conclusion, Directors of Education make efficient use of EMIS data for planning and policymaking; yet, the EMIS system still has a great deal more potential than what it is now being utilized for, and this potential can be achieved in a variety of different ways.

Research Question 2: How qualified and well equipped are the EMIS managers?

The EMIS Directors were the most qualified individuals to give the data that would answer the study's question, and as a result, we obtained the data for this research question from them. It may be possible to gain some insight into the factors that contribute to EMIS knowledge and use in the Greater Accra Region by analysing the data on their qualifications and the degree to which they are well prepared.

Table 7 displays the breakdown of EMIS officers that can be found in the sample used for the study. Officials from the education departments of the metropolitan area, municipalities, and the Greater Accra Regional office make up the officials recruited.

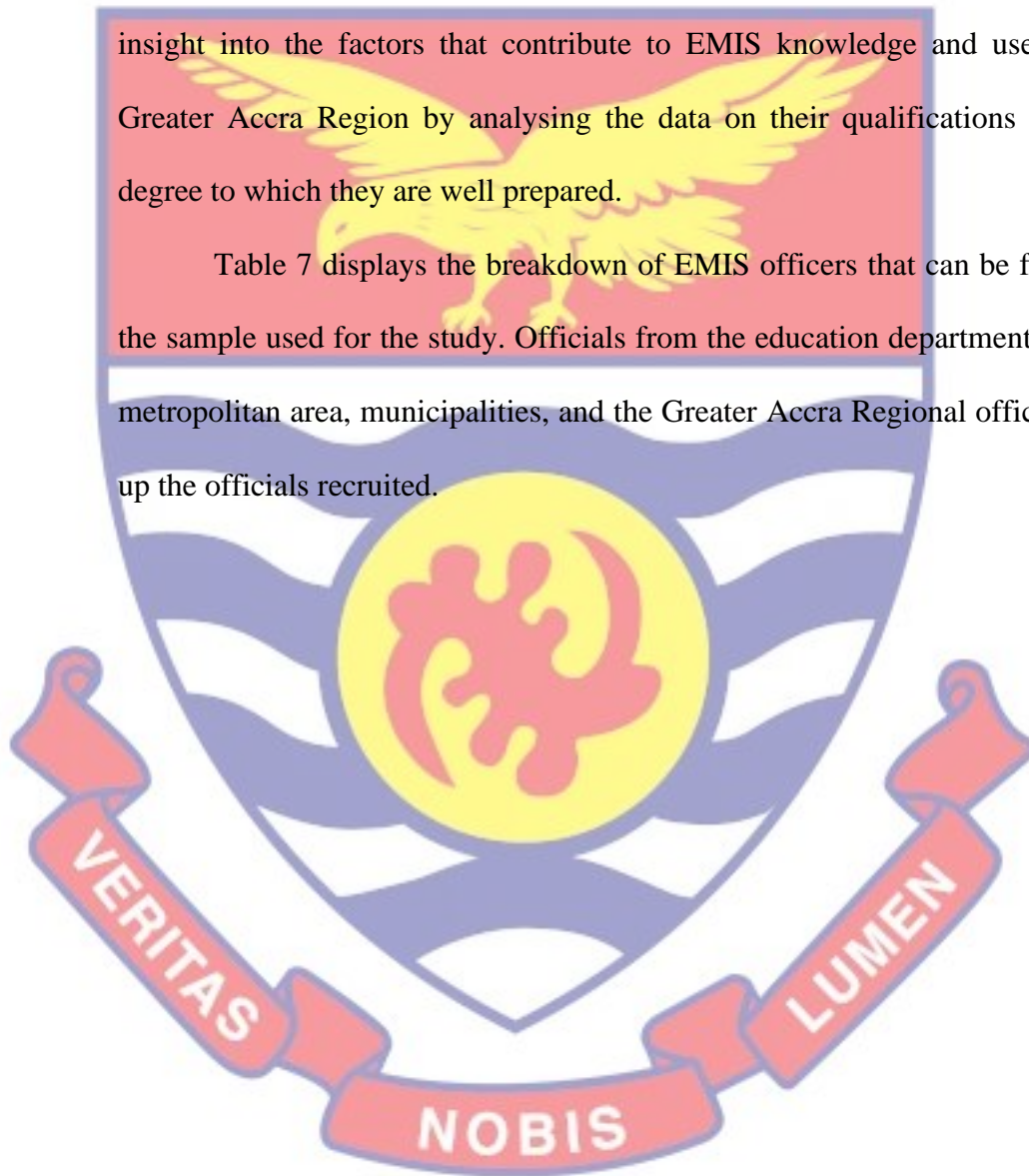


Table 7: Cross tabulation of the distribution of EMIS Office Respondents' positions and their Office locations

Office Location	Position					Total
	Regional EMIS Statistics Officer	Head/ Assistant Statistics Officer	Director/ EMIS/ Officer	Statistics Officer Clerk)	EMIS/ Statistics (Data Entry)	
Greater Accra						
Regional Office	1(5.0%)	1(5.0%)	2(10.0%)	1(5.0%)	5(25.0%)	
Tema Metropolis	0(0.0%)	1(5.0%)	4(20.0%)	1(5.0%)	6(30.0%)	
Tema West Municipal	0(0.0%)	1(5.0%)	3(15.0%)	1(5.0%)	5(25.0%)	
Ga South Municipal	0(0.0%)	1(5.0%)	2(10.0%)	1(5.0%)	4(20.4%)	
Total	1(5.0%)	4(20.0%)	10(55.0%)	4(20.0%)	20(100.0%)	

Source: Field Survey, (2022)

Table 7 uncovers that out of the total of 20 respondents who were EMIS officials, 4 (20.0 percent) were Data Input Clerks and 10 (66.7 percent) were EMIS/ Statistics officials. Additionally, 4 (20.0 percent) were Assistant Directors of Education in charge of Statistics/EMIS, and 1 (5.0 percent) was the Head of the Regional EMIS Office. In addition to supplying information on EMIS knowledge and use in the Greater Accra Region, the ramifications of this sample for the study will help in addressing the first research question that was posed.

Table 8: EMIS Office Respondents according to their qualification in computing

Qualification in computing	Frequency	Percentage (%)
Yes	17	85.0
No	3	15.0
Total	15	100

Source: Field Survey, (2022)

Table 8 reveals that out of the 20 EMIS officers who responded to the questionnaires, 17 of them, representing about 85% had qualifications in computing whereas the remaining 15% do not have any qualification in the field. This implies that most of the officers in charge have some level of qualification in computing.

Table 9 presents the distribution of the qualifications in computing possessed by the EMIS officials.

Table 9: Distribution by EMIS Office Respondents according to their qualification in computing

Types of Qualification	Frequency	Percentage (%)
M.Ed. (IT)	3	17.6
Microsoft Office Suite Professional		
Qualification	7	41.2
Data analytics (SPSS, Python, Excel)	4	23.5
Diploma (IT)	2	11.8
B.Sc. (Computer Science), SQL, Oracle		
Database	1	5.9
Total	17	100

Source: Field Survey, (2022)

Despite the fact that 7 (41.2 percent) of EMIS Office Respondents stated that they had a professional certification in the Microsoft Office suite (Word, Excel, PowerPoint, and Access), only 4 (23.5 percent) stated that they had a qualification in data analytics. The rest of the respondents either hold a Bachelor of Science in Information Technology, a Bachelor of Science in Information Technology with a Master's Degree in Education in Information Technology, or a Degree in Information Technology (Computer Science).

The bulk of EMIS personnel, in my opinion, have basic computing qualifications, which are essential for such a delicate area of the Education Service in Ghana. Some of them, on the other hand, have information technology qualifications, which is a benefit.

This trend could also be attributed to a lack of dedication and compensation concerns among personnel with the necessary computer skills, as seen by the challenges faced during Ghana's phase two EMIS deployment. This is in line with Infodev (2006), who found that once EMIS office personnel learned basic IT skills, they were able to get significantly better-paying employment in the private sector.

Refresher/In-Service Trainings for EMIS Officers

The results of the survey as presented in Table 11, demonstrates that every single responder had received some form of in-service or refresher training. Table 10 provides a breakdown of the data on the refresher and in-service trainings that respondents attended.

Table 10: Refresher/In-service Training for EMIS Officers

Refresher/In-service Training	Frequency	Percentage (%)
Training for Data entry clerks on school census organized by MOE and EMIS office	7	41.2
National School Census Workshop and Training for Statistic/Data entry clerks on school census organized by MOE and EMIS office	2	11.8
School Report Card Teacher by USAID and Annual School Census by DFID	1	5.9
Educational Annual School Census by MOE	5	29.4
EQUAL and GAEC	2	11.8
Total	17	100

Source: Field Survey, (2022)

Table 10 shows the EMIS Officer-Respondents' attendance at various refresher/in-service trainings. While 7 (41.2%) of respondents stated they attended workshop for Data entry clerks on the Enumeration of Schools organized by the Ministry of Education and the EMIS office, 5(29.4%) said they attended the Ministry of Education's Educational Yearly School Census.

The Ministry of Education organized the majority of workshops for EMIS personnel, while some were organized by donor agencies such as USAID and DFID. The outcome of the results presented in Table 10 reveals that all of the EMIS Officers who responded to the survey took part in a refresher/in-service training session.

Table 11: A crosstab of the highest academic and professional qualification of the EMIS officers

Academic Qualification	Professional Qualification				Total
	3-Year Cert 'A'	Degree	Post-Graduate Diploma	Diploma	
Master's Degree	2(11.8%)	2(11.8%)	-	2(11.8%)	6(35.3%)
Degree	3(17.6%)	3(17.6%)	-	1(5.9%)	7(41.2%)
Post-Graduate Diploma	1(5.9%)	-	1(5.9%)	-	2(11.8%)
Diploma	-	-	-	2(11.8%)	2(13.3%)
Total	6(35.3%)	5(29.4%)	1(5.9%)	5(29.4%)	17(100%)

Source: Field Survey, (2022)

All of the EMIS Officers who responded possessed both academic and professional qualifications, according to a cross tabulation. While 6 (35.3%) and 7 (41.2%) of them each earned a Master's degree and a First degree, the remaining 2 (11.8%) held either a Post-Graduate Diploma or a Diploma. In addition, Table 11 reveals that 6 (35.3 percent) of the EMIS officers who participated in the study held a 3-Year Certificate 'A,' while only 5 (23.4 percent) of them held a Bachelor's Degree. In conclusion, 1 (5.9 percent) of them hold a Post-Graduate Diploma, while 5 (29.4 percent) of them hold a Diploma as their highest professional certification.

Table 12: Office Equipment in the EMIS Offices

Office Location	No. of Computers	Internet Access	Telephone
Greater Accra Region	3	Present	Present
Tema Metropolis	2	Present	Present
Weija Municipality	2	Absent	Absent
Tema Municipality	2	Present	Absent

Source: Field Survey, (2022)

Table 12 demonstrates that all EMIS offices were equipped with computers. It also shows that, all EMIS offices, apart from Accra Metropolis, have internet connection. Table 12 shows that, with the exception of the Weija Municipal and Greater Accra Regional EMIS offices, the rest of the EMIS offices did not have access to a telephone.

Chapter Summary

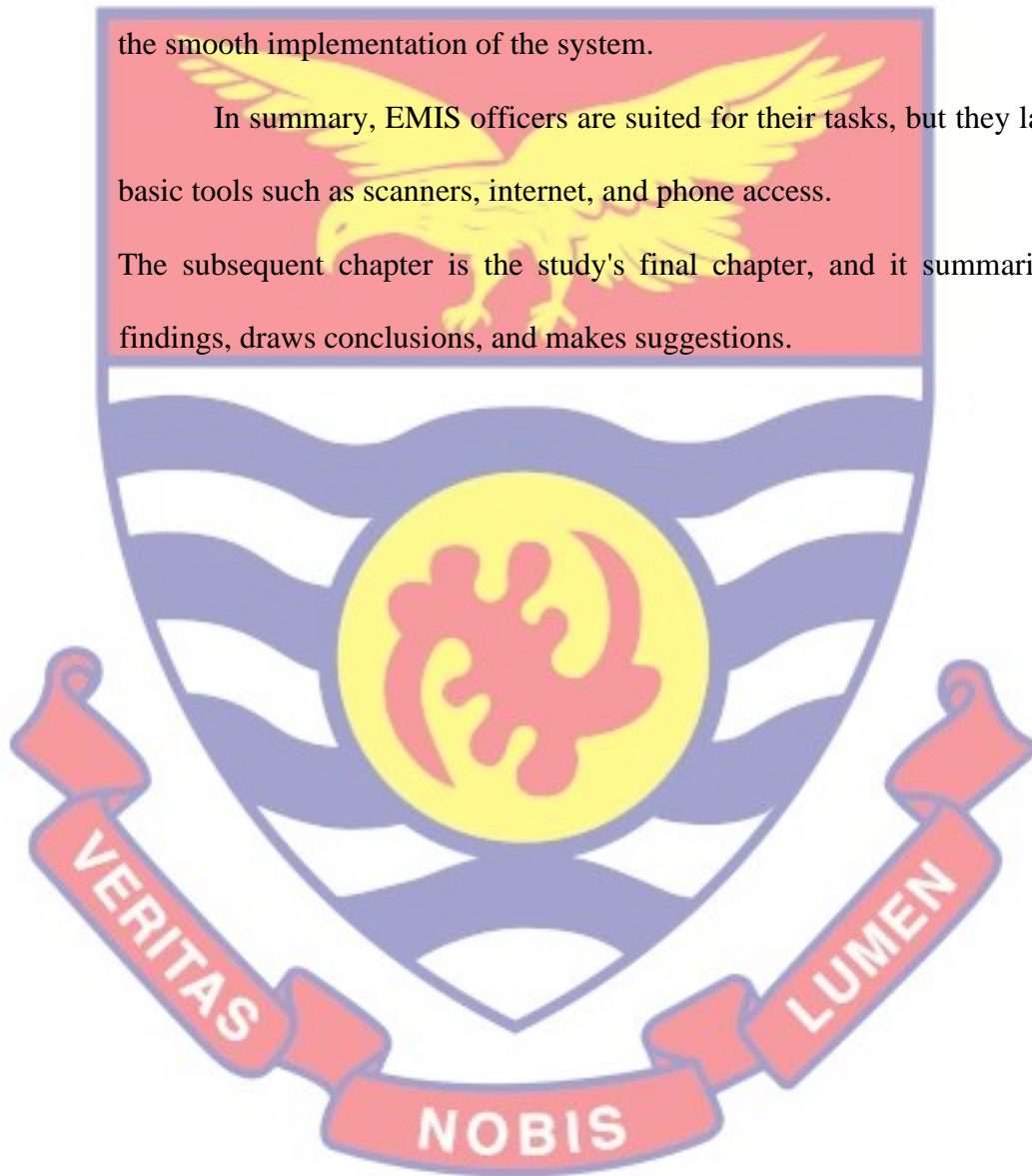
The findings of the study revealed that, the MOE on average, organizes about seven training sessions for Data entry clerks on school

census in order to improve their performances in the implementation of the system.

It can also be inferred from the results of the findings that all respondents have knowledge of EMIS and its importance in managing the school system. However, insufficient and inadequate equipment inhibit the smooth implementation of the system.

In summary, EMIS officers are suited for their tasks, but they lack basic tools such as scanners, internet, and phone access.

The subsequent chapter is the study's final chapter, and it summarizes the findings, draws conclusions, and makes suggestions.



CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Introduction

This chapter provides an overview of the entirety of the study, a concise summary of the findings, and the study's conclusions. It makes actionable recommendations and identifies areas for further research into how stakeholders use EMIS in planning, policy formulation and strategizing in the Greater Accra Region.

Overview of the Study

The study's goal was to determine how qualified and equipped EMIS administrators are, as well as how stakeholders in the Greater Accra Region use EMIS in planning, policy formation, and strategizing.

The research design utilized in this study was a descriptive research design. A method known as random sampling was utilized in order to choose members of the public to serve as the study's sample. Greater Accra served as the focus of this particular research. The study selected two municipal education offices, one metropolitan education office, and the Regional Education Offices correspondingly. The sample for the study consisted of all of the Directors of each Municipal, Metropolitan, and regional organization, as well as the Assistants to those Directors. Others who were included in the sample were EMIS Coordinators, EMIS Officers, Circuit Supervisors, Heads of Basic schools and Senior High Schools, and Teachers. Also included in the sample were EMIS Coordinators and EMIS Officers. In order to collect data for the study, the researcher developed a questionnaire for the data collection

processes. The questionnaire was subdivided into 2 parts, the first of which asked for demographic information, and the second of which contained the research questions. Apart from the main portions, the Directors and EMIS executives addressed extra questions from a designated section. Due to their encounters with EMIS, this was to assist in obtaining data from them in order to address two research questions. Sixty questionnaires were administered in total, with 56 completed and returned for the study.

Key Findings

The study's major conclusions were that:

- All three Municipal and Metropolitan Offices of Education in Greater Accra that were the study's sample, had EMIS offices.
- Each year's School Census is the most essential news source about the state of each school, according to the Ministry of Education.
- EMIS is well-known, particularly among employees of the Regional/ Metropolitan/ Municipal/ Directorates of Education, the Ministry of Education, Teachers and UNESCO.
- EMIS does not have its own webpage.
- Users of EMIS are often individuals that are aware of it.
- Administrators of Education are the frequent end users of EMIS for academic planning, monitoring, budgeting, assessment, and policy making, in addition to administering educational information systems.
- EMIS offices are under-resourced, with few lacking basic office devices, internet connectivity while others lack communication devices.

Conclusions

Based on the analyses and findings therein, it is safe for the researcher to make the following conclusions: firstly, The Ministry of Education considers EMIS to be the most essential source of information on each school's situation. EMIS offices, on the other hand, are under-resourced, with some lacking standard office gadgetries and supplies. Some of the offices are also not linked to the web.

Second, all three Municipal and Metropolitan Offices of Education in Accra that were the study's sample include EMIS units, indicating that education offices use EMIS. The EMIS system's users are also taught how to be resourceful when using it.

Lastly EMIS, according to the Ministry of Education, is more than just a database system for gathering educational data; it also aids in the planning and formulation of educational policy.

Recommendations

Per the study's findings, the under listed proposals have been identified

- The Ministry of Education, in collaboration with the Education Service in Ghana, must equip EMIS facilities with cutting-edge technology, such as computers, scanners, photocopiers, and phone lines.
- As part of its information dissemination plan, the national EMIS office must make flyers, bulletins, and periodic newsletters regarding EMIS's objectives and operations available to the public. This can be accomplished by developing a staunch and

trustworthy database where users, benefactors, scholars, and other partners can hinge on instructional material.

- The EMIS office should do additional study into EMIS users and usage in order to determine how EMIS can be improved for maximum efficiency. Parents and other stakeholders should be inspired to employ EMIS to make educated resolutions than depending on unreliable sources or educated assumptions.
- Directors of Education are the frequent end users of EMIS therefore they must be given more training in order to use EMIS more extensively for managing educational information systems, planning, and policymaking.
- Officers in charge of EMIS must be supported to take additional courses to help them improve their mastery and abilities for their task. Regular hands-on sessions and seminars should be a priority. EMIS personnel require constant technical support.
- That the EMIS head office should provide a webpage for all educational facilities that provide it data as a long-term strategy.

Suggestions for Further Research

This research is expected to spark more research into Educational Management Information Systems for educational reasons, as well as benefit the other fields of education. This study could be lengthened to include all of the Greater Accra Region's Districts, Municipalities, and Metropolises as well as other regions.

REFERENCE

- Abdul-Hamid, H. (2017). What Is an Education Management Information System and Who Uses It?.
- Aboagye, M. O., Antwi, C. O., & Yasin, J. (1996). Decentralization and Education Information System. *Psychological Studies*, 64(2), 221-234.
- Adawy, M. I., Nor, S. A., & Mahmuddin, M. (2018). Data redundancy reduction in wireless sensor network. *Journal of Telecommunication, Electronic and Computer Engineering*, 1-6.
- Ahituv, N., & Neumann, S. (1986). Principles of Information Systems for Management, wyd. 2, Wm. C.
- Aldarbesti, H., & Saxena, J. P. (2014). Management information system for education. *IOSR Journal of Research & Method in Education*, 4(1) 36-44.
- Ampofo, J. A. (2020). Challenges of Student Management Information System (MIS) in Ghana: A case study of University for Development Studies, Wa Campus. *International Journal of Management & Entrepreneurship Research*, 2(5), 332-343.
- Apuke, O. D. (2017). Quantitative research methods: A synopsis approach. . *Kuwait Chapter of Arabian Journal of Business and Management Review*, 33(5471), 1-8.
- Barata, J., & Cunha, P. R. (2017). Synergies between quality management and information systems: a literature review and map for further research. 28(3-4), 282-295.

BECTA (2000). *A preliminary report for the DfEE on the relationship between ICT and primary school standards*, Coventry: BECTA Available [Online] a HYPERLINK "<http://www.becta.org.uk/news/reports/>"\h t: <http://www.becta.org.uk/news/reports/>

Bell, L., & Vernitski, A., (2011). *Seemingly gliding: the power of metadata in academic resource discovery systems* (Electronic version).

Bell, S. & Wood-Harper, T. (2003). *How to set up information systems: A non-specialist's guide to the multiview approach*. London: Earthscan Publications Ltd.

Benyon, D. (1990). *Information and data modeling.*: Oxford: Blackwell Scientific Publications.

Berg, K. L., Seymour, T., & Goel, R. (2013). History of databases. *International Journal of Management & Information Systems (IJMIS)*, 17(1), 29-36.

Bhandari, P. (2020). *What is Qualitative Research? Methods & Examples*. Scribbr.

Checkland, P. (1999). *Soft systems methodology: A 30-year retrospective*. England: John Wiley & Sons Ltd.

Chen, C. J. (2018). Developing a model for supply chain agility and innovativeness to enhance firms' competitive advantage.

Chen, H., Hailey, D., Wang, N., & Yu, P. (2014). A review of data quality assessment methods for public health information systems. *International journal of environmental research and public health*, 11(5) 5170-5207.

Chilonga, M., & Lis, B. (2019). Application of Education Management Information System (EMIS) to Information and Knowledge Management in Academic Libraries. *Selected Papers For*, 19. Retrieved from <https://learningportal.iiep.unesco.org/en/glossary/educational-management-information-system-emis>

Chris, L. A. (2015). Barriers hindering implementation, innovation and adoption of ICT in primary schools in Kenya. *International journal of innovative research and development*,.

Chu, X., Ilyas, I. F., Krishnan, S., & Wang, J. (2016). Data cleaning: Overview and emerging challenges. 2201-2206.

Chung, C. (2009). Ghana School Report Card Findings Including EMIS Support Assessment: *Academy for Educational Development*.

Connaway, L. S., Dickey, T. J., & Radford, M. L. (2011). "If it is too inconvenient I'm not going after it:" Convenience as a critical factor in information-seeking behaviors. *Library & Information science research*, 33(3), 179-190.

Coronel, C., & Morris, S. (2016). *Database systems: design, implementation, & management*. Cengage Learning.

Coy, M. J. (2019). Research methodologies: Increasing understanding of the world. *International Journal of Scientific and Research Publications*, 9(1), 71-77.

Eden, M. B., & Ofre, E. T. (2010). Reading and Internet Use Activities of Undergraduate Students of the University of Calabar, Calabar, Nigeria. *African Journal of Library, Archives & Information Science*, 20(1), 11-18.

Eden, M. B., & Ofre, E. T. (2010). Reading and Internet Use Activities of Undergraduate Students of the University of Calabar, Calabar, Nigeria. *African Journal of Library, Archives & Information Science*, 20(1).

Edzii, A. A. (2017). Edzii, A. A. (2017). Decentralised educational planning: A case study of two districts in Ghana. *Doctoral dissertation, University of Sussex*.

Ellison, R. (2004). *A practical guide to working with Education Management Information Systems*. London: DfID. Retrieved February 24, 2021, from HYPERLINK "<http://www.paris21.org/documents/2402.pdf>" \h <http://www.paris21.org/documents/2402.pdf>.

Fabiano, N. (2017). Internet of Things and blockchain: Legal issues and privacy. The challenge for a privacy standard. In *2017 IEEE International Conference on Internet of Things (iThings) and IEEE Green Computing and Communications (GreenCom) and IEEE Cyber, Physical and Social Computing (CPSCom) and IEEE Smart Data (SmartData)*, 727-734.

Ferdousi, F., Baird, K., Munir, R., & Su, S. (2018). . Associations between organisational factors, TQM and competitive advantage: Evidence from an emerging economy. Benchmarking. *An International Journal*.

Fisher, C., Lauría, E., & Chengalur-Smith, S. (2012). Introduction to information quality. *AuthorHouse*.

Fisher, C., Lauría, E., & Chengalur-Smith, S. (2012). *Introduction to information quality*. AuthorHouse.

Fletcher, S. P. (2012). Looking through the Lenses of Educational Management Information Systems. *International Journal of Computing*, 1(1) 10-24.

Fletcher, S. P. (2012). Looking through the Lenses of Educational Management Information Systems (EMIS). *International Journal of Computing*, 1(1) 10-24.

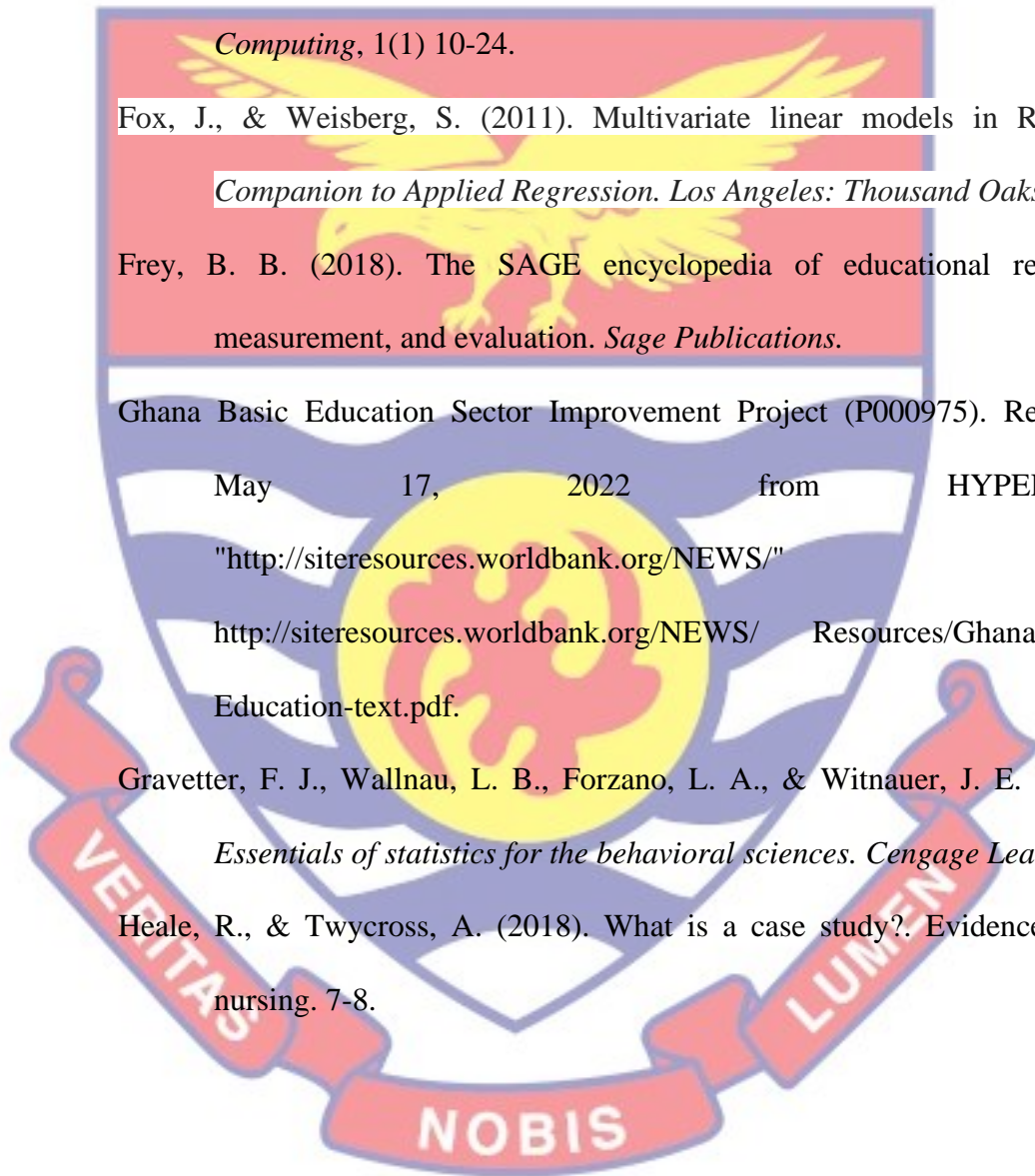
Fox, J., & Weisberg, S. (2011). Multivariate linear models in R. *An R Companion to Applied Regression*. Los Angeles: Thousand Oaks.

Frey, B. B. (2018). The SAGE encyclopedia of educational research, measurement, and evaluation. *Sage Publications*.

Ghana Basic Education Sector Improvement Project (P000975). Retrieved May 17, 2022 from HYPERLINK "<http://siteresources.worldbank.org/NEWS/>" \h <http://siteresources.worldbank.org/NEWS/Resources/Ghana-Basic-Education-text.pdf>.

Gravetter, F. J., Wallnau, L. B., Forzano, L. A., & Witnauer, J. E. (2020). *Essentials of statistics for the behavioral sciences*. Cengage Learning.

Heale, R., & Twycross, A. (2018). What is a case study?. *Evidence-based nursing*. 7-8.



Hochin, T., Kobayashi F., Tsuji K., Nomiya H. (2009). *Seamless usage of user's databases in Archaeological Database System*. Retrieved July 25, 2011, from [http://cipa.icomos.org/text %20files/KYOTO/121.pdf](http://cipa.icomos.org/text%20files/KYOTO/121.pdf)

Infodev. (2006). Terms of Reference for EMIS Case Studies of Best Practice. *World Bank*.

Jackson, M.C. (2004). *Systems thinking: Creative holism for managers*. England, UK: John Wiley and Sons, Ltd.

Kemp, S. E., Hort, J., & Hollowood, T. (2018). *Descriptive analysis in sensory evaluation*.

Khazanchi, D. & Munkvold, B.E. (2000). Is information systems a science? An inquiry into the nature of the information systems discipline. *The DATA BASE for Advances in Information Systems*, 31(3): 24-42.

Laudon, K.C. & Laudon, J.P. (1998). *Information systems and the internet: A problem solving approach*. Fort Worth, TX: The Dryden Press, Harcourt Brace College Publishers.

Link, S., & Prade, H. (2019). Relational database schema design for uncertain data. *Information Systems*, 88-110.

Litman, T. (2013). The new transportation planning paradigm. *Institute of Transportation Engineers. ITE Journal*, 83(6), 20.

Low, A. (2003). Research Rules to Live By: Eight Strategies to Ensure That Students Use an On-line Database Effectively. *School Libraries in Canada*, 22(4), 30. Retrieved May 17, 2022, from EBSCOhost Library, Information Science, & Technology Abstracts database.

Mahanti, R. (2019). *Data Quality: Dimensions, Measurement, Strategy, Management, and Governance*. Quality Press.

Malcam, E. (2012). Ghana's Educational Policymakers and Their Impact on Information and Communication Technology Education: A Case Study of a Ghanaian Model Senior High School. *Ohio University*.

McCombes, S. (2020). Descriptive Research Design | Definition, Methods & Examples.

McFadden, F. R., Hoffer, J. A., & Prescott, M. B. (1999). *Modern Database Management*. (5th ed.). Addison-Wesley.

McLeod, S. (2018). Questionnaire: Definition, examples, design and types. .

Meghini, C., Scopigno, R., Richards, J., Wright, H., Geser, G., Cuy, S., & Vlachidis, A. (2017). ARIADNE: A research infrastructure for archaeology. *Journal on Computing and Cultural Heritage (JOCCH)*, 10(3), 1-27.

Ministry of Education and Sports. (2005). *District Education Office Financial and Operational Capacity Strengthening Training Handbook*. Ministry of Education and Sports.

Nalini, M., & Anbu, S. (2016). Elimination of Data Redundancy before Persisting into DBMS using SVM Classification. *Int J Eng Res*.

O'Brien, J.A. (1991). *Introduction to information systems in business management*. Boston, MA: IRWIN.

Oz, E. (2002). *Management information systems*. Canada:Course Technology

Pajibo, E., & Tamanja, M. E. (2017). Influence and Challenges of the Capitation Grant on Education Delivery in Basic Schools in Ghana. *Asian Journal of Education Training*, 53 - 67.

Plantin, J. C. (2019). Data cleaners for pristine datasets: Visibility and invisibility of data processors in social science. *Science, Technology, & Human Values*, 44(1), 52-73.

Powell, J. J. (2006). Special education and the risk of becoming less educated. *European Societies*, 8(4), 577-599.

Quansah, F., Ankoma-Sey, V. R., & Aheto, S. P. (2017). Perception of Distance Education Students of their Involvement in Assessment Decisions in Ghana. *Asian Journal of Distance Education*, .

Robinson, A., Christensen, A., & Bacon, S. (2019). From the CDC: the Prevention for States program: preventing opioid overdose through evidence-based intervention and innovation. *Journal of safety research*, 68, 231-237.

Sahin, S., & Mete, J. (2021). A Brief Study on Descriptive Research:: Its Nature and Application in Social Science. *International Journal of Research and Analysis in Humanities*, 1(1) 11-11.

Shankaranarayanan, G., & Blake, R. (2017). The evolution and growth of data quality research. *Journal of Data and Information Quality*, 8(2) 1-28.

Shelly, G. B., Cashman, T. J. & Vermaat, M. E. (2007). *Discovering Computers, A Gateway to Information*. Thomson Course Technology.

Skidmore, S. & Eva, M. (2004). *Introducing systems development*. New York: Palgrave, Macmillan.

Students in Their Own Words. (2010). *Searcher*, 18(10), 26-29. Retrieved May 17, 2022, from EBSCOhost Library, Information Science, & Technology Abstracts database.

Thompson, N. M., & Casely-Hayford, L. (2008). The financing and outcomes of education in Ghana. 15.

Toby, T., & Jagadish, H. (2011). Database Modeling and Design. *ScienceDirect*.

Truex, D., Baskerville, R. & Travis, J. (2000). A methodical systems development: The deferred meaning of systems development methods. *Accounting Management and Information Technologies*, 10: 53-79.

Vaisman, A., & Esteban, Z. (2014). Data warehouse systems. *Data-Centric Systems and Applications*.

Viennet, R., & Pont, B. (2017). Education Policy Implementation: A Literature Review and Proposed Framework. *OECD Education Working Papers. No. 162*.

Von Bertalanffy, Ludwig. (1968). General systems theory. New York: Allen Lane Penguin Press. Warren, L. & Adman, P. 1999. The use of critical systems thinking in designing a system for university information systems support service. *Information Systems Journal*, 9: 223-242.

Wang, X., & Cheng, Z. (2020). Cross-sectional studies: strengths, weaknesses, and recommendations. *Chest*, 158(1), S65-S71.

Wolf, S., Aber, J. L., Behrman, J. R., & Tsinigo, E. (2019). Experimental impacts of the “Quality Preschool for Ghana” interventions on teacher professional well-being, classroom quality, and children’s school readiness., 10-37.

Zaveri, A., Rula, A., Maurino, A., Pietrobon, R., Lehmann, J., & Auer, S. (2016). Quality assessment for linked data: A survey. *Semantic Web*, 7(1) 63-93.


APPENDIX

A. Introductory Letter from the department of Data Science and Economic Policy.

UNIVERSITY OF CAPE COAST
COLLEGE OF HUMANITIES AND LEGAL STUDIES
SCHOOL OF ECONOMICS
DEPARTMENT OF DATA SCIENCE AND ECONOMIC POLICY

Telephone: 83328-96796

Telegrams & Cables: University, Cape Coast
E-mail: aeedep@ucc.edu.gh



UNIVERSITY POST OFFICE
CAPE COAST, GHANA

OUR REF: SOE/DDSEP/S.V.1/11
YOUR REF:

24TH MAY, 2021

INTRODUCTORY LETTER
(MR. SILAS VICKU)

Dear Sir/Madam

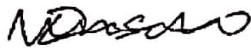
I wish to introduce Mr. Silas Vicku a student of the Department of Data Science and Economic Policy with registration No. SE/DMD/20/0003, at University of Cape Coast, who is researching on the topic "EVALUATION OF DATA AND INFORMATION SYSTEMS IN THE EDUCATION SECTOR OF THE GRATER ACCRA REGION".

We would be grateful if the student is given the necessary assistance for the execution of his Dissertation .

We wish to assure you that the information provided would be treated with utmost confidentiality.

Thank you.

Yours faithfully,



William G. Brafu-Insaidoo (Associate Professor)
[Head]

B. Permission granted to administer questionnaire to some GES

Personnels in Tema Metro Education office

GHANA EDUCATION SERVICE

In case of reply the number and date of this should be quoted



REPUBLIC OF GHANA

METRO EDUCATION OFFICE
P.O. BOX 436
TEMA

My Ref No GES/1M10/1/VOL 2

9TH OCTOBER, 2021

Your Ref No
SILAS VICKU
P.O. BOX 55
SOGAKOPE – VOLTA REGION

Dear Sir/Madam,

PERMISSION TO ADMINISTER QUESTIONNAIRE TO SELECTED BASIC SCHOOLS AND OFFICERS OF METRO EDUCATION OFFICE, TEMA METROPOLIS

Permission is hereby granted to the bearer, who is pursuing an MSc degree in Data Management and Analysis at University of Cape Coast and is conducting research on the topic "Evaluation of Data and Information Systems in The Education Sector of The Greater Accra Region to administer questionnaire to selected officers of the Metro Education Office and Basic schools in the Metropolis

Officers and headteachers approached are please requested to co-operate with him and are to ensure that contact hours are not unnecessarily disrupted.

Thank you.

Yours faithfully,

BERNICE OFORI (MRS)
DIRECTOR OF EDUCATION
TEMA METRO.

DISTRIBUTION

OFFICERS AND HEADS OF BASIC SCHOOLS APPROACHED

CC: Dr. William Godfred Cantah

(Programme Coordinator)

Department of Data Science and Economic Policy

UCC -Cape Coast

C. Permission granted to administer questionnaire to some GES

Personnels in Ga South Municipal Education office

GHANA EDUCATION SERVICE

In case of reply,
the number and date of this
letter should be quoted

My Ref No GES/GSM/PER/21/06
Your Ref No



REPUBLIC OF GHANA

MUNICIPAL EDUCATION OFFICE
GA SOUTH MUNICIPAL
PMB 2
WEIJA

11th November, 2021

PERMISSION TO ADMINISTER QUESTIONNAIRES TO SOME G.E.S. PERSONNEL IN THE GREATER ACCRA REGION

I refer to your letter on the above subject dated 19th October, 2021 and wish to inform you that permission has been granted you to administer the questionnaires to your selected respondents.

You can use this to obtain permission to administer the questionnaire to your respondents within the Municipality.

Thank you for the interest shown in our Municipality.

FELICIA OKAI AGYEIBEA (MRS)
DIRECTOR OF EDUCATION
GA SOUTH MUNICIPAL

WEIJA
DIRECTOR OF EDUCATION
GA SOUTH MUNICIPAL
P.M.B 2 WEIJA

SILAS VICKU
P.O. BOX 55
SOGAKOPE V/R

NOBIS

D. Permission granted to administer questionnaire to some GES

Personnels in Tema West Education office

GHANA EDUCATION SERVICE

In case of reply the
number and date of this
letter should be quoted

MR Ref No. G/ED/ADMIN/RES/VOL 1/100
YOUR Ref No.



REPUBLIC OF GHANA

MUNICIPAL EDUCATION OFFICE
TEMA WEST MUNICIPAL
P.O. BOX 86 1957
TEMA

4TH OCTOBER, 2021

**ADMINISTRATION OF QUESTIONNAIRES TO SOME GES PERSONNELS IN
THE TEMA WEST MUNICIPALITY**

Permission is hereby granted to MR. SILAS VICKU a master's student from the University of Cape Coast to do research on the topic "EVALUATION OF DATA AND INFORMATION SYSTEMS IN THE EDUCATION SECTOR OF THE GREATER ACCRA REGION" in the Tema West Municipality.

All GES Personnel he may approach for assistance in this Municipality may kindly and readily offer him such assistance.

Yours faithfully,

.....
Isaac MacCarthy-Mensah (MR.)
Director, Tema West Municipal
Tema

Silas Vicku
P.O. Box 55
Sogakope V/R

E. Permission granted to administer questionnaire to some GES

Personnels in Greater Accra Regional Education office

GHANA EDUCATION SERVICE

In case of reply the
number and date of this
letter should be quoted

My Ref: GES/GAR/MC
Your Ref.:



REPUBLIC OF GHANA

REGIONAL EDUCATION OFFICE
P.O. BOX M 148
ACCRA

4TH OCTOBER, 2021

SILAS VICKU
P.O. BOX 55
SOGAKOPE – VOLTA REGION

Dear Sir,

**ADMINISTRATION OF QUESTIONNAIRES TO SOME GES PERSONNELS IN
THE GREATER ACCRA REGION**

Permission is hereby granted to Mr. Silas Vicku a Master's student from the University of Cape Coast and researching on the topic "Evaluation of Data and Information Systems in The Education Sector Of The Greater Accra Region".

All GES Personnel he may approach for assistance in the Region may kindly and readily offer him such assistance.

Yours sincerely,

.....
MONICA ANKRAH
REGIONAL DIRECTOR
GREATER ACCRA REGION

F. QUESTIONNAIRE

This study is being done to evaluate the data and information systems used in the Greater Accra Region's education sector. Therefore, it would be greatly appreciated if you could devote some of your precious time to answering these questions. Please know that every information you

choose to share through this questionnaire will be handled in the strictest of confidence in order to protect your anonymity.

SECTION A

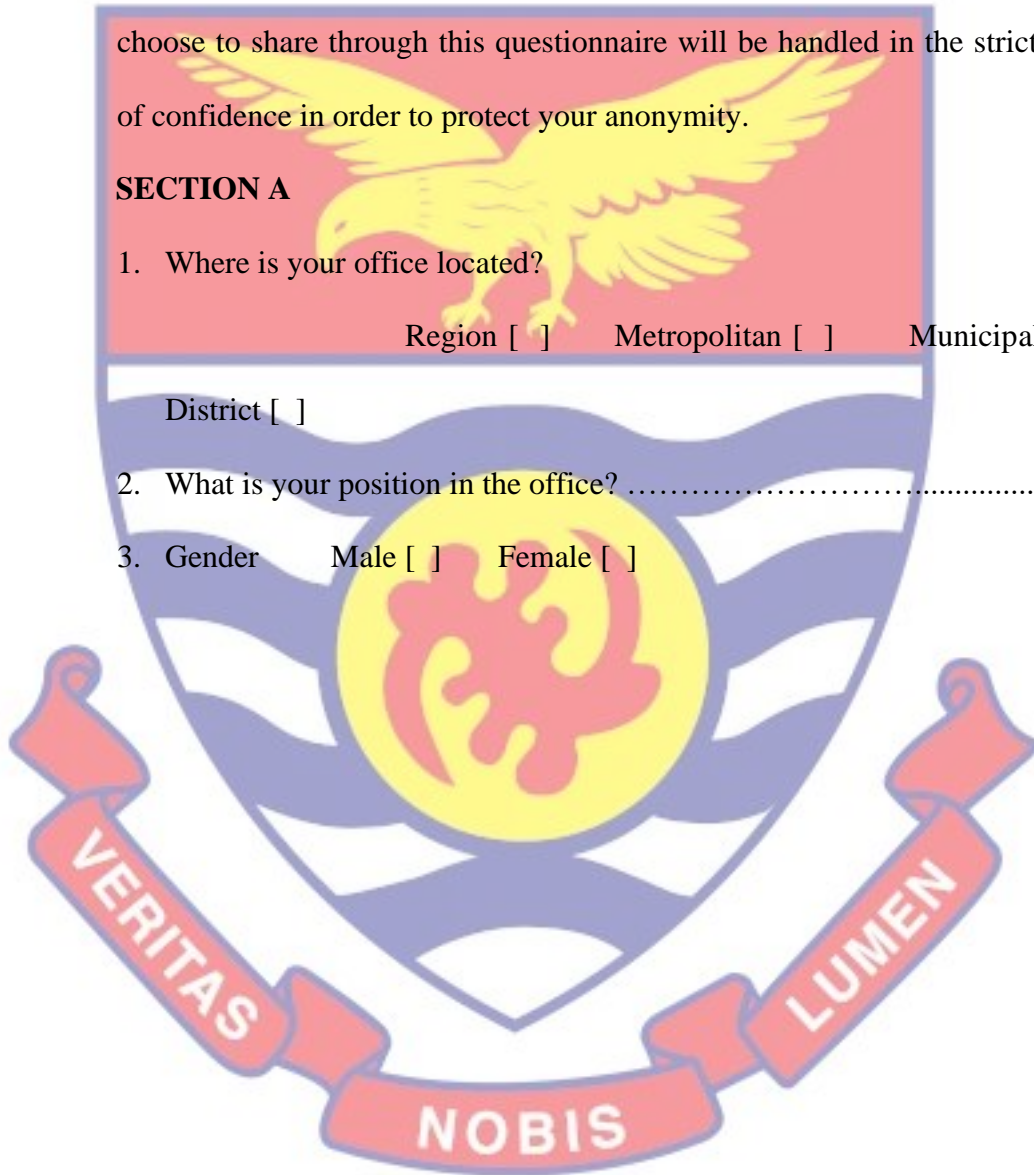
1. Where is your office located?

Region [] Metropolitan [] Municipality []

District []

2. What is your position in the office?

3. Gender Male [] Female []



SECTION B

This section seeks to find out about how Educational Management Information System (EMIS) is known. For each statement, please indicate your response by placing “X” in the box.

Select only one response for each statement.

4. Do you know about EMIS? Yes [] No []

If yes, please answer the following questions.

5. EMIS is used for school mapping and school census.

Yes [] No [] I don't know []

6. EMIS is of value to educational administration.

Yes [] No [] I don't know []

7. EMIS is of value to supply of school resources.

Yes [] No [] I don't know []

8. EMIS is of value to governance of schools.

Yes [] No [] I don't know []

9. EMIS is an educational management tool.

Yes [] No [] I don't know []

10. EMIS is an educational management database tool.

Yes [] No [] I don't know []



SECTION C

This section deals with the objectives of Educational Management Information System (EMIS). For each statement, please indicate the extent to which you agree or disagree by placing “X” in the appropriate box. The scale notation is as follows: SA – Strongly Agree, A –Agree, N – Neutral, D – Disagree, SD – Strongly Disagree

Select only one response for each statement

Opinion	SA	A	N	D	SD
11. EMIS is an efficient management information system in the Ghanaian educational system.					
12. EMIS has been contributing significantly to policy formulation and operational planning.					
13. EMIS contributes to monitoring of targets through periodic review by stakeholder participation.					
14. EMIS is capable of giving information about disadvantaged areas in education. (E.g. deprived schools, lack of Teaching and Learning Materials, and electricity).					
15. EMIS data helps in budget allocations by government and other donor bodies for the education sector.					

SECTION D

The statements in this section relate to users of Educational Management Information System (EMIS) and how they use it. For each statement, please indicate your response by placing “X” in the box.

Select only one response for each statement.

Please mark (X) for some of the people who use EMIS.

16. Ministry of Education?

Yes [] No [] I don't know []

17. Directors of Region/Metropolitan/Municipal/District of Education?

Yes [] No [] I don't know []

18. GES (Dep. Directors, Scheduled Officers, etc.)?

Yes [] No [] I don't know []

19. Metropolitan/Municipal/District Assembly?

Yes [] No [] I don't know []

20. Teachers?

Yes [] No [] I don't know []

21. Parents?

Yes [] No [] I don't know []

22. Headmasters/ Head teachers?

Yes [] No [] I don't know []

23. Circuit supervisors?

Yes [] No [] I don't know []

24. NGOs?

Yes [] No [] I don't know []

] 25. Researchers?

Yes [] No [] I don't know []

] 26. UNESCO?

Yes [] No [] I don't know []

27. Other(s) (*Please specify*)

.....

If you marked *yes* against any of the items above, please indicate how the person uses Educational Management Information System (EMIS) in the spaces provided below against the items you answered as *yes*.

28. ii. Ministry of Education:

.....

29. ii. Directors of Region/Metropolitan/Municipal/District of Education:

.....

.....

30. ii. GES:

.....

31. ii. Metropolitan/Municipal/District Assembly:

.....

32. ii. Teachers:

.....

33. ii. Parents:

.....

34. ii. Headmasters/Headteachers:

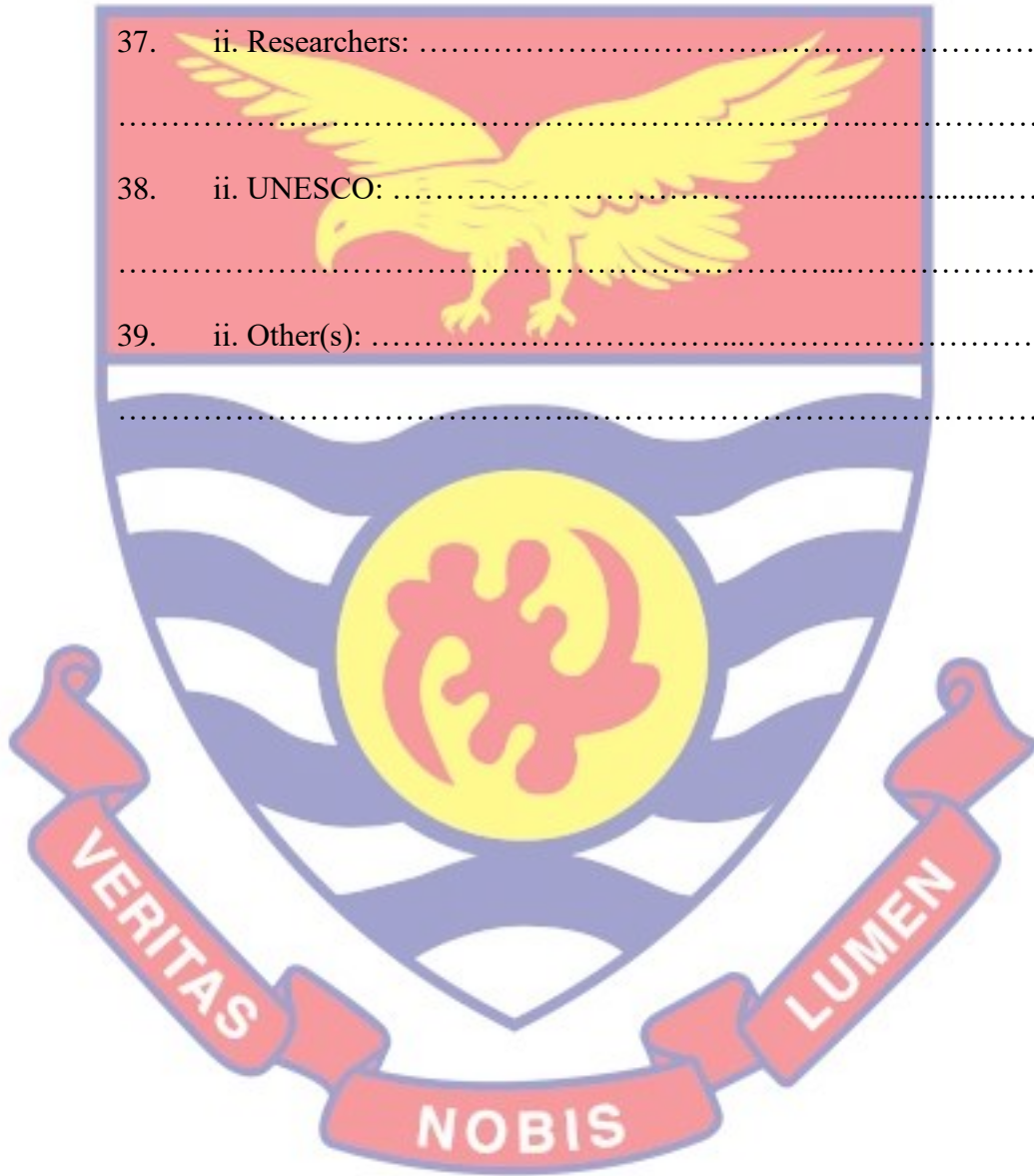
.....
35. ii. Circuit supervisors:

.....
36. ii. NGOs:

.....
37. ii. Researchers:

.....
38. ii. UNESCO:

.....
39. ii. Other(s):



SECTION E (For Regional/ Metropolitan/ Municipal/ District Directors of Education Only)

40. As the director, do you use EMIS for planning? Yes [] No []

41. If you have answered “Yes” to question 28, please mention how you use EMIS for planning.

i.....

ii.....

iii.....

iv.....

42. As the director, do you use EMIS for policy making? Yes [] No []

If you have answered “Yes” to question 30, please mention some of the policies you used EMIS for making.

i.....

ii.....

iii.....

iv.....

43. As the director, does EMIS help you map strategies for your District/Region? Yes [] No []

44. If you have answered “Yes” to question 31, please mention some of the

strategies EMIS helped you to map.

i.....

ii.....

iii.....

iv.....



SECTION F (For EMIS Officials Only)

The following statements in this section relate to the extent to which managers of Educational Management Information System (EMIS) are qualified and equipped for their role. For each statement, please fill in the spaces provided below.

45. Do you have any qualification in computing? Yes [] No []

If yes, please state them.

.....
.....

46. Do you have any qualification in management? Yes [] No []

If yes, please state them.

.....
.....

47. Have you ever attended any refresher/ in-service training in respect to EMIS? Yes [] No []

If yes, please state them together with those who organized them.

.....
.....

48. What is your highest academic qualification?

.....
.....

49. What is your highest professional qualification?

.....
.....

50. How many years have you being working in the educational sector?

.....

51. How many years have you being working in your current position?

.....

52. How many computers does you office have?

None [] 1 [] 2 [] 3 [] 4 [] 5 []

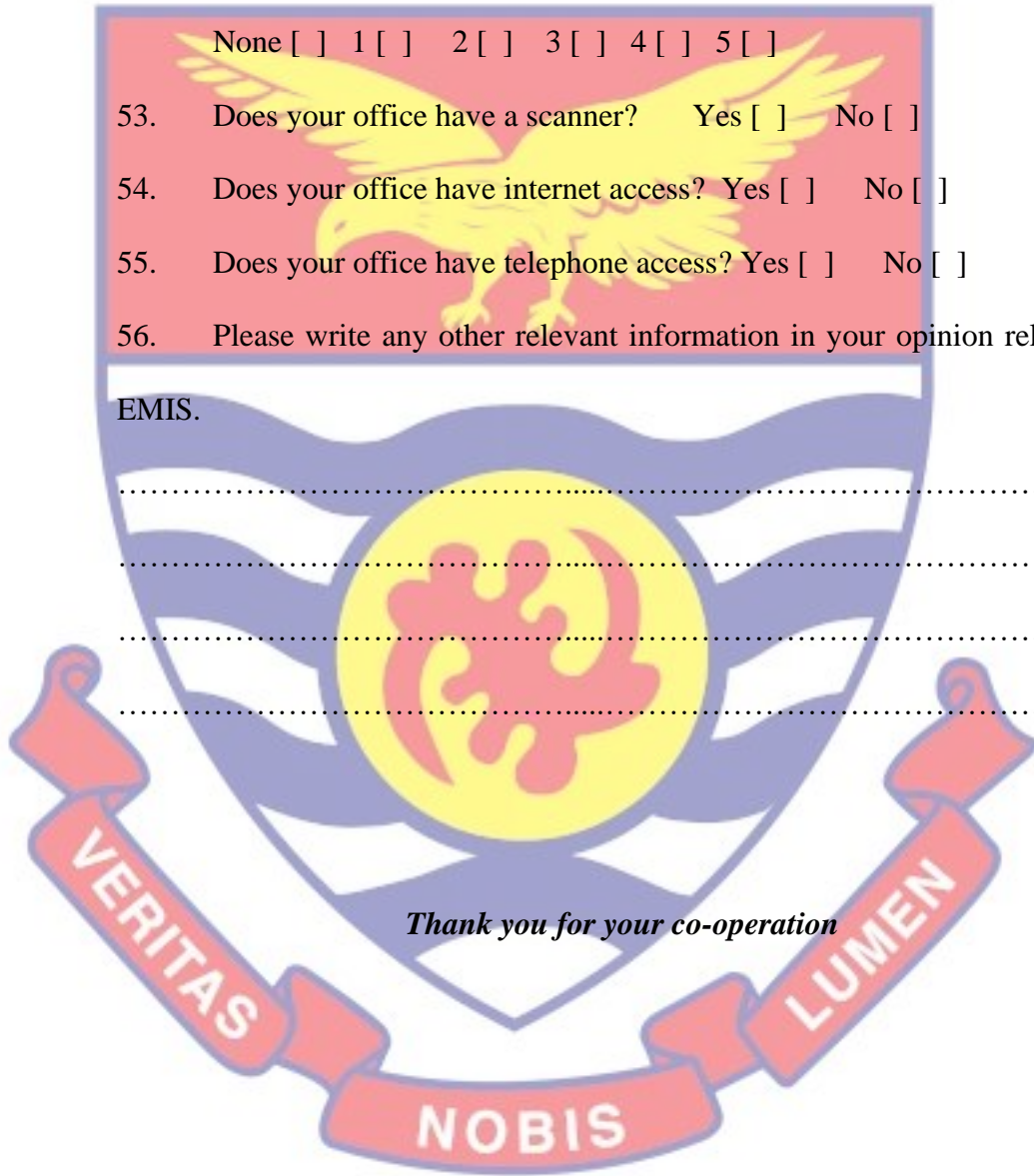
53. Does your office have a scanner? Yes [] No []

54. Does your office have internet access? Yes [] No []

55. Does your office have telephone access? Yes [] No []

56. Please write any other relevant information in your opinion related to EMIS.

.....
.....
.....
.....



Thank you for your co-operation