IMPACT OF SELECTED FACTORS ON EDUCATION MANAGEMENT INFORMATION SYSTEMS OUTCOMES IN THE COUNTIES OF NYANZA REGION, KENYA.

BY

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DECLARATION

DECLARATION BY CANDIDATE:

This thesis is my original work and has not been presented for a degree to any other university.

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ABSTRACT

Information systems are created to enable organizations utilize technologies to gather and use information for effective management. Ministry of Education Science and technology (MOEST) is committed to the implementation of Education Management Information System (EMIS) to provide data to improve planning, policy formulation and decision-making. MOEST provides Information Technology (IT) infra structure, trains personnel to manage data collection and it provides funds annually to the District Education Officers (DEO) to facilitate EMIS activities since 2004. Despite these efforts, a survey by MOEST revealed that data capture completion rate had been low at the districts education offices particularly in Nyanza Region, thereby delaying the nationwide data processing. The key factors in data entry are personnel, technological and organizational. Their Impact on EMIS outcomes in Nyanza region were however unknown. Therefore the purpose of this study was to establish the impact of selected factors on EMIS outcomes in Nyanza Region, Kenya. The objectives of the study were to; determine the impact of personnel, technological and organizational factors on EMIS outcomes. The study was based on the concept that personnel, technological and organizational factors impact on information and system quality outcomes. The study employed correlation and descriptive survey research designs. The target population was 34 District EMIS coordinators, 68 Data Capture Personnel, 34 DEOs and the Regional EMIS Coordinator. Simple random sampling technique was used to select 29 District EMIS coordinators, 29 DEOs, 58 Data Capture Personnel and purposive sampling technique for Regional EMIS Coordinator. The data were collected using questionnaires and Interview schedules. Face validity of the research instruments for data collection were determined by experts in Educational Administration were consulted and their input included in the final draft of the instruments. Pilot study was conducted using 3(8.8%) District EMIS coordinators, 6(8.8%) data capture personnel and 3(8.8%) DEOs of the target population. Cronbach's alpha was used to determine the reliability of instruments and their average reliability coefficients were 0.77 and 0.78 for the District EMIS coordinators Questionnaire (DECQ) and Data Capture Personnel Questionnaire (DCPQ) respectively. Quantitative data was analyzed using descriptive and inferential statistics. Qualitative data was analyzed in emergent themes. The study established that personnel, technological and organizational factors contribution of 16.9%, 12.7% and 18.3% respectively towards EMIS outcomes. Job design, gender and age were established as personnel predictors of EMIS outcomes, while Staff competency on EMIS and availability of IT infrastructure were dominant technological factors impacting the outcomes of EMIS. Management support and resources allocation were the best organizational predictors of EMIS outcomes. The study concluded that organizational had higher impact on EMIS outcomes followed by personnel and technological factors r. The study recommended that the user satisfaction could be improved by facilitating personnel well to carry out EMIS activities; the transfer of data capture from the DEOs to individual learning institutions to reduce the bulk of work; MOE should consult with stakeholders to avoid duplication of data collection; continuous EMIS staff development programmes for educational managers to improve managerial EMIS/IT knowledge. The findings of this study could be useful in providing recommendations to the MOE that would contribute to the improvement and sustainability of EMIS.

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LIST OF ABBREVIATIONS AND ACRONYMS

ABBREVIATIONS

DCPQ Data Entry Personnel Questionnaire
DECQ District EMIS Coordinator Questionnaire
DEO District Education Officer
DEOIS District Education Officer Interview Schedule
DISE District Information System for Education
KCSE Kenya Certificate of Secondary Education.
KIE Kenya Institute of Education
NCAER National Council of Applied Economic Research
NCERT National Council of Educational Research and Training
NECIS National EMIS Coordinator Interview Schedule
OECS Organization of Eastern Caribbean States
OERU OECS Education Reform Unit
PDE Provincial Director of Education
PTA Parents Teachers Association.
RECIS Regional EMIS Coordinator Interview Schedule
SED State Education Department

ACRONYMNS

BECTA British Educational Communications and Technology Agency
EFA Education For All.
EMIS Education Management Information System.
FCUBE Free Compulsory Universal Basic Education
GIS Geographic Information System
IS Information System.
IT Information Technology
KNEC Kenya National Examination Council
MDGs Millennium Development Goals
MHRD Ministry of Human Recourses Development
MIS Management Information System
MOEST Ministry of Education Science and Technology
UNESCO United Nations Educational Scientific and Cultural Organization
USAID United States Agency for International Development

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CHAPTER ONE

INTRODUCTION

1.1Background to the Study

Education Management Information System (EMIS) is a system designed to organize and process information related to the management of education resources and services, to improve planning, resource allocation, monitoring, policy formulation and decision-making (Wako, 2003). It is usually established within a national Ministry or department responsible for education to process and disseminate information about learning institutions, demographics of students, teachers and non teaching staff, performance measures data, learning activities, financial management information, community participation and evaluative outputs (Ibrahim, 2005; UNESCO, 2006; Kingdom of Cambodia, 2008).

According to UNESCO (2005) good performance in the education sector contributes to national development through the production of appropriate human resource that helps to spur productivity and eliminate poverty, consequently improving human welfare. Therefore, to cash on these returns, the education sector has been allocated a greater share of the governments' expenditure in most developing countries (Al-Samarrai, 2003). For example, Transparency International Kenya (2010) observed that nearly 73 per cent of government social sector expenditure and 40 per cent of the national recurrent expenditure is channelled to the education sector.

Abagi and Odipo (1997) therefore underscore the importance of efficient management of these enormous education resources through planning, so that those funds allocated to the sector have maximum impact on efficiencies within the education system

(Republic of Kenya, 2005a). Successful management of education requires effective policy-making and system monitoring through data and information too (Hua & Herstein, 2003). Therefore, to address this, EMIS is specifically created for management of education. Certainly, education data is important for the purpose of macro level administration and management (Mohamed, Kadir, May-Lin, Rahman, & Arshad, 2009).

Deming's (1986) theory of Total Quality Management (TQM) emphasizes that continual gathering and use of statistical data and information leads to effective management, for this assists to identify problems as they happen instead of when it is too late to solve them. To improve business process and enhance productivity, organizations have therefore developed Information Systems (Kelegai & Middleton, 2004). Information Systems are the means by which people and organisations utilise technologies to gather, process, store, use and disseminate information (Burch & Grudnitski, 1989). Further to that, basing his definition on the contemporary context, O'Brien (1999) defines Information System (IS) as an organized combination of people, hardware, software, communication networks and data resources that collect transform and disseminate information in an organization.

According to DeLone and McLean (2003), Information System correlates to profitability and productivity in an organization, at the same time, it leads to motivation of personnel. Stephen (1995) submits that the use of information technology provides significant benefits in work, cost reduction, productivity improvement and better services to customers. Zviran and Erlich (2003) contend that

an information system which meets the needs of its users would make performance attainable and reinforce satisfaction with the system.

To this effect, countries around the world have invested significant resources into collecting, processing and managing data through EMIS (Hua & Herstein, 2003). Cassidy (2005) notes that there were considerable amounts of resources directed to EMIS activities in South and Central America in the 1990s, while Caribbean countries have focused on both national and region-wide effort to develop EMIS for over 15 years. In 2006 and 2007 at least four Caribbean countries; Jamaica, Barbados, Antigua and Barbuda and St. Lucia conducted EMIS projects. Gaible (2008) reports that Jamaica launched EMIS initiatives, funded by United States Agency for International Development (USAID), to improve access to school census data, system-wide introduction of computer-based recordkeeping, and development of a school-based Geographic Information System (GIS) system. Despite the completion of EMIS development, both information access and information utilization in Jamaica remained limited.

In Asia the development of EMIS has been evident in India, Cambodia and Malaysia (Kingdom of Cambodia, 2008). In India, under the District Information System for Education (DISE) all the districts were provided with adequate hardware and MIS software for data collection. By the end of 2003, it was expected that all the districts would adopt EMIS in two years as the manual collection of information system would be gradually replaced by the DISE and accorded the status of the official statistics. In Malaysia, the implementation of EMIS started in June 1997 using the first release of the EMIS application software (Mokhtar, 2000). EMS data collection was school level

based under a School Data Teacher (*Guru Data Sekolah*) appointed by the Director General of Education who was responsible for keying-in, updating and correcting the EMIS data in the previously installed EMIS application. The School Data Teacher then send the data in diskette(s) to the respective DEOs for the Data Officer to verify and validate, who then merges the data from all schools in the district into one file and send the diskette(s) to the SED. The process of verification and validation was repeated at this level but this time between the SED and the DEO. Though data collection in West Malaysia was fully computerized, in East Malaysia, only some districts in Sabah and secondary schools in Sarawak were able to participate in the computerized data collection process (Mohamed et al., 2009).

A number of studies have been carried out to identify causal factors of IS success. Most of these studies focus on the three elements that either intervene, impact, impact or determine MIS success, implementation, adoption or use. They include organizational, technological, or personnel factors (Ang, Davies & Finlay, 2001b; Lawrence, 2010; Young & Jordan, 2008; Sepahvand & Refnezhad 2013; Hwang, Lin & Lin, 2012). Complex interactions between technology and its organizational factors in the implementation process make it difficult to make comparisons and develop consistent theory (El Louadi, 1998). Studies by Havelka (2002), Bento and Bento (2006) and Hussein, et al. (2007) focused on both personnel, technological and organizational factors. Masrek, Jamaludin and Hashim (2009) as well as Bruggen, Smidts and Wierenga (2001) similarly studied those three factors, but went further to include environmental factors, while Yusof and Ang (2013) on their part incorporated process factors. Therefore in this study the impact of the three selected factors; personnel, technological and organizational factors on EMIS outcomes were examined for a sample of Nyanza Region, Kenya.

As such, research in the developed countries has identified a number of personnel factors that impact EMIS outcomes. These studies hold the view that EMIS success is "associated with personnel' profile like age and gender (DeLone & McLean, 2003; Hua & Herstein 2003; Havelka, 2002; Havelka, Conrad & Glassberg, 2002). Specifically, Mcmullin and Dryburg (2011) analysis of data from Canada, Australia, England and the United States shows that highly skilled IT/IS workers are predominantly young. Fraser (2010) observed that there is tremendous fascination with twenty-year-olds in the IT/IS a related job. Concurring, Houtz and Gupta, (2001) Margolis and Fisher (2002) and Bross (2005) also found significant gender differences – favouring males in terms of attitudes towards computer use and self-perceived computer experience thereby affecting IS outcomes.

These findings are however not supported by Roussos (2007), who found no significant relationship between age and personnel attitudes towards IT/IS. This finding led credence to Fraser's (2010) argument that preference of younger individuals in IT/IS fields is an ageist attitude and negative stereotypes about older female workers to impact hiring practices, thereby leaving older and female workers highly vulnerable to unemployment and redundancy in the IT/IS industry. Despite such contradiction, more revealing evidence seems to support the assertion that women are underrepresented in IS field (Igbaria & Chidambaram, 1997; Mcmullin & Dryburg, 2011). Igbaria and Chidambaram (1997) found that women were on average younger and less experienced than were men in lower-level positions and receive lower salaries than do men.

Therefore, the existing data imply that there is no axiomatic relationship between personnel factors like age and success of Information Systems. Rather, this relationship may vary considerably by context and by levels of modernization and development. In addition to age and gender, DeLone and McLean (2003) found that individuals with

longer experience in an organization and less educated subjects have less positive attitudes towards Information Systems while a priori involvement with MIS has positive correlation with user satisfaction thus MIS Success.

Studies have likewise acknowledged technological factors that are antecedent to realization of favourable EMIS outcomes (Bento & Bento, 2006; Kelegai & Middleton; 2004, Hussein et al. 2007a). Bento and Bento (2006) found that one of the strongest and most consistent predictor of MIS implementation success is availability of IT infrastructure such as computers and Internet technologies as they facilitate information processing. No wonder, Gaible (2008) concurred that the EMIS outcomes in Jamaica with regard to information access and utilization remained inadequate due to lack of computers and inadequate internet connectivity.

Gaible (2008) further notes that EMIS outcomes are very much dependent on IS competency of the staff, as lack of adequately trained staff, was a challenge in implementation of EMIS among Caribbean countries. Kelegai and Middleton (2004) found out that lack of training in existing IT and new developments in MIS were found to be critical barriers to IS outcomes. Similarly, Hussein et al. (2007a) established that a higher level of IS competency relates to a higher degree of satisfaction and information quality. Saunders and Jones (1992) found IS competency to be one of the top ten dimensions for assessing IS function performance. Similarly, Okiy (2005) points out that poor and inadequate telecommunication facilities, poor level of computer literacy as well as awareness of Internet and computer facilities among policy makers in Africa are the challenges militating against the use of ICTs.

Apart from Hussein et al. (2007) many other studies note that one of the important antecedent factors of IS success are the organizational factors that serve as enhancers

to implementation of successful IS. (Saunders & Jones, 1992; Ang, Davies & Finlay, 2001; Lawrence, 2010; Young & Jordan, 2008; Dong, Neufeld, & Higgins, 2009; Bento and Bento, 2006). These organizational factors include management support, decision making structure, goal alignment, management style, managerial EMIS knowledge and resources allocation. Saunders and Jones (1992), Ang, Davies and Finlay, (2001b) and Lawrence, (2010) studies concur that top management support is fundamental predictor of the outcome of Information System in an organization. Young and Jordan (2008) avow that top management support is the most critical factor to systems implementation success. Hussein et al. (2007), King and Teo (1996) and Jarvenpa and Ives (1991) King and Teo (1996) indicated that one of the strongest and most consistent IS success predictor, relative to timeliness and relevance, is top management support. They argue that since the top management authorizes funds and implements an IS, they would be eager to reap positive results to ascertain whether their decisions were correct and fruitful. Other more recent studies found that top management support is effective in both high and low task interdependence groups (Hwang & Schmidt, 2011).

However, Sharma and Yetton (2011) asserts that effect of top management support on IS could be situational and not universal depending on the size and culture of the organization. However, Hussein et al. (2007) and Hua and Herstein (2003) considered goal alignment to be more important in determining the outcome of IS. This finding is in agreement with World Bank (2010) who points out that EMIS is often designed by technical people, ignorant of prevailing educational policies and with insufficient input from education specialists thus, not aligned with educational goals, consequently leading to failure in its implementation. This also accords with Ang et al. (2001)

observations, which showed that goal alignment as the second strongest predictor of IS usage. Similarly, Hussein et al. (2007b) found managerial IT knowledge to be positively related to IS success dimensions. Ang et al. (2001b) confirms further that senior management experience, background and knowledge on IT, awareness and recognition of IS activities and potentials, as well as their ability to plan strategically has an impact on successful IS outcomes.

Grover (1993) found decentralized decision-making as one of the strongest facilitators of IS / IT use in large and complex organization. Trucano (2006) confirms that in Nigeria, the development of standardised software augured well for state-level EMIS to provide comprehensive information in support of decentralised management. Hussein, et al. (2007a) found that there is a positive relationship between a centralized decision making systems with successful outcomes of an IS.

Similarly significant relationship between resources and IS implementation has been observed, arguably resource allocation is related to system quality, information quality, perceived usefulness and user satisfaction (Wixom & Watson, 2001; Hussein, et al. 2007). For example, Gaible's (2008) experience in Jamaica revealed that high costs associated with acquisition, operation and maintenance of ICT infrastructure was a significant barrier to the increased effectiveness of EMIS programs. While Trucano's (2006) study in Nigeria reveal that early EMIS work in those countries was incomplete and not sustained due to lack of resources.

Bernbaum and Moses (2011) asserts that workable EMIS depends on three factors; the right people, motivated to perform and skilled in their work; the right processes that

reduce duplication and reinforce accuracy and accountability; the right technology, appropriate to the state of the country, and the reliability of its infrastructure. So far, several studies have examined the impact of personnel, technological and organizational factors on IS (Saunders & Jones, 1992; Ang, Davies & Finlay, 2001; Lawrence, 2010. Havelka, 2002; Hussein et al. 2007b), however, far too little attention has been paid to impact of personnel factors like job design, technological factors such as functionality IT infrastructure and maintenance. These studies were limited in scope as they did not consider motivation as a dimension of leadership in the organization in the education sector.

It is apparent that research on IS/IT, has often been focused on populations and organisations based in United States, Malaysia and Australia and large multinational companies like World Bank. (Havelka, 2002; Hussein et al's 2007). These studies seldom focused in institutions operating in an unstable economic environment like Africa in which IS/IT is challenged by low level of ICT skills; lack of functional ICT policy; economic barriers; ICT infrastructure and poor level of computer literacy (Okiy, 2005). More so some conclusions on factors that impacted IS were based on a synthesis of previous theoretical and empirical studies on IS conducted in the 1980s and 1990s (DeLone & McLean, 2003) yet the role of IS has changed during the last decade and academic inquiry into IS effectiveness has progressed over the same period. Hua and Herstein, (2003) work was paper presentation based on their decade experience working on EMIS development in MOE in Egypt, Jamaica, Malaysia, Ghana and Latvia. To date there is no pragmatic study that focuses on the management style of DEOs, yet they play key role in the educational management in Kenya.

The literature review on impact of personnel factors on EMIS outcomes (e.g. DeLone & McLean, 2003; Hussein et al.2007a; Havelka, 2002; Havelka et al. 2002; Buabeng-Andoh, 2012; Wong & Hanafi, 2007) shows that personnel factors like gender, age, experience, education level and job design are pertinent predictors of EMIS outcomes. While studies that focused on the impact of technological factors on EMIS outcomes (e.g. Hussein et al.2007a; Bento & Bento, 2006; Ang, et al. 2001; Gaible, 2008; Masrek et al. (2009) and Kelegai & Middleton, 2004) revealed that technological factors like availability and functionality of the IS/IT infrastructure, IS/IT competencies and technical user support are pertinent to EMIS outcomes. Those studies that focused on impact of organizational factors on EMIS outcomes (Ang et al. (2001a), Lawrence 2010; Young & Jordan, 2008; Hussein et al. 2007b; Gaible, 2008; Sepahvand and Arefnezhad (2013), Trucano, 2006; Hwang and Schmidt, 2011; Sharma & Yetton, 2011; Ahlan, 2005 & Hua & Herstein, 2003) showed that organizational factors like decision making structures and management style, managerial EMIS knowledge, top management support, resources allocation were antecedent to EMIS success . However, these studies were based in Malaysia, USA, Australia, Qatar, Jordan, and Canada. Britain, Netherlands, Turkey, Papua New Guinea, the Caribbean countries, Malawi, and Nigeria. What was unknown was the impact of these personnel, technological and organizational factors on Educational Management Information System (EMIS) outcomes in Nyanza region, the gap that this study attempted to fill.

More so, a study on the interplay of personnel, technological and organizational variables in counties of Nyanza Region, Kenya, an African context, with different economic environment was vital as part of an ongoing continuum of research in the

area of MIS. In addition the study offered a more current supplementary research to validate the observations made by DeLone and McLean (2003) and Hua and Herstein (2003) in a different sector and economic environment.

A number of African countries have embraced EMIS for their educational management as well. In Mozambique, EMIS provides a range of statistical information including enrolment of orphans following the HIV and AIDS pandemic and about poor attendance and drop-out since 1980, with donor assistance (Trucano, 2006a). Similarly, Spratt and Crouch (2001) noted that Guinea Conakry's Ministry of Education with USAID and World Bank funding and technical assistance upgraded its infrastructural capacity for information management since the early 1990s. This enabled Guinea Conakry to produce reasonably sound education statistics distributed in the form of Statistical Yearbooks and disseminated brochures. Trucano (2006b) observe that Ghana's formalised attempts at developing the EMIS occurred in the late 1990s, though as a pilot exercise, when the government implemented the policy of Free Compulsory Universal Basic Education (FCUBE). Trucano (2006c) notes that due to lack of resources, early EMIS work was incomplete and not sustained in Nigeria. However, more recently, development of standardised software has enabled state-level EMIS to provide comprehensive information in support of decentralised management.

The World Bank (2010) acknowledges that over forty World Bank education projects have been initiated which have components related to the development of EMIS or ICT related projects. However, more than half of ICT-related projects have failed in the corporate sector in OECD countries, and that such rates are even higher in the

public sector in developing countries. Essentially, Wako (2003) affirms that EMIS projects supported World Bank projects are often behind schedule and or have to be significantly re-worked. Even if a system is delivered on time and within budget, it is not guaranteed that it will be used or liked by its intended users; nor will it achieve the expected benefits. Besides, in countries where EMIS data is successfully captured and documented in Statistical year books and brochures, policy-makers hardly use the data to guide education policies (World Bank, 2010). Similarly, in Malaysia, Mohamed et al.(2009) acknowledge that EMIS has been plagued with data quality problems. These views are also supported by Hwang, Lin and Lin (2012), who observed that implementation of information systems is usually resource intensive in terms of human resources, time and funds, but the results are often less than satisfactory, finally organizations are forced to abandon the IS project.

EMIS implementation in Kenya was embodied within the government policy documents, specifically; the Kenya Education Sector Support Programme (KESSP) and the Sessional Paper No. 1 of 2005 (Republic of Kenya, 2005a). KESSP comprises twenty three (23) investment programmes grouped around six thematic areas of financing, access, sector management, and quality, retention in secondary, tertiary and higher education. EMIS is one of the 23 investment plans of KESSP whose role is to provide an effective and efficient framework for a harmonized and timely collection, processing, analysis and dissemination of education data from all levels of education and training for policy makers, planners, managers and other stakeholders (Republic Of Kenya, 2009a). Additionally, Republic of Kenya (2012) affirms that the Vision 2030 secretariat consider education data to be so crucial in social sector planning and

supports effects to make Education Data Management Systems a Flagship Project in the second Medium Term Plan (MTP) of Vision 2030.

Therefore, Republic of Kenya (2008) comprehensively asserts that EMIS was created to fulfill the following objectives:

i. To establish harmonized and integrated systems, particularly registration, enrolment, staffing, finances and facilities.
ii. To enable timely collection of education data.
iii. To facilitate information processing and analysis.
iv. To facilitate dissemination and feedback of education information.
v. To enable sharing and exchanging of data and information.
vi. To facilitate efficiency in necessary decisions and intervention measures (including early warning).
vii. To provide systems for education planning and management.

Consequently, to achieve these objectives the MOE has consistently been involved in; capacity building for clerical officers to manage data collection and analysis (Republic of Kenya, 2009b); provide funds annually to the DEOs to facilitate EMIS activities (Republic of Kenya, 2010b); equipping the districts offices with ICT accessories computers, printers and Local Area Networks (LAN) for data capture; and providing technical assistance for maintenance of the IT infrastructure (Republic of Kenya, 2009a). The core statistics captured by EMIS, annually, in Kenya includes school characteristics, enrolment, staffing profile, finances, physical facilities, examination performance records, and income and expenditure statements. The data collection targets pre-primary, primary, secondary, non formal education schools, University,

Teacher Training Colleges, TIVET, Adult Basic Education and Training (Republic of Kenya, 2009a).

Republic of Kenya (2012) reveal that the EMIS Programme was focused on data collection and capture at the district level involving six stages of data management cycle (Appendix VI). In the first stage, the questionnaires were distributed to the learning institutions to be completed and then returned to the DEOs office for manual validation, confirmation of their completeness and follow up. In the second stage the EMIS system software is installed into the computers at the DEOS office to enable the trained data personnel carry out data entry. The data is then backed up and sent to the EMIS data centre to be consolidated in a common national database: Thirdly, at the Ministry of Education, EMIS data centre, data aggregation and analysis is then done by tabulation and compilation of the report. In the fourth stage education report is compiled, printed and published, followed by dissemination through workshops, seminars and internet in the fifth stage. Finally feedback from stakeholders' reviews and responses are noted for necessary improvements (Republic of Kenya, 2008).

It suffices to observe that, despite enormous contribution and immense expenditure by MOE to facilitate EMIS activities, this has not been without hitches, and objectives of EMIS are seldom met (Republic of Kenya (2009c). Incomplete, unreliable data, poor response rates from schools and untimely data collection processes has rendered the EMIS ineffective. Particularly, both the EMIS Kenya Educational Statistical Booklet 2003 – 2007 and EMIS Kenya, Education Facts and Figures 2002 – 2008 were released in 2009 and 2010 respectively. The information in these documents was two years behind schedule and was not available on line for stakeholders' consumption

(Republic of Kenya, 2009c; Republic of Kenya, 2010a). Speedy analysis of this data has been constrained by lack of capacity at the MOE headquarters and when fully done, it is disseminated too late to the field officers (Republic of Kenya, 2005a).

Similarly, non-response and other parallel systems of data collection have presented challenges in maintaining the consistency of educational indicators (Republic of Kenya, 2010a). Each of the key MOE agencies such as Kenya National Examination Council (KNEC) and TSC had their own data capture software to serve their needs. In most of the cases the data capture systems were still manual with submission made through paper work sent by DEOs. In addition, ICT had not been fully utilized to improve the data flows. There was lack of continuous connectivity between the districts and the ministry to facilitate data capture at the lower levels and real time transfer of the same. This appalling situation has worsened further by financial limitations and liquidity problems after the winding up of KESSP 1 and absence of legal provisions to guard against misinformation or non-cooperation by heads of learning institutions that provided inaccurate data to suit their unique circumstances (Republic of Kenya, 2012).

According to Republic of Kenya (2010c), in circular Ref No. MOE/EMIS/P/7/11, the MOE did a nationwide survey to assess the status of EMIS data management at the District Education Offices. The survey revealed that data capture completion rate was low; only 41(15.65%) districts out of 262 had completed to capture the September 2009 data by March 2010. This delayed the whole EMIS data management cycle. The completion rate was highest in Nairobi (33.33%) then followed by Central (19.44%), Rift Valley (17.46%), Eastern (16.98%), North Eastern (16.67%), Western (14.29%) and Coast (8.33%). Nyanza had the lowest data capture completion rate at 8.11%

(Table 1). During a training of the Nyanza Counties' EMIS personnel, there was dissatisfaction by the data capture personnel and EMIS coordinators that the EMIS funds were never availed for the facilitation of EMIS data collection from schools, yet the personnel were expected to work overtime on weekends to meet the deadlines (Republic of Kenya, 2009b). This is symptomatic of the justifiable need to evaluate the performance of EMIS with respect to fulfilling its objectives in the counties of Nyanza Region.

Table 1

Data Capture Completion Rate by Region

Region	**Number of Districts**	**Data Entry Completion Rate** f (%)
Rift Valley	63	11(17.46)
Eastern	53	9 (16.98)
Nyanza	37	3 (8.11)
Central	36	7 (19.44)
Western	28	4 (14.29)
Coast	24	2 (8.33)
North Eastern	12	2 (16.67)
Nairobi	9	3 (33.33)
Total	**262**	**41(15.65)**

Source: Republic of Kenya (2010b)

Hua and Herstein (2003) noted that the success of Information Systems (IS) is measured by outcomes like timeliness and reliability of its data and information processing in addition to their effective use for policy decisions. Further to that , DeLone and Mc Lean (2003), Hussein, Selamat, Anom ,Shahriza, Karim and Ali (2007), Sepahvand and Refnezhad (2013) as well as Bento and Bento (2006) proposed a model of measurable information system outcomes consisting of system use, system quality, user satisfaction, information quality, individual impact and organizational

impact. Mohamed, et al's (2009) EMIS study in Malaysia measured data quality in terms of data completeness, data domain validity and business rules conformance, and data accuracy. Bernbaum and Moses (2011) assert that EMIS data need to be accurate, timely, reliable and understandable. Besides, other renowned studies suggest that IS outcome can be gauged by its perceived usefulness, profitability, productivity, personnel motivation, cost and time saving capabilities in organization, net benefit to individual, organizations and society (Debone & McLean, 2003; Hwang & Schmidt, 2011; Nag, Davies and Finlay, 2001b; Lawrence, 2010; Zviranan & Elrich, 2003; Young & Jordan, 2008). While, Chung, Rainer and Lewis (2003) and Byrd and Turner (2000) used flexibility of information technology infrastructure as measures of IS success.

Hussein, et al. (2007), DeLone and McLean, 2003, Hwang and Schmidt, (2011) assert that system quality is the technical level outcome of IS such as reliability of the software, hardware, internet and questionnaires, ease of use, response time and system accuracy, while Information quality refers to the quality of the data that are available from the IS. More specifically, relevance, understand ability, accuracy, conciseness, completeness, currency, timeliness, usability and consistency are critical aspects of data quality (Sepahvand & Refnezhad, 2013). Kahn, Strong, and Wang, (2002) as well as Mohamed, et al. (2009) describe data quality dimensions as accessibility, amount of information, believability, completeness, concise representation, consistent representation, ease of manipulation, free-of-error, interpretability, objectivity, relevancy, reputation, security, timeliness, ease of understanding and value-added. There is lack of agreement on what constitute the dependant variable (Delone & Mclean, 1992). Therefore based on the aforementioned literature, the measures for

dependent variable EMIS outcomes in this study included: information timeliness, completeness, relevance, reliability and accessibility as well as user satisfaction.

Case studies by World Bank have been done in Bangladesh, Ghana, Nigeria and Mozambique to find out best practices and lessons learned from EMIS projects (World Bank, 2011). Similarly Bernbaum and Moses (2011) reviewed implementation of EMIS projects in Uganda, Malawi and Zambia from 2003 to the 2011 to gain insights and lessons learned on designing, implementing, and evaluating EMIS projects. However, since the Kenyan EMIS programme began in 2004 its effectiveness in fulfilling its objectives has never been evaluated. It is important, therefore, that an investigation was carried out to identify some of the factors that are associated with EMIS outcomes in Nyanza Region, so that corrective measures, where possible, can be taken.

1.2 Statement of the Problem

Successful management of education sector requires effective policy-making and system monitoring through quality information. The Kenya government has been committed to the implementation of Education Management Information System (EMIS) to process and disseminate timely data on the educational system to improve planning, policy formation and decision-making. The Ministry of Education has trained personnel to manage data collection and provides funds annually to the District Education Officers to facilitate EMIS activities. The District Education Offices have also been equipped with computers, printers and Local Area Networks (LAN) for data capture. Despite these efforts, EMIS technical team survey report reveals that data capture completion rate has been low at the District Education Offices, thereby causing delay in information processing. Only 41(15.65%) districts out of 262 had completed

to enter the September 2009 EMIS data by March 2010. Nyanza Counties had the lowest data entry completion rate at 8.11%. The highest data entry completion rate was in Nairobi County (33.33%) then followed by Central Counties (19.44%), Rift Valley Counties (17.46%), Eastern (16.98%), North Eastern Counties (16.67%), Western Counties (14.29%) and Coast Counties (8.33%).

This situation hampered the provision of an effective and efficient timely collection, processing, analysis and dissemination of education data through EMIS in the counties of Nyanza region. Hence, this study offers supplementary and expanded research to establish the Impact of personnel, technological, and organizational factors on EMIS information processing timeliness, completeness, relevance, reliability, as well as user satisfaction in Nyanza Counties, Kenya. Understanding factors that Impact the EMIS outcomes might allow policy makers to create innovative and highly efficient work environments to achieve EMIS objectives.

1.3 Purpose of the Study

The purpose of the study was to establish the impact of selected factors on Education Management Information Systems outcomes in the counties of Nyanza Region, Kenya.

1.4 Objectives of the Study

The specific objectives of the study were to:

(i) Determine the impact of personnel factors on EMIS outcomes in the counties of Nyanza Region.

(ii) Establish the impact of technological factors on EMIS outcomes in the counties of Nyanza Region.

(iii) Determine the impact of organizational factors on EMIS outcomes in the counties of Nyanza Region.

1.5 Research Questions

The study was guided by the following research questions:

(i) What is the impact of personnel factors on Education Management Information Systems outcomes in the counties of Nyanza Region?

(ii) What is the impact of technological factors on Education Management Information Systems outcomes in the counties of Nyanza Region?

(iii) What is the impact of organizational factors on Education Management Information Systems outcomes in the counties of Nyanza Region?

1.6 Significance of the Study

The findings of this study on the impact of organization, personnel and technological factors are useful in:

(i) Providing suggestions and recommendations to the MOEST that would contribute to the improvement and sustainability of EMIS.

(ii) Serving as a baseline survey to benchmark on the existing human capacity and infrastructure for EMIS in Nyanza Region which may help to monitor, track changes and set future targets for EMIS.

(iii) Contributing new knowledge on Information Systems in the field of education management.

1.7 Assumptions of the Study

The study was guided by the following assumptions:

(i) All the sub counties of Nyanza Region were involved with the EMIS programme.

(ii) The EMIS coordinators in charge at the sub counties level were knowledgeable enough on EMIS.

(iii) The instruments were appropriate measures of personnel, technological and organizational factors as well as EMIS outcomes.

(iv) The personnel, technological and organizational factors had impact on EMIS outcomes in the counties of Nyanza Region.

(v) The economic, environmental and socio-political factors had less impact on personnel, technological and organizational factors.

1. 8 Scope of the Study

The scope of the study covered District Education Offices within Counties in Nyanza Region. Data was collected from DEOs, District and Regional EMIS coordinators as well as data capture personnel in Nyanza Region. The study examined the impact of selected factors that Impact EMIS programme. The selected factors were personnel, technological and organizational factors since many studies reviewed revealed them to be salient predictors of IS. Questionnaires and interview schedules were developed and used to elicit information from EMIS personnel on the impact of personnel, technological and organizational factors on Education Management Information Systems in Nyanza Region, Kenya. Nyanza represents a wide diversity of urban and rural District Education Offices with enough demographic profile to reduce any bias caused by being selected purposively. The study was focused on EMIS activities within the 2010 to 2012 period.

1.9 Limitations of the Study

One (1.72%) Data Capture Personnel did not fully fill some parts of the open ended item of the questionnaire as required. This was assumed as it was not significant.

1.10 Conceptual Framework

In this study a conceptual framework (Figure 1) based on the concepts that personnel factors (Wong & Hanafi, 2007; Mcmullin & Dryburg, 2001; DeLone & McLean, 2003; Havelka, et al. 2002), technological factors (Hussein et al.2007a; Bento & Bento, 2006; Ang, et al.2001) and organizational factors (Ang, et al. , 2001;Hussein et al.2007b; Hua & Herstein, 2003) impact information quality and system quality outcomes. DeLone and McLean (2003) suggests that information system dependant variable; information quality includes timeliness, completeness, accuracy and relevance); while system quality encompasses reliability, flexibility or usability of system's software and hardware as well as user satisfaction, cost and time saving capabilities of the Information System.

The framework suited the study at hand by hypothesizing that EMIS success is contingent upon a mix of interdependent elements namely; personnel factors, technological factors and organizational factors. Personnel factors like age, gender, educational level, job level and length of service have impact on EMIS, especially satisfaction. Females and older individuals with longer tenure in an organization and less educated subjects have less positive attitudes towards Information Systems while a priori involvement with MIS has positive correlation user satisfaction thus MIS Success (Hussein et. al, 2007a & Havelka, 2002).

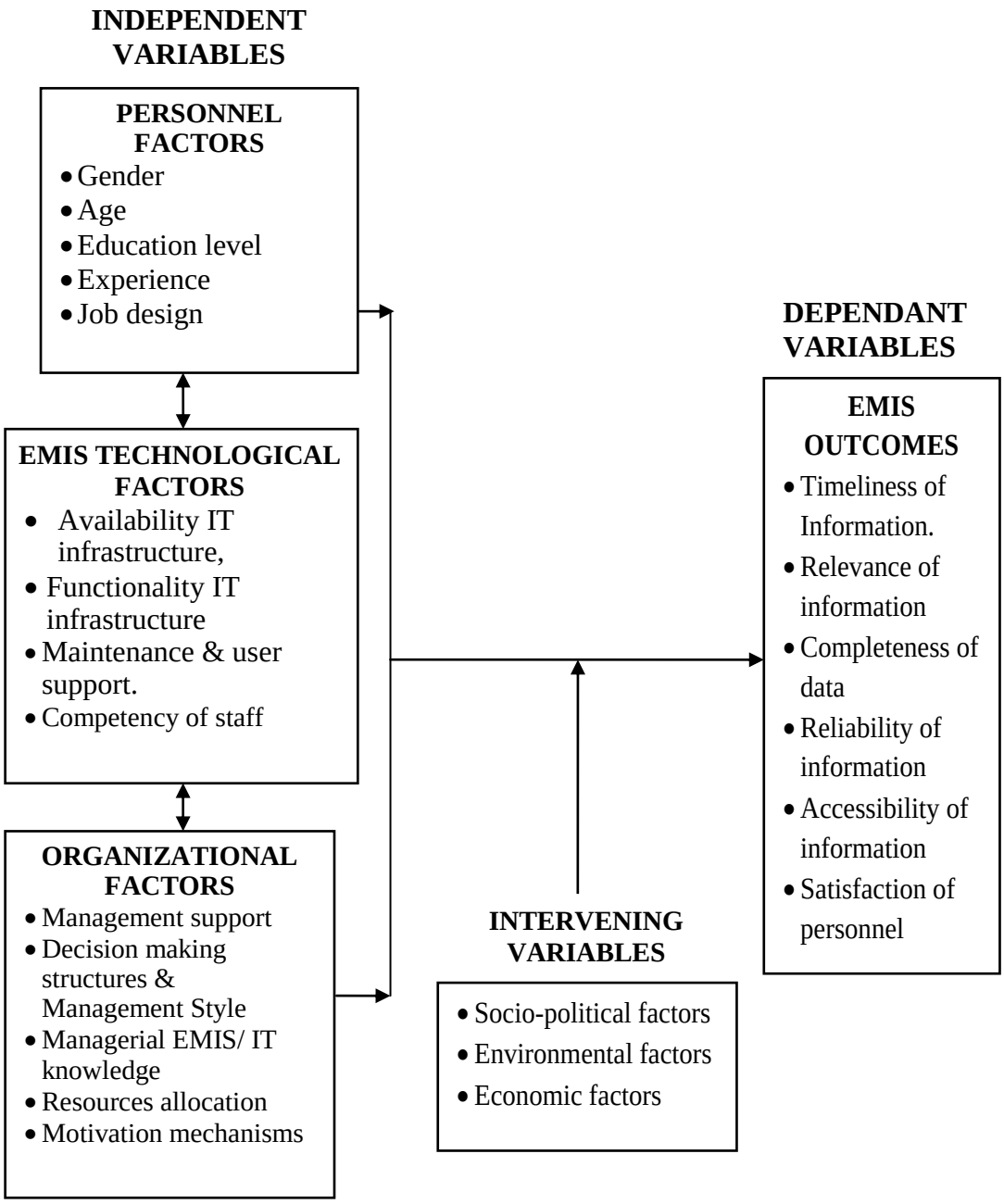

Figure 1 Conceptual framework showing factors that impact on Education Management Information System (EMIS)

Technological factors that have impact on the outcome of EMIS comprises of the IT infrastructure, processes, the human capability and structures. The availability, functionality, adaptability and usage of these technological factors have effect on the outcome of EMIS like timeliness, relevance and dissemination of Information.

Organizational factors are management support, decision making structure, management style, managerial EMIS knowledge, resources allocation. In a favourable leadership, the DEO can catalyse the success of EMIS by motivating EMIS personnel; availing funds for EMIS purpose to ensure goal achievement (Hussein et al. 2007).

In the conceptual framework, economic, environmental and socio-political factors are the intervening variables in the success of EMIS. Prices and market mechanisms have impact on the ability of the organization to acquire the computers and the soft ware. When the district is so wide geographically, the process of data collection from schools is so cumbersome especially when the infrastructure is poor and lack of transport. With disputed district boundaries, it may be hard to locate schools within the administrative framework. Socio-political factors include the policies and legislation, political stability and cultural practices. Collecting information is only possible in an environment of political stability and clear legislation and policies. The effect of cultural practices is viewed to be an impediment in data collection in communities of nomadic lifestyles. The effects of these intervening variables were assumed to be inconsequential in interfering with the impact of the selected factors on EMIS outcomes however it was best eliminated by the fact that environmental, socio-political and economic factor are the same (kept constant) across the counties and randomizing the sample.

Therefore it was conceptualized that the organizational, personnel and technological factors had impact on the expected outcome of EMIS like information timeliness, relevance, reliability consistency, completeness and accessibility (Rai, et al. (2002). This conceptual framework helped to refine the goals, develop relevant research objectives, select appropriate variables, methodology and identify potential validity threats to the conclusions.

1.11 Operational Definition of Terms

Decision Making Structures and Management Style: The organization variable that entails organization hierarchy, decision making systems, the way in which the managers tend to impact, coordinate, and direct people's activities towards group's objectives or impose decisions on subordinates, degree of communication, consultation with and trust on subordinates. Decision making structures and management style included goal alignment in this study.

Education Management: Creating formal structures and an establishment based structures on a mission**,**

EMIS Outcome: This is the dependent variable that is determined by information timeliness, relevance, reliability, completeness, accessibility data and user satisfaction.

EMIS: A system that uses technology to organize and processes information related to the management of education resources and services to improve planning, resource allocation, monitoring, policy formation and decision-making.

Goal alignment: Linking of organizational goals and IS goals together by mobilizing enterprise resources and processes to execute organizational objectives and support of the organization's mission, values, vision, strategy, goals, roles and responsibilities.

Impact: influencing after a long period of time more than 5 years.

Information Quality: This is information system construct that targets the meaning level of the output in terms of accuracy, timeliness, relevance, accessibility, and adaptability.

Information System: Organized combination of people, hardware, software, communication networks and data resources that gather, process, store, use and disseminate information in an organization.

Nyanza Region: Consists of Homa Bay, Kisii, Kisumu, Migori, Nyamira and Siaya counties of the Republic of Kenya. The Counties are divided into 34 administrative sub counties at the time of study.

Organizational Factors: These are organizational conditions inherent to the office of the DEO that impact EMIS out comes such as management support, decision making structure, management style, managerial EMIS knowledge, goal alignment and resources allocation .

Outcome: Results after an activity.

Personnel Factors: Conditions inherent to the EMIS staff that impacts their own use of EMIS such as the gender, age, education level and experience of the users.

Personnel Satisfaction: The extent to which users believe the information system available to them meets their requirements

Selected Factors: These are the factors that the study focused on namely personnel, technological, organizational factors

Staff Competency on EMIS: Ability of the staff to capture or key in EMIS data into the computers.

System Quality: The technical level outcome of EMIS such as reliability of the software, hardwares, internet and questionnaires, ease of use, response time and system accuracy.

Technological Factors: Conditions inherent to the information technology infrastructure of EMIS that impact EMIS such as the hardware, software, integration, structure and user support available.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

In this chapter, literature review was done under the themes derived from the objectives of the study. They include; the impact of personnel factors on Education Management Information System, the impact of technological factors on Education Management Information System and the impact of organizational factors on Education Management Information System.

According to Bernbaum and Moses (2011), in the implementation of EMIS, the combination of the people (leadership, managerial and technical) and process (administrative requirements, timelines, job skills, and funding) are frequently the most difficult to align with EMIS outcomes to provide quality education information in a timely, cost-effective, and sustainable manner, at all administrative levels, and to support selected operational functions. As such, in this study the literature on the impact of the personnel, technological and organizational factors were reviewed.

2.2 Impact of Personnel Factors on Education Management Information System Outcomes

WHO (2001) describes personnel factors as an individual's internal factors, which include among others gender, age, social background, education, profession, past and current experience, overall behavioural pattern and character of an individual. In the context of this study, personnel factors are defined as the particular background and features of staff working with EMIS which can impact functioning positively or negatively on his/her use, adoption, implementation or outcomes of EMIS. Therefore studies have acknowledged a number of personnel factors that impact MIS outcomes

including; gender (Igbaria & Chidambaram, 1997; Wong & Hanafi, 2007; Huotz and Gupta, 2001), age (Morris & Venkatesh, 2000; Mcmullin & Dryburg, 201; Al-Shafi & Weerakkody, 2009) , education level (Choudrie & Lee, 2004; Choudrie & Papazafeiropoulou, 2006), experience (DeLone and McLean (2003) and job level or design (Havelka, 2002; Havelka, Conrad & Glassberg, 2002).

For instance, research by Choudrie and Lee (2004) as well as that of Morris and Venkatesh (2000) investigated the role of gender in the adoption and usage of IT/IS and revealed that gender had an important effect and role when considering technology adoption and usage in organisational context. Likewise, Venkatesh, Morris, Davis and Davis *(*2003) showed that male users use a computer more than females to show that gender as one of the most important variables when adopting technology. Venkatesh et al. *(*2003) study sampled heterogeneously across different contexts of technologies, organizations, industries, business functions, and nature of use (voluntary vs. mandatory) to ensure robust results. They used questionnaire to capture perceptions as the users' experience with the technology. Behavioural intention to use the system was measured using a three-item scale. Seven point scales were used for all of the constructs' measurement, with 1 being the negative end of the scale and 7 being the positive end of the scale.

In another survey study administered in two universities in Tehran, Iran, according to Shashaani and Khalili (2001) female had significantly lower confidence than males when it came to their ability to use computers. Shashaani and Khalili sample consisted of 375 undergraduate students; 155 males and 220 females. Their ages ranged from 17 to 25, with a median of 20. The Computer Attitude Survey (CAS) was used to measure

the students' attitudes toward computers on a five-point scale (strongly disagree=1; strongly agree=5). They used Mann–Whitney Test to measure male and female students' attitudes and the Spearman rank correlation to measure the association.

Consistent with Houtz and Gupta (2001), Bross (2005) and Margolis and Fisher (2002) correspondingly found significant gender differences – favouring males in terms of attitudes towards new technology, the extent of computer use and self-perceived computer experience. In Margolis and Fisher's (2002) study they employed grounded theory techniques for qualitative analysis of interviews to assess the technological frames of reference of selected highly satisfied and highly dissatisfied users.

Moreover, even when females perceived themselves as being more competent in using computers, Shashaani and Khalili (2001) noted that they felt helpless, nervous and uncomfortable around computers, while Bross (2005) reports that they expressed higher anxiety levels compared to males. As a result, there is a consensus in the literature of Information systems (IS) that women are underrepresented in IS field (Igbaria & Chidambaram, 1997; Mcmullin & Dryburg, 2011; Wong & Hanafi, 2007; Huotz and Gupta, 2001). Igbaria and Chidambaram (1997) presented results based on the survey responses of about 348 employees in the IS field, they found that, women were on average, less experienced than men in lower-level positions and receive lower salaries than do men even when age, work experience and job level were controlled. Consistently, this argument is further augmented by Mcmullin and Dryburg (2011) data which supports the view that IT/IS related job are not gender neutral. Specifically they revealed that men compromise 81 percent in the United Kingdom, 80 percent in the USA, 75 percent in Canada and 78 percent in Australia's jobs related to

IT/IS. The evidence of female underrepresentation in the field of IS is supported by Huotz and Gupta (2001) too, they found that even though both genders could be positive about technological ability, males rated themselves higher than females.

Wong and Hanafi (2007) in their case study at Universiti Putra, Malaysia of gender differences in attitudes towards information technology among students affirmed that females exhibit more negative views and perception towards the use of computers than males. Their sample consisted of 102 participants; 73 females and 29 males with the mean ages of females and males of 20.81 (SD=1.32) years old and 21.72 (SD=2.74) year olds respectively. Three dimensions were measured; usefulness, confidence and aversion. The questionnaire comprising of 23 items was used to measure the attitudes of participants towards IT. Each of the 23 items were accompanied by a Likert scale ranging from a score of 1 to 5, with 1 representing "strongly disagree" and 5 representing "strongly agree". They used Independent *t*-test, MANOVA and Bonferroni method in ANOVA to analyse their data.

In the teaching profession, Buabeng-Andoh (2012) cited Volman and Van Eck (2001) to have found that female teachers had low levels of computer use due to their limited technology access, skill, and interest. Similarly, it was reported that male teachers used more ICT in their teaching and learning processes than their female counterparts (Kay, 2006; Wozney et al. 2006), female teachers were integrating technology into their teaching less than the male teachers integration of ICT in schools in Queensland State (Jamieson-Proctor, Burnett, Finger and Watson, 2006).

However, the findings by Volman and Van Eck (2001), Kay (2006) Wozney et al. (2006) and Jamieson-Proctor et al. (2006) contrasted the findings of Breisser (2006) who found that females' self-perceptions about technology competence improved while males' self-perceptions about technological dominance remained unchanged as female teachers applied ICT more than the male teachers. However, Norris, Sullivan, Poirot and Soloway (2003) revealed that gender variable was not a predictor of ICT integration into teaching, a finding which agreed with Kay's (2006) that there is no causal relationship between gender and IT/SI adoption.

The other personnel factor which has been found to underpin the impact of EMIS outcomes is age. Morris and Venkatesh (2000) as well as Venkatesh et al. (2003) in their studies reported that age difference impacted adoption and usage behaviours in favour of younger users. In this sense, Venkatesh *et al.* (2000) found that the majority age group adopting computers in the USA is 15-17 years, followed by the group of 26-35 years.

This was not an unprecedented phenomenon, as there were other significant empirical support for age as a predictor of IS outcomes. Mcmullin and Dryburg (2011) analysis of data from Canada, Australia, England and the United States shows that highly skilled IT workers are predominantly, young. Specifically they noted that in Australia 77 percent of highly skilled workers are under the age of forty, which compares with 72 percent in Canada, about 75 percent in the United States 80 percent in the United Kingdom. Mcmullin and Dryburg (2011) finding is in agreement with Fraser's (2011) submission that there is tremendous fascination with twenty-year-olds in the IT/IS related jobs. He further posited that older workers are generally characterized as less

technologically adept and less interested in new technology. In his analysis, Fraser (2010) revealed that majority of the IT/IS firms employ workers under the age of forty; between 25 and 30 percent of the employees in the IT firms are in their forties, between 8 and 15 percent are in their fifties and only 1 and 3 percent in their sixties. Similarly, Al-Shafi and Weerakkody (2009) observed that the majority (66%) of Qatar citizens adopting e-government are in the age groups from (25) years to (44) years.

However, other studies question the validity of these arguments. According *to* Ruossos (2007), age had no significant relationship with attitudes towards computing. Fraser (2010) in his classic critique of gender and age bias in IT/IS related work, opined that it is an ageist attitude and negative stereotypes about older and female workers abilities to adapt and train on new technologies to impact hiring practices, thereby leaving older and female workers highly vulnerable to unemployment and redundancy in the IT/IS industry.

Though the aforementioned studies predominantly recognized age and gender as the leading personnel predictors of IS, according to Shasshani and Khalili (2001) computer experience, education level and socioeconomic status play a very important role in narrowing the age and gender gap. Similarly, Al-Shafi and Weerakkody (2009) examined the demographic differences (gender, age and education) as social variables by employing the Pearson chi-square test, and found that the e-government adopters in the state of Qatar differ significantly in terms of gender, age and education level. Dwivedi and Lal (2007) argues that individuals that have educational qualification are more likely to attain better occupation and are more likely to adopt new innovations. Similarly, Venkatesh et al. (2000) reported a positive correlation between the level of

education, technology ownership and usage. This result agreed with Choudrie and Lee (2004) and Choudrie and Papazafeiropoulou (2006) who submitted that the level of education is one of the most important drivers of IS success.

DeLone and McLean (2003) found that individuals with longer experience in an organization, and less educated subjects have less positive attitudes towards Information Systems while a priori involvement with MIS has positive correlation with user satisfaction thus MIS Success. However, another interesting finding was that of Al-Shafi and Weerakkody (2009) who found that the majority of non-adopters were reported to have higher levels of education.

Correspondingly DeLone and McLean (2003) review revealed in contrary to Mcmullin and Dryburg (2011). Igbaria and Chidambaram (1997 findings that males have less positive attitudes towards Information Systems. However DeLone and McLean (2003) observed that older individuals with longer tenure in an organization, and less educated subjects have less positive attitudes towards Information Systems while a prior involvement with MIS has positive correlation with user satisfaction thus MIS Success, thereby lending credence to Choudrie and Lee (2004) and Choudrie and Papazafeiropoulou (2006) studies who submitted that education is one of the most important drivers of IS success..

Considerable literature on the subject of IS success by Havelka, (2002), Havelka, Conrad and Glassberg (2002), revealed that personnel satisfaction as a measure of IS success has been found to be strongly correlated with the demographic factors like age, gender, educational level, job level, departmental level, length of service thus

augmenting the aforementioned studies by Choudrie and Lee (2004), Houtz and Gupta(2001), Margolis and Fisher (2002) as well as Shashaani and Khalili (2001) on gender; Morris and Venkatesh, (2000) Mcmullin and Dryburg (2011) Al-Shafi and Weerakkody (2009) concerning age; Choudrie and Lee (2004) and Choudrie and Papazafeiropoulou (2006) regarding education; and DeLone and McLean (2003) concerning experience with MIS.

Havelka (2002) analysed user personnel factors that impact Information System development success in Miami, USA. He further found that user personnel factors like bias, commitment, communication skills, computer literacy, ownership, participation, procedures, understanding of the current system, and understanding of needs were are related to Information system success. These findings are corroborated by Watson's (2007) argument that even though an IS could aid operation of workers, they may resist the IS innovation for fear of social consequences and therefore if the objectives of the IS are not clearly understood and supported, then, it is not likely to succeed. Hua and Herstein (2003) underscore the importance of motivated and willing staff for EMIS to be successful.

Arguably, the studies by Shashaani and Khalili (2001), Igbaria and Chidambaram, (1997) and Mcmullin and Dryburg (2011) studies relied too heavily on analysis of data from developed countries without any comparative analysis of the scenario in African developing economies. Again, DeLone and McLean (2003) conclusions were based on a synthesis of previous theoretical and empirical studies on IS conducted in the 1980s and 1990s such as Lucas (1978), Igbaria and Nachman (1990) and King and Teo

(1996). However, the role of IS has changed during the last decade and academic inquiry into IS effectiveness has progressed over the same period.

Job design is yet another personnel factor that has been shown to have an impact of adoption, use, and thus success of IS implementation. Specifically, Buabeng-Andoh (2012) note that the workloads of teachers impact their acceptance of IT in classrooms. For example, increased workload coupled with teaching with IT was critical in a large Australian multi-campus urban university (Samarawickrema & Stacey, 2007), increased workload of teachers was alarming and asking them to take on board yet another task in an already overcrowded curriculum and extremely busy work day is pushing many teachers to the limit (Neyland, 2011). Similarly, in the Jordanian education system teachers were already overloaded and they could not cope with the pressure from ICT training (Abuhmaid, 2011), thus giving prominence to the impact of job design of personnel to the implementation and outcomes of IS.

Taken together, the existing evidence from developed nations suggests that there is no axiomatic relationship between gender, age, experience, job design and development of Information systems. Rather, this relationship varies by context and from one country to the other. The generalisability of much published research Information systems to the education sector on this issue is problematic. Much of the existing evidence, however, requires comparison across different socioeconomic settings to determine the role of development in shaping relationship between gender, age, experience, job design of personnel and development of Information systems.

This study given that Havelka, (2002) study was based in the USA and Hussein et al.'s (2007b) study conducted in Malaysia; it is probable that demographics of the IS personnel were different and therefore their findings are not generalizable to Nyanza Counties, Kenya.

Hussein et al. (2007b) used questionnaires to collect data from a stratified sample of 450 employees based on their position level using an information system in their work were of the electronic government agencies in the central administrative complex in Putrajaya, Malaysia. On the other hand, Havelka (2002) used informal interviews to collect data. Remarkably, unlike Hussein et al. (2007) and Havelka (2002) studies which collected data from one target population, this study involved four target groups, while both questionnaires and interview schedule were used to collect data. The four target groups were the District EMIS coordinators, data capture personnel, DEOs, and Regional EMIS coordinator. Involving many target groups and different tools to collect information is called triangulations which enhances reliability.

More profoundly, unlike earlier studies on personnel factors, this study shed light on the impact of job design on outcomes of EMIS. DeLone and McLean (2003), Hussein et al. (2007a) and Havelka (2002) studies did not study on the impact of job design and mobility of personnel on outcome of IS. Hua and Herstein (2003) observe that EMIS staff may have additional responsibilities unrelated to EMIS, which they may view as their "official" jobs thus "extra" responsibilities such as EMIS may suffer. In addition, Civil service staff may be more likely to leave the public sector after acquiring additional training, especially in the area of IT, as it may enable them to earn a higher

salary elsewhere. It was therefore imperative to look at the impact of job design of personnel on outcome of IS in attempt to fill these gaps.

The literature review on impact of personnel factors on EMIS which included the works of DeLone and McLean (2003), Hussein et al. (2007a) and Havelka (2002), Havelka et al. (2002), Choudrie and Lee (2004) and Choudrie and Papazafeiropoulou (2006), Buabeng-Andoh (2012), Igbaria and Chidambaram, (1997), Abuhmaid (2011) as well as Wong and Hanafi, (2007) focused on personnel factors like gender, age, experience, education level and job design were conducted in Malaysia, USA Australia, Qatar, Jordan, United Kingdom and Canada. What was unknown was the impact of personnel factors on Educational Management Information System (EMIS) outcomes in Nyanza region, the gap that this study attempted to fill.

2.3 Impact of Technological Factors on Education Management Information Systems

According to Watson (2007) technological factors in an Information System comprises of the IT infrastructure, processes and the human capability. Watson (2007) further offers a comprehensive description of IT infrastructure component of IS to include; hardware, software and telecommunication equipment that are used to capture, process, store and distribute information. He clarifies that the hardware is the physical equipment such as a personal computer and even a modern cell phone used to process information, while software is the set of coded instructions (programs) that direct the hardware to perform the required tasks. Telecommunication systems are the networking equipment enabling users and devices to communicate, Watson (2007) adds.

DeLone and McLean (2003) observe that IS outcome is affected by how well the hardware and the software work together in relation to the technical expertise. Therefore, appreciably plenty of studies purport that MIS implementation, adoption, satisfaction or success is contingent upon a number of technological factors including; availability and functionality the IS/IT infrastructure, IS/IT competencies and technical user support (Hussein et al.2007a; Bento and Bento, 2006; Hussein et al. 2007, Ang, et al.2001; Saunders & Jones, 1992; Chung, Rainer & Lewis, 2003; Jones, 2004; Masrek, Jamaludin & Hashim, 2009).

For case in point, Hussein et al. (2007a) investigated the relationship between the technological factors and the IS success in the context of the Malaysian electronic government environment and found that potential technological antecedents of IS success were IS facilities, integration and competency of the staff, structure and user support. These findings by Hussein et al. (2007a) are also supported by Bento and Bento (2006) and Delson (1994) studies. Bento and Bento (2006) found that the types of technology used in the IS, the degree of use of e-commerce and Internet technologies were highly related to the successful outcomes of the Information processing. They also found that the IS outcomes; 'Usefulness of IS' and "Effectiveness', are positively related to technology like internet. Delson (1994) in his part revealed that availability of EMIS facilities, competency of the officers; structure and user support impacted the EMIS successful outcomes.

Research by Ang, et al. (2001) and Chung, Rainer and Lewis, (2003) showed that availability of IS facilities is influential in determining the success of IS adoption and implementation because it is related to IS effectiveness. Hussein et al.'s (2004) work

in an e-government computing environment found strong correlation between distributed IS structure and four dimension of IS effectiveness i.e. information quality, systems quality, service quality and perceived usefulness. This argument is further augmented by Masrek, Jamaludin and Hashim (2009) study, which showed that availability of IS structure is conducive for strategic utilization of IS in terms of product / service differentiation, cost leadership and growth advantage.

Chung, Rainer and Lewis (2003) using data from 200 U.S. and Canadian companies, examined the impact of the four components of IT infrastructure flexibility (compatibility, connectivity, modularity, and IT personnel) on strategic IT-business alignment and the extent to which various applications are implemented within an organization. The findings from analysis of a structural model provided evidence that connectivity, modularity and IT personnel (among other considerations) make significant, positive impacts on strategic alignment and that all four components result in significant, positive impacts on the applications implementation. The study reinforces the importance of IT infrastructure flexibility to organizations as one source for sustainable competitive advantage.

Delson (1994) and Bento and Bento (2006) studies differed significantly in context and methodology. Bento and Bento (2006) study explored the factors affecting the performance of IS from a sample of 1,990 respondents in accounting, finance, general management and information technology. The sample included small, medium and large organizations, operating at regional, national, international and global levels across a broad range of the Dow Jones Global Industry Groups in the US. Their empirical test of the hypotheses was conducted using stepwise regression. On the other

hand, Delson (1994) study was conducted to find out the state of the arts of the EMIS in the 76 central schools, 63 district offices, and 6 division offices of the Cordillera Administrative Region. It utilized the questionnaires coupled with interviews and observation. The data were statistically treated using frequency counts, one way classification of the Analysis of Variance (ANOVA), the Kruskal-Wallis test and the Chi-Square test. Both studies employed simple random sampling method.

This study adopted some aspect of methodologies used by Bento and Bento (2006) and Delson (1994) to determine the extent to which availability, competency of the EMIS officers, usage and functionality of the of EMIS IT infrastructures impacted outcome of EMIS in Nyanza Counties. Specifically this study adopted correlation type of research design, data was analysed by inferential statistics (chi test and regression analysis). However the point of departure of the current study from these studies was targeted group and area of focus. Notably, the study used simple random sampling for DEOs, data capture personnel and EMIS co-ordinators while purposive sampling methods was used to sample Regional EMIS Coordinators in Nyanza Counties, Kenya. In addition, all the districts in Nyanza Counties were involved in the study, and this made the study more representative and more generalizable to the area of the study.

Gaible (2008) observed that when Jamaica launched EMIS initiatives funded by United States Agency for International Development (USAID), its objective was to improve access to school census data, system-wide introduction of computer-based recordkeeping, and development of a school-based Geographic Information System (GIS) system. Despite the completion of EMIS development, both information access and information utilization in Jamaica remain limited. Limited access to computers and

inadequate connectivity was cited to be one of the barriers that led to limited information access and utilization. Therefore, Gaible's (2008) findings similarly underscored the importance of availability of IS facilities as a predictor of IS success, thus corroborates the aforementioned findings of Masrek, et al. (2009) and Bento and Bento (2006).

Okiy (2005), in his analysis of the status of ICT in Africa, points out that poor and inadequate telecommunication facilities, poor level of computer literacy, poor computer facilities; poor awareness of Internet facilities among policy makers and government officials; and minimum involvement of academic institutions in network building in Africa as challenges militating against the use of ICTs. However, the situation for EMIS Kenya was different, according to Republic of Kenya (2009a); the MOE had equipped the District Education Offices with computers, printers and Local Area Networks (LAN) for data capture. This study therefore sought to find out the extent to which the availability, functionality, adaptability and usage of the computers, printers and Local Area Networks (LAN) have impacted on the outcome of EMIS in Nyanza Counties.

Relationship between IS competency and IS outcomes has also been investigated by Masrek, Jamaludin, and Hashim, (2009), Hussein et al. (2007a), Kelegai and Middleton (2004), Ang et al. (2001) as well as Saunders and Jones (1992). According to Masrek, Jamaludin, and Hashim, (2009) IS competency refers to skilled workers working cooperatively in cross functional teams embracing different kinds of technologies. Further to that, Byrd and Turner (2000) draws our attention to distinctive categories of IT personnel competency. He asserts that the personnel should be well-

versed in the combination of technical competencies, boundary competencies and functional competencies. Whereas, technical competencies denote a set of measures of technical capabilities such as programming, understanding software development process and knowledge of operating systems; boundary competencies on the other hand relates to the importance of IT personnel having skills and knowledge to assume roles outside their area of training or original competencies which include project management and business process support; while functional competencies is concerned with the ability of the IT personnel to understand the business processes they are to support and apply the appropriate technical solution to a given business problems.

The findings by Hussein et al. (2007a) established that a higher level of IS competency relates to a higher degree of satisfaction and information quality which; encompasses timeliness, completeness, reliability, and accessibility of information. This is indeed a confirmatory test of previous study by Ang et al. (2001) and Saunders and Jones (1992). Ang et al. (2001) empirically explored the use of IS to support TQM processes in the Malaysian public sector and revealed that the level of IS competency among the staff exhibit high levels of IS usage. Similar to Ang et al. (2001), Saunders and Jones (1992) had previously indentified IS competency as one of the top ten dimensions for assessing IS function performance.

Similarly, Gaible's (2008) study in the Caribbean countries and Kelegai and Middleton's (2004) work in two Papua New Guinea (PNG) organisations concurred with the findings of Ang et al. (2001) and Saunders and Jones (1992). Particularly, Gaible (2008) and Kelegai and Middleton (2004) findings were unanimous that lack of

adequately trained staff on existing hardware and software as well as and new developments in MIS were critical barriers to MIS implementation. As a result, there was over-reliance on vendor sales representatives whose contracts lacked flexibility, foresight, or protection for the purchasing organizations. Therefore it is conceivable that these studies seem to suggest that availability of IT infrastructure per se does not guarantee IS implementation success, but having competent in-house IS personnel to effectively resolve the technological issues faced by the end users are crucial to ensure success.

According to Republic of Kenya (2009b) the MOE has consistently been involved in training of EMIS personnel. The focus of the training has been on role of EMIS in education delivery, sources of educational data, education statistics and indicators, data analysis and reporting as well as dissemination and publication of EMIS data. Other areas include monitoring and evaluation, technology transfer, effective information systems, roles and responsibilities in EMIS ICT application in data management. It was therefore necessary to find out whether the training received by the personnel to be IS/IT competent had impact on EMIS in Nyanza Counties.

Apart from availability of IS infrastructure and IS competency some studies have found Technical user support to be a significant predictor of MIS implementation, adoption and success. Masrek et al. (2009) concisely asserts that technical user support deals with the technical support and help given to users in terms of operating the IS in the organization. Further to this, Shaw, Delone and Niederman (2002) elaborately identify the critical elements among user support to include: participating in design planning, software upgrades, IS staff response time, improved personal

productivity, user training, documentation, development support, hardware standards, hardware upgrades, system downtime, system response time and cost-effectiveness.

Other relevant contributions on technical user support include those earlier studies by Vijayaraman and Ramakrishna (1990) and Mirani and King, (1994), lately both Ang et al. (2001) and Hussein et al. (2007) made similar revelations in Malaysia. Hussein et al. (2007) empirically proved that technical user support is significantly correlated with IS success such as systems quality, information quality, perceived usefulness and user satisfaction. Ang et al. (2001) demonstrated positive contribution of technical user support on IS utilization, while Mirani and King, (1994) and Vijayaraman and Ramakrishna (1990) recognized the importance of technical user support in ensuring personal computer utilization.

Studies reveal that technical user support has been so pertinent in integration of IS/IT in the education. For example Jones (2004) cited in Buabeng-Andoh's (2012) review of literature on factors influencing teachers' adoption and integration of information and communication technology into teaching assert that the frequent breakdown of a computers and lack of technical assistance would impinge on teacher use of computers. Thus teachers would be discouraged from using computers because of fear of equipment failure since no one would give them technical support in case there is technical problem.

BECTA (2004) agreed that "if there is a lack of technical support available in a school, then it is likely that technical maintenance will not be carried out regularly, resulting in a higher risk of technical breakdowns". In Ireland, the National Council for

Technology in Education, (NCTE) 2005 census on ICT infrastructure (as cited in ICT strategy group report, 2008-2013) found that about 85.3% of schools reported technical support and maintenance as a 'high' or 'very high' priority and claimed that it should be an important element of the school ICT environment with proper technical support being made available to maintain hardware and infrastructure. Similarly, Yilmaz, (2011) in assessing the technology integration processes in the Turkish education system reported that in providing schools with hardware and internet connections, it is also crucial to provide the schools with technical support with regard to repair and maintenance for the continued use of ICT in schools.

Therefore, if there is no technical support for teachers, they become frustrated resulting in their unwillingness to use ICT (Tong & Trinidad, 2005). Even though, lack of technical support discourages teachers from adopting and integrating technology in classrooms, a study by Korte and Husing (2007) revealed that schools in Britain and the Netherlands have appreciated the significance of technical support to help teachers to integrate technology into their teaching.

It is worth noting that, this study was carried out in the background of paucity of MIS studies in Africa, otherwise Kenya. For example, Gaible's (2008) work was a summary report based on 16 Country Surveys: Anguilla, Antigua and Barbuda, Aruba, Barbados, British Virgin Islands, Cayman Islands, Dominica, Grenada, Jamaica, Montserrat, St. Kitts and Nevis, St Lucia, St. Vincent and the Grenadines, Trinidad and Tobago, Turks and Caicos Islands, and U.S. Virgin Islands in the Caribbean. While Bento and Bento (2006) study used stepwise regression to analyze data from a sample of 1,990 respondents in small, medium and large organizations, operating at regional,

national, international and global levels across a broad range of the Dow Jones Global Industry Groups, in the US. Kelegai and Middleton (2004) study was based in Papua New Guinea which adopted exploratory qualitative fieldwork; they used questionnaires mailed to 50 organisations sampled purposively due to their experience with IS. The other studies notably by Mirani and King, (1994) and Vijayaraman and Ramakrishna (1990), Hussein et al. (2007a), Ang et al. (2001) and Saunders and Jones (1992) were done in Asia.

Therefore, this study was done to find out whether technological factors abovementioned impact EMIS outcomes in Nyanza region as a maiden attempt to fill the gaps in Kenyan context. To make the study more robust, both quantitative and qualitative methods were adopted so that the inherent weaknesses of each method were made up for by mutually enhancing each other (Blease & Bryman, 1986). Indeed, in this way, this study distinctively departed from Gaible's (2008) summary of Caribbean Countries' Surveys, Bento and Bento (2006) stepwise regression studies, Kelegai and Middleton (2004) exploratory qualitative fieldwork.

The literature review on impact of technological factors on EMIS outcomes by Hussein et al.(2007a), Bento and Bento (2006), Ang, et al.(2001), Saunders and Jones (1992), Chung, et al. (2003), Korte and Husing (2007), Yilmaz, (2011) Gaible (2008), Jones (2004), Masrek, et al. (2009) as well Kelegai and Middleton (2004) revealed that technological factors like availability and functionality the IS/IT infrastructure, IS/IT competencies and technical user support had impact on information systems' outcomes in countries like Britain , Netherlands, Turkey, Papua New Guinea, Malaysian, US and the Caribbean countries including Anguilla, Antigua

and Barbuda, Aruba, Barbados, British Virgin Islands, Cayman Islands, Dominica, Grenada, Jamaica, Montserrat, St. Kitts and Nevis, St Lucia, St. Vincent and the Grenadines, Trinidad and Tobago, Turks and Caicos Islands, and U.S. Virgin Islands. Nyanza region of Kenya was not covered by this literature, the knowledge gap this study attempted to fill.

2.4 Impact of Organizational Factors on Education Management Information Systems

Organizational factors have also been found to have had impact on Information Systems. Saunders and Jones' (1992) study revealed that organizational factors like mission, goals of the organization, IS executive hierarchical placement, management style, culture and IS budget size had impact on the information system's outcomes. Ang, Davies and Finlay (2001) on their part, identified organizational factors that impact on the outcome of IS to be organizational structure, managerial IT knowledge, availability of financial resources and goal alignment. On the same note Lawrence (2010) conceptualizes organisational factors that impact IS as organisational resources. More importantly, all the three studies were in agreement that top management support and organisational size are fundamental predictors of the outcome of Information System in an organization (Saunders & Jones, 1992; Ang, Davies & Finlay, 2001; Lawrence, 2010).

Incidentally, Lawrence (2010) study methodology set it apart from the other studies. While Saunders and Jones' (1992) and Ang et al. (2001) employed correlation and descriptive survey designs, Lawrence (2010) employed qualitative case study design to study the factors that impact Small to Medium-sized Enterprises (SMEs) decision to

adopt and use Internet in business. He selected his sample randomly from the seven SMEs guided by the theoretical sampling principle of grounded theory. Grounded theory was used to analyse the case study data to generate a descriptive and exploratory theory of the adoption of the Internet rooted in the experiences of the SMEs. In the contrary, case studies limit making causal conclusion, because it ignores alternative explanations which cannot be ruled out. Case studies are always unclear about the generality of the findings since it involves the behaviour of one entity which may not reflect the behaviour of most groups (Bell, 2011).

This study differed from Lawrence (2010) study in that it employed both correlation and descriptive survey research designs. Correlations do not necessarily represent a causal relationship; therefore it was necessary to couple it with descriptive survey. The primary advantage of descriptive survey is that great amount of data could be gathered in a short period of time (Ary, Jacob & Razavieh, 1996).

Young and Jordan (2008) maintain that top management support is the most critical factor to systems implementation success. Ragu-Nathan, Apigian, Ragu-Nathan and Tu (2004) cited in Sepahvand and Arefnezhad (2013) conceptualized top management support as involvement and participation of the executive or top-level management of the organization in IT/IS activities. The role and impact of top management support has been vastly researched in diverse IT/IS implementation setting. For example, top management support has been investigated in studies which linked it to its impact on IT/IS use (Brown and Bostrom, 1994; Ang, et al. 2001; Mohd-Yusof, 1999), IS success (King & Teo, 1996), the implementation of internet in Malawi (King, 2001), public management information systems (Ang et al. 2001 & Hussein et al. 2004) and

enterprise resource planning (Ramayah & Eri, 2005). All these studies have consistently found that top management support is influential in ensuring the success of IS/IT. King and Teo (1996) therefore concluded that top management support facilitated the successful deployment of strategic IS applications, while lack of top management support inhibited the strategic use of IT/IS.

Other studies that were done in the USA by Glynn, Fitzgerald and Exton (2005) and Australia by Al-Qirim and Corbitt (2001) similarly recognized the importance of top management support in open source software. According to Masrek, Jamaludin, and Hashim (2009), high degree of managerial support for IS /IT implementation demonstrates commitment and develops conducive implementation environment by providing necessary resources such as time, space, equipment and people. They add that when vision are shared within the organization and continually communicated and supported by senior management, it leads to clear common objectives toward technological advances.

Other more recent studies, found that top management support is equally effective in both high and low task interdependence groups (Hwang & Schmidt, 2011). Hussein et al. (2007) conducted a study on organizational factors that impact information systems success in e-government agencies in Malaysia and found that the involvement and participation of the top-level management of the organization in IT/IS activities was responsive to the successful outcomes of IS. King and Teo (1996) argue that since the top management authorizes, funds and implements an IS, they would be eager to reap positive results to ascertain whether their decisions were correct and fruitful. While in the education sector, school technology leadership is a stronger predictor of teachers'

use of computer technology in teaching (Anderson & Dexter, 2005), because a leader who implements technology plans and shares a common vision with the personnel stimulate them to use technology in their work(Yee, 2000)

However, not all empirical evidence supports the critical role of top management support (Dong, Neufeld, & Higgins, 2009). Sharma and Yetton (2011) asserts that effect of top management support on IS could be situational and not universal as reported by Young and Jordan (2008) and Hwang and Schmidt (2011). Sharma and Yetton (2011) explain the inconsistency by asserting that top management support is critical when task interdependence is high, but "a relatively weak and probably not critical component when task interdependence is low". While, the opposing view of Hwang and Schmidt (2011) is that variance in research findings on top management support is, for the most part, artifactual rather than a function of task interdependence. Therefore this study sought to find out the impact of the involvement of the DEOs on the outcome of EMIS given that they are the top managers at the District level, where data collection and capture is done. According to the Republic of Kenya, (2010b) the MOE avails funds annually to the DEOs to facilitate EMIS activities, it was important for this study to find out whether the DEOs had been able to direct the funds for better outcome of EMIS.

King and Teo (1996) assessed the impact of integrating business planning and IS planning from medium to large US corporations. Their study used a random sample of 600 firms while questionnaires were used to collect data from the CEOs and the Senior Information Systems Executives. The reliability of the scales was assessed using Cronbach Alpha. Both descriptive (means and standard deviations) and inferential

statistics (one way ANOVA test, one-way Kruskal-Wallis and Mann-Whitney tests) were used to analyse the data. Similarly, this study also applied Cronbach's Alpha to assess reliability of the rating scale questions and questionnaires were used to collect data. However, this study differ from King and Teo (1996) Hussein et al.'s (2007) study in that it were limited to the education sector. What is deficient in these studies is that they did not investigate the impact of organizational location on outcomes of IS, a gap that this present study tried to fulfil.

Ang et al. (2001b), investigated the impact of organizational factors together with other factors on IS usage in the Malaysian public sector and found that goal alignment as the second strongest predictor of IS usage. They succinctly defined goal alignment as linking of business goals and corporate IS goals together. Harvey (2010) notes that goal alignment is the continuous process of mobilizing enterprise resources to execute company objectives, and when all the structures, processes and support of the organization's mission, values, vision, strategy, goals, roles and responsibilities, then that goal alignment is accomplished. According to Saunders and Jones (1992) to promote the achievement of organizational goals the IS plans must be tied to the overall organizational plans. Therefore studies by Hussein et al. (2007) and Hua and Herstein (2003) considered goal alignment to be important in determining the outcome of IS.

In the Malaysian private sector context, Ahlan (2005) in his study of the Malaysian banking industry found that inadequate strategy alignment may lead to highly problematic IT implementations. He observed that some of the strategy alignment inadequacies include lack of organization wide strategy, lack of authority in strategy

formulations, top management not well exposed to viable technology in formulating long term IT goals, and unclear strategic direction to steer technology deployment. However, World Bank (2010) observes that management information systems in the education sector are often designed by technical people, ignorant of prevailing educational policies and with insufficient input from education specialists. It was therefore crucial to find out the whether EMIS programs are in tandem with the goals of the District Education Offices and to what extent the existing circumstances pertaining to goal alignment, impacts on EMIS in Nyanza Counties.

In this study, it is hypothesized that if the DEOs have shared vision in maintaining reliable educational data and information in their offices, then they are likely to embrace and domesticate EMIS due to its utility value; and the DEOs would not view EMIS as MOE affair imposed on them. According to Hua and Herstein (2003) a shared vision for EMIS leads to all stakeholders, from data entry staff to policy-makers, feeling a sense of ownership not just in EMIS but in its outcome as well. It empowers individuals and units to do more than merely comply with directives and do whatever is in their power to guarantee the success of EMIS. Since goal alignment is a factor of top management support, it was not studied exclusively, but was implied within the top management variable in this study.

Another aspect of organizational factor that has been found to impact on IS is the decision making structures. Hage and Aiken (1969) as cited by Sepahvand and Arefnezhad(2013) defines decision-making structure as type of control or delegation of decision-making authority throughout the organization and the extent of participation by organizational members in decision-making pertaining to IT/IS. Ang et al. (2001)

found strong relationship between decision making structures and IS success. So far there are two systems of decision making structures; decentralized and centralized systems. In a centralized structure the decision making authority lie with higher level of an organization hierarchy while in a decentralized structure, the decision making power is distributed and the departments and divisions have varying degrees of autonomy (Chang, 2006). As such, an earlier study by Grover (1993) found decentralized decision-making, as one of the strongest facilitators of IS and IT use in large and complex organization. Similarly, Trucano (2006) in Nigeria points out that that development of standardised software augured well for state-level EMIS to provide comprehensive information in support of decentralised management. These findings on decision making structures are incongruent with Hussein, et al. (2007) who found a positive relationship between a centralized decision making systems with successful outcomes of an IS in the public sector environment which has traditionally adopted centralized IS structure.

O'Reilly and Pfeffer (2000) opine that while highly centralized companies tend to have more bureaucratic traits, on the other hand highly decentralized companies may tend to appear more out of control. Consequently, Gaible (2008) observed that centralized structure have met opposition by some governments as they complain that EMIS are imposed by donors more as control mechanisms than as tools for effective planning. Gaible (2008) observed further that local governmental authorities may have similar complaints about their participation in EMIS managed by a central governmental authority, especially where there is no history of sharing information and receiving anything useful in return.

From these studies there is no conclusive evidence as to which of decision making structure has effect on IS outcome; with centralized having high impact in some studies and decentralized systems better in others (Grover, 1993; Trucano, 2006). Therefore in view of these inconsistencies, this study investigated whether centralized or decentralized decision making structures had impact on the EMIS outcome in Nyanza Counties. It is worth noting that the EMIS Kenya data collection and capture is decentralized at the district level where the DEOs are the major decision makers, while data aggregation, analysis, reporting and dissemination are centralized at the MOE head quarters (Republic of Kenya, 2008).

Hussein et al. (2007) identified management style as the other aspect of organizational factor that impact on the outcome of IS. According to Hussein et al. (2007) management style deals with the way in which the managers tend to impact, coordinate, and direct people's activities towards group's objectives. Different types of management styles are exemplified by whether or not they impose decisions on subordinates, degree of communication, amount of team work, system of rewards, degree of consultation with and trust on subordinates. Lu and Wang (1997) studies have categorized management into people-oriented and task oriented styles. People-oriented managers emphasize inter-personal relationship and are concerned with mutual trust, friendship, respect and warmth. On the other hand, task-oriented managers tend to focus more on task aspect of jobs and deals with defining and organizing tasks for goal attainment.

Bento and Bento (2006) thus found that 'Usefulness of IS' is positively related to collaborative management Styles. While Hussein et al. (2007) found management style

to be highly correlated to IS like system reliability and usability, information relevance and timeliness as well as user satisfaction. On the other hand Sepahvand and Arefnezhad (2013) cite Lu & Wang (1997) for having realized mixed results in their study of the relationship between management styles with user participation and systems success over MIS growth stages. They found, both people-oriented and task-oriented styles had a positive significant relationship with system success while both styles had no effect on system success at the initiation stage. They argued that at the initiation stage, computers are being introduced to the organization and users must learn the new technology on their own. This, in turn ended up creating dissatisfaction among the users.

In Bento and Bento's (2006) study, they considered decision-making structures such as command and control verses collaborative which they found to be related to three critical outcomes of IS; information quality, effectiveness, and usefulness. Hua and Herstein (2003) argue that collaborative management style is crucial for EMIS success since different experts have specific roles to play. For example, the central coordinating body, made up of representatives from stakeholder provides EMIS policy guidance while an oversight committee made up of data providers, information managers, researchers and policy makers identify data and information needs. This study found out whether there had been any collaboration with other stakeholders and how that collaboration had impacted on EMIS in Nyanza Counties. In this study a variables management style and decision making structure were conjoined and treated as one variable with multidimensional construct: Delegation of decision-making authority throughout the DEOs offices and the extent to which of EMIS personnel participate in decision-making and degrees of autonomy pertaining to IT/I; the way in

which the DEOs impacted, coordinated, and direct personnel activities towards actualizing EMIS objectives; and whether or not DEOs imposed decisions on personnel, degree of communication, amount of team work, system of rewards, degree of consultation with and trust on EMIS personnel.

Managerial IT knowledge is yet another fundamental organizational factor that Hussein et al. (2007b) found to be positively related to IS success dimensions. Ang et al. (2001b) confirms further that senior management experience, background and knowledge on IT, awareness and recognition of IS activities and potentials, as well as their ability to plan strategically has an impact on successful IS outcomes. These reviews evidently imply that managers who clearly recognized IS/IT potentials in enhancing productivity have the tendency to promote IS success in their organization. According to Gaible (2008), there has been slow adoption of ICT policies in education sector, therefore such delays caused unnecessary barriers to increasing the effective use of IS for management. This phenomenon is compounded by policymakers' lack of understanding of ICT issues. For example in St. Lucia, Gaible (2008) noted that an ICT-in-education policy was drafted based on the 2002 OERU template, yet the completed policy had not been adopted as of mid-2007. This study therefore sought to find out whether the levels of IT knowledge, experience and background of the DEOs have some correlation with the outcome of EMIS like timeliness in Nyanza Counties.

Kelegai and Middleton (2004) study involved exploratory qualitative fieldwork using quantitative instruments such as questionnaires to deepen the qualitative data and strengthen theory. They also employed a questionnaire survey and purposive sampling method to select 10 organizations on the basis of prior contacts and listings in the PNG

Telephone directory. Interviews were conducted on site and used NVivo, a qualitative analysis package, to analyse their data.

Some studies including Wixom and Watson (2001), Sepahvand and Arefnezhad (2013) as well as Masrek, Jamaludin, and Hashim, (2009) observed significant relationship between resources and IS implementation. According to Sepahvand and Arefnezhad (2013) resources may include money, people and time that are required to successfully complete a project. Masrek, Jamaludin, and Hashim, (2009) observes that availability resources aid in the implementation of an innovation in three ways; contributes to technical and organizational preparedness through previous expenditures, acquire resources that aid in implementation, such as securing the services of managerial or technical talent from a consulting firm and pursue more risk due to the cushion of assets that will lessen the blow of a failure should it occur. Wixom and Watson (2001) observed that having sufficient funds, appropriate people and enough time have positive effects on project's outcome because it leads to a better organizational commitment and also overcome organizational obstacles. Similarly, Hussein, et al. (2007) found resource allocation to be related specifically to MIS outcomes including; system quality, information quality, perceived usefulness and user satisfaction. For example the Malaysian government had allocated a huge amount of fund in the national ICT projects and most of the succeeded (Hussein, et al. 2007).

Gaible's (2008) experience in Jamaica and Trucano's (2006C) study in Nigeria reveal that early EMIS work in those countries was incomplete and not sustained due to lack of resources. According to Hua and Herstein (2003) EMIS activities are frequently funded initially through one-off disbursements by donor organizations with little hope

of funds for sustainability. Gaible (2008) study realized that the high costs associated with acquisition, operation and maintenance of ICT infrastructure was a significant barrier to the increased effectiveness of EMIS programs. In addition, procurement-related issues arising from differing accounting timelines and priorities by donors and to inter -ministry coordination have led to delays, renegotiation of timetables and extension of EMIS project (Gaible, 2008; Hua & Herstein (2003).

Whether relationships between resource allocation and EMIS that prevailed in Malaysian, Jamaica and Nigeria governments also apply in the context of Kenya remain one of the questions that justified this study. The resource allocation for EMIS data collection at the District Education Offices in Kenya are also budgeted for by the government and it was essential to find out how the allocation and usage of these funds impact on the outcome of EMIS. It was also necessary to examine whether procurement and budget related issues have impact on the outcome of EMIS in Nyanza Counties education offices since the DEOs are normally provided with funds from the by the MOE with a vote head specific to EMIS data collection.

Though the high impact of organizational factors is generally recognized, their effect has been characterized as situational and their effect may be moderated by other variables (Hwang, Lin & Lin, (2012). These reviews on the impact of organizational factors on outcomes of EMIS tend to suggest that leadership is paramount in determining the outcome of EMIS. To date there is no pragmatic study that focuses on the management style of DEOs, yet they play key role in the educational management in Kenya. Besides these divergent findings on the relationship between decision

making systems and effectiveness in implementation of government policies is inconclusive.

The literature review on impact of organizational factors on EMIS outcomes by Ang, et al. (2001a), Lawrence (2010), Young and Jordan (2008), Hussein et al. (2007b), King and Teo (1996), Gaible (2008), Sepahvand and Arefnezhad (2013), Masrek, et al. (2009), Wixom and Watson (2001), Trucano (2006) Glynn, et al. (2005), Al-Qirim and Corbitt (2001), Hwang and Schmidt, (2011) Dong, et al. (2009), Sharma and Yetton (2011), Ahlan (2005) as well as Hua and Herstein (2003) revealed that organizational factors like decision making structures and management style, managerial EMIS knowledge, top management support, resources allocation in Malawi, Jamaica and Nigeria, Malaysian St. Lucia, USA and Australia. Nyanza region of Kenya was not covered by this literature; neither did these studies investigate motivational mechanism as an organizational factor, the knowledge gap this study attempted to fill. It was of the essence to look at whether the leadership offered by the DEOs is supportive to the realization of positive outcomes of EMIS in Nyanza Counties.

All these studies ignited interest in the Kenyan context given a paucity of research in the area IS in educational management. By focusing in Nyanza Region within Kenyan education sector, this study offered a more current supplementary research to validate the observations made by DeLone and McLean (2003) and Hua and Herstein (2003) in an African context, in a different sector and economic environment.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter gives a description of the procedures which were used in conducting the study. It focuses on research design, the area of study, the study population, sample and sampling techniques, instruments for data collection, validity and reliability of the instruments, procedures for data collection and the methods of data analysis.

3.2 Research Design

This study adopted both descriptive survey and correlational designs. Descriptive survey was used to explore opinions, attitudes and knowledge about factors that impact on EMIS. The descriptive survey was preferred because; it enabled for adaptation of a holistic approach in the study, it was easy to use with research tools like questionnaires and interview schedules and it allowed for the collection of data from a large number of respondents in a relatively short period (Cohen, Manion, & Morrison, 2000).

To complement descriptive survey, correlation design was used due to its appropriateness to enable the analysis of strength and direction of the relationship among a large number of variables in a single study (Borg & Gall, 2007; Kerr, Hall and Kozub (2002). On the same note, analysis of how these variables either singly or in combination affect the EMIS outcomes was possible (Creswell, 2005). For example, establishing the impact of personnel, technological and organizational factors on EMIS outcomes was possible through correlation design. It enabled the researcher to find out whether the personnel factors like age, gender or academic qualification yield a statistically significant predictive power for EMIS out comes like timeliness,

relevance, completeness, reliability, consistency, information accessibility, and user satisfaction.

3.3 Area of Study

Counties of Nyanza Region are located between latitudes 0^{o} 15'N and 1^{o} 45'S, longitudes 35^{o} 15'E and 34^{o}E. It is bordered by Western Region to the North, Rift Valley Region to the East and the Republic of Tanzania and Uganda to the South and west respectively. It is located in the South West part of Kenya around Lake Victoria (Appendix VII). The capital of Nyanza Region is Kisumu, the third largest city in Kenya. The town grew up as the terminal of the Uganda Railway from 1901, to become the leading port on Lake Victoria, Africa's largest fresh water lake (Republic of Kenya, 2000).

Nyanza Region is the 5^{th} largest Region in Kenya, constituting Homa Bay, Kisii, Kisumu, Migori, Nyamira and Siaya counties. The Counties are divided into 34 administrative districts at the time of study (Appendix VI). The total area of the Counties is about 15,788.3 Km^2; its total population is estimated at 4,398,395, comprising 2,291,069 females and 2,107,326 males.

The Nyanza region is endowed with the rich soils of Kisii Highlands, ample rainfall which support agriculture and livestock production. The Kano plains and the adjacent zones are suitable for cotton and irrigated rice. Food crops include maize, sorghum, beans, groundnuts, cassava and sweet potatoes. Among the cash crops grown are; tea, coffee, cotton, rice, tobacco, sugar cane and bananas. Fish remains one of the main sources of animal protein and a huge income earner in the Region. There is a great potential for tourist attractions in this region. Historical sites, Kisumu Museum, Ruma

National Park, Kit Mikayi rock, recreational Sailing, resorts on Takawiri Islands are some of these attractions (Republic of Kenya, 2000).

Nyanza Region's headquarters Kisumu City stands among the eleven (11) cities in eight (8) African countries under the Millennium Cities Initiative (MCI) having been voted by UN-HABITAT as ideal location to launch the MCI. The main aim of MCI was to try and achieve the Millennium Development Goals (MDGs) focusing on poverty eradication, health, education, gender equality, environmental protection and global partnerships. Global partnership for development is hinged upon exchange of new (information and communication) technology (Republic of Kenya, 2008b). According to Republic of Kenya (2006a), Kenya can leapfrog into economic security in this globalized world by embracing ICT, since ICT is the engine of economic growth and development in the modern age. EMIS being one of the categories of ICT in the education sector just as E-Government, Republic of Kenya (2006b) asserts that its success will bolster economic growth that is targeted by MCI.

Given that Nyanza Region was found to be lagging behind in EMIS data capture completion rate as compared to other seven regions of Kenya (Republic of Kenya, 2010c), it was therefore necessary to conduct a study on the impact of selected factors on EMIS in counties of Nyanza Region.

3.4 Study Population

Population refers to the complete set of observations about which we would like to draw conclusions (Lodico, Spaulding, & Voegtle, 2006), and according to Cohen, Manion and Morrison (2000), population does not necessarily refer to people but rather to some observed characteristics determined by the specific interests of the investigator. The total population of this study comprised of all those who have a direct relationship with EMIS. According to the EMIS Kenya Technical survey done in March, 2010 there were 34 districts with functional EMIS programmes at the District Education Offices in Nyanza Counties (Appendix VI) (Republic of Kenya, 2010c).

There were four categories of respondents in this study, who had direct relationship with EMIS, thus were deemed appropriate for the following reasons;

a) 34 EMIS coordinators in the respective districts who were involved in management of EMIS data collection process and data capture (N=34).
b) 34 District Education Officers (DEO) who oversaw the management of EMIS data collection and capture process. They were the top managers who provided and received funds from MOE for EMIS project and they helped in identification of EMIS personnel.
c) 68 Data capture personnel or data clerks who did the data entry into the computers.
d) The Regional EMIS coordinator who lead the technical support team. He provided the technical support and linked the District with the National office.

3.5 Sample and Sampling Techniques

A sample is a part of the population to represent the larger group from which they were selected (Ary, Jacobs, & Razavieh 1996). The sample size was estimated by adapting the procedure proposed by Krejcie and Morgan (1970) cited in Cohen et al. (2000). Krejcie and Morgan developed a table for sample sizes (n) for populations (N) with finite sizes (Appendix X) based on the following formula;

$$\mathbf{S} = \frac{\mathbf{X^2 NP(1-P)}}{\mathbf{d^2(N-1) + X^2(1-P)}}$$

S = required sample size

$\mathbf{X^2}$ **=** the table value of chi-square for one degree of freedom at the desired confidence level

N = the population size

P = the population proportion (assumed to be .50) since this would provide the maximum sample size)

d = the degree of accuracy expressed as a proportion (.05)

This formula was used in determining the sample sizes of the respondents. According to the Krejcie and Morgan, and for purposes of this study, the population size was N = 34 and thus by interpolation a sample size goal of n = 29 for the districts, thus EMIS coordinators and DEOs. While for the Data Capture Personnel N=68 the sample size was n =58. Therefore, simple random sampling technique was used to select 29(85.3%) DEOs and 29(85.3%) EMIS coordinators. On the other hand, purposive sampling, a non-probability sampling technique, was used to select 58 data capture personnel and the regional EMIS coordinator. Non-probability sampling techniques are less complicated to set. Mugenda and Mugenda (2003) state that purposive

sampling is where the researcher uses his/her judgment to select population members who are good prospects for accurate information. The advantages of purposive sampling is that it takes less time and effort. In this case the data capture personnel were purposively sampled based on the two (2) most active participants in each sub county as identified by the 29 EMS coordinators totalling 58. While the Regional EMIS coordinator was purposively selected because his mandate was to oversee the EMIS in Nyanza region, linked the Districts with the National office and provided the technical support.

Table 3.1 presents a summary of the study sample.

Table 3.1 Sample Frame

Respondents	**Target population (N)**	**Sample Size**	
		f	**%**
DEOs	34	29	85.3
EMIS Coordinators	34	29	85.3
Data Capture Personnel	68	58	85.3
Regional EMIS Coordinator	1	1	100.0

3.6 Instruments for Data Collection

Creswell (2005) aver that the research instruments provide the input into a study and therefore the quality and validity of the findings are solely dependent on it. The instruments that were used to collect data were questionnaires and interview schedules. The description and justification of their application in the study are given as follows:

3.6.1 Questionnaires

Questionnaires were used to collect information from 29 District EMIS coordinators and 58 data capture personnel. Borg and Gall (2007) defines questionnaires as set of questions or statements presented to a respondent for answers. According to Creswell (2005) and Kerr, Hall, and Kozub (2002) questionnaires sufficed for this study for a number of reasons; first they provide a high degree of standardization and adoption of generalized information amongst population; secondly large amounts of information could be collected from a large number of people in a short period of time and in a relatively cost effective way; thirdly it could be used with limited effect to its validity and reliability; lastly the results of the questionnaires could be quickly and easily quantified through the use of a software package like SPSS and they could be analysed more 'scientifically' and objectively than other forms of research tools.

Kombo and Trump (2006), Kothari (2003) and Mugenda and Mugenda (2003) describe three basic types of questionnaires: Closed–ended, Open-ended and combination of both. Closed–ended questionnaires include all possible answers/prewritten response categories, and respondents are asked to choose among them e.g. multiple choice questions and rating scale questions. These types of questions are used to generate statistics in quantitative research, and most responses can be entered easily into a computer for ease of analysis. On the other hand, Open-ended questions allow respondents to answer in their own words by writing in an answer on blank section for the response. As there are no standard answers to these questions, data analysis is more complex. A questionnaire with combination of both closed-ended and open-ended questions, begins with a series of closed –ended questions, with boxes to tick or scales to rank, and then finish with a section of open-ended questions or more detailed response.

As for this study, through extensive literature review and based on three research objectives a combination of both closed-ended and open-ended was used to develop two questionnaires; the District EMIS Coordinator Questionnaire (DECQ) and Data Capture Personnel Questionnaire (DCPQ). They suited the research best to generate statistics in correlation quantitative research which were then entered into a computer for ease of analysis in correlation study at the same time to allowed respondents to answer in their own words in descriptive survey study.

3.6.1.1 District EMIS Coordinator Questionnaire (DECQ)

The District EMIS Coordinator Questionnaire (DECQ) was used to gather data from District EMIS Coordinators. It was divided into five sections; A, B, C, D and E (Appendix I). Section "A" of the research questionnaire elicited information on EMIS Coordinators' background like: gender, age, job design, education level, and length of service. The information on the background of personnel was important as the literature review reveal that IS success, have been found to be strongly correlated with the demographic factors like age, gender, educational level, job level, departmental level, length of service (Havelka, 2002; Havelka, Conrad & Glassberg, 2002).

Section B of DCPQ contained descriptive statements in a rating scale used to elicit responses of EMIS personnel on the impact of personnel factors like Gender, Age, Education level, Experience, Job design on EMIS outcomes. The responses were placed on a 5-point rating scale of Very low impact (VL), low impact (L), moderate impact (M), high impact (H) and very high impact (VH) and were rated 1, 2, 3, 4 and 5 respectively.

Section C contained descriptive statements designed to elicit responses on the impact of technological factors on EMIS outcomes. Technological factors, especially, number of working computers devoted to EMIS, Internet access in the office and availability of Local Area Network were examined. Similarly they were to respond on whether availability IT infrastructure, functionality IT infrastructure, Maintenance and User support and competency of staff had any impact on EMIS outcomes. These responses were placed on a 5-point rating scale of Very low impact (VL), low impact (L), moderate impact (M), high impact (H) and very high impact (VH) and were rated 1, 2, 3, 4 and 5 respectively.

Section D was based on organizational factors. Semi structured and categorical questions on the location of DEO's office, duration since the DEO's office started, number of Staff in office and whether there were other systems for collecting data in the district. Similarly there were responses placed on a 5-point rating scale of Very Low Impact (VL), Low Impact (L), Moderate Impact (M), High Impact (H) and Very High Impact (VH) and were rated 1, 2, 3, 4 and 5 respectively aimed at finding out whether organizational factors like management support, Decision making structures and management style, managerial EMIS/ IT knowledge, resources allocation and motivation mechanisms had impact on EMIS outcomes.

Section E consisted of questions on EMIS outcome variables. Six items namely; timeliness, relevance, completeness, reliability, accessibility of information and satisfaction of personnel on the questionnaire were the measures of EMIS outcomes. The respondents were to rate the EMIS outcomes in the following rating scale: Very Poor (VP) =1, poor (P) = 2, Fair (F) = 3, Good (G) = 4 or Very Good (VG) = 5.

3.6.1.2 Data Capture Personnel Questionnaire (DCPQ)

The Data Capture Personnel Questionnaire (DCPQ) was used to gather data from Data Capture Personnel. The Data Capture Personnel Questionnaire (DCPQ) also consisted of sections A, B, C, D and E (Appendix II). Section A was used to identify characteristics of data capture personnel like, gender, age, job design, and employer and education level. Section B of DCPQ contained descriptive statements in a rating scale used to elicit responses of data capture personnel on the impact of personnel factors; gender, age, education level, experience, job design on EMIS outcomes. Section C had statements designed to elicit responses on the impact of technological factors like availability IT infrastructure, functionality IT infrastructure, maintenance and user support and competency of staff on EMIS outcomes. Section D was aimed at finding out whether organizational factors like management support, decision making structures and management style, managerial EMIS/ IT knowledge, resources allocation and motivation mechanisms had impact on EMIS outcomes. The responses in sections B, C, D were placed on a 5-point rating scale of Very Low Impact (VL), Low Impact (L), Moderate Impact (M), High Impact (H) and Very High Impact (VH) and were rated 1, 2, 3, 4 and 5 respectively.

In Section E of Data Capture Personnel Questionnaire (DCPQ), six items namely; timeliness, relevance, completeness, reliability, accessibility of information and satisfaction of personnel on the questionnaire were used to gauge the EMIS outcomes. The respondents were to rate the EMIS outcomes in the following rating scale: Very Poor (VP) =1, Poor (P) = 2, Fair (F) = 3, Good (G) = 4, Or Very Good (VG) = 5.

3.6.2 Interview Schedule

Creswell (2005) defines interview schedule as an oral asking of questions by the interviewer and oral responses by the participant or a selected group. The aim of the interview is to collect data through verbal communication or through interpersonal communication between individuals or a group. Interview Schedule was used to gather in-depth information to counter check the information obtained through questionnaires (Mugenda and Mugenda, 2003). There were a number of advantages of interview schedule which were considered for its use. First, there would be secure relationship between the interviewee and the researcher and certain information could be gained from an interview that an individual may not be willing to put down on paper (Kombo & Trump, 2006; Kothari, 2003; Mugenda & Mugenda, 2003). Moreover, the information that the interviewee gave could be evaluated directly whether it was sincere or not, hence checking the trustworthiness of the response (Borg & Gall, 2007; Creswell, 2005).

Borg and Gall (2007) argue that there are three main types of interviews: the standardized or structured, semi-standardized and non-standardized. A standardized interview is one where the wording and the question structure is asked from one interviewee to another without changing the structure; a semi standardized is one where the interviewer asks all the interviewees the same major questions, uses the same list to guide him or her but asks questions freely as he wishes, sensibly and even joins the conversation to find out what they think about the topic. In a non-standardized interview the interviewer just has a list of topics he/she wants to discuss with the respondent, free to phrase the questions as he/she wants, asking questions in

any order that seems sensible for the topic at that time and even joins the conversation to talk about what is the respondents' perception about the topic.

In this study, the semi-structured interview questions were used because it had several advantages. First it could allow for a lot of information to be obtained beneath the surface level. Secondly, it was also easy to design and the respondents led the conversation. Probing was common to clarify unclear questions to the interviewee and also in depth information about the subject is accessible. It enabled respondents to talk freely and without much emotion, rendering authentic information, rich depth and honesty about their experience (Kombo & Tromp, 2006).

Therefore, two types of Interview Schedule were used in the study, namely. District Education Officers Interview Schedule (DEOIS) and Regional EMIS Coordinator Interview Schedule (PECIS). Their details were discussed as follows;

3.6.2.1 District Education Officers Interview Schedule (DEOIS)

The interview schedule consisted of ten guiding questions that allowed for spontaneous discussion. This enabled the researcher to pursue issues that arose with individual respondents. District Education Officers Interview Schedule (DEOIS) had questions on the allocation of resources for EMIS, involvement of DEOs office, the state of IT infrastructure; training of personnel on EMIS, whether availability of resources had impacted on EMIS programme in the District. (Appendix III).

3.6.2.2 Regional EMIS Coordinator Interview Schedule (RECIS)

Regional EMIS Coordinator Interview Schedule (RECIS) had questions on how the involvement of the Education office, the state of IT infrastructure, training of personnel on EMIS, availability of resources had impacted the EMIS outcomes in Nyanza Counties (Appendix IV).

3.7 Validity of the Instruments

The aim of research is to produce results that are valid and robust according to Kombo and Trump (2006). Mugenda and Mugenda (2003) explain that validity is the accuracy and meaningfulness of inferences, which are based on research results. While according to Borg and Gall (2007) validity is the degree to which a test measures what it purports to measure.

Both face and content validity were tested in the study. Face validity refers to whether the instruments can measure what it purports to measure (Ary et al. 1996). In order to gain a solid grasp of the objectives of the study and also of the nature of the data needed, a pilot study was carried out among; 3(8.3%) District EMIS coordinators, 7(10.2%) data capture personnel and 3(8.3%) DEOs which sufficed as Mugenda and Mugenda, (2003) assert that a pilot study should consist of between 1% to 10% of the population. It helped to identify items that could be misunderstood and needed to be revised or eliminated. They were also asked to comment on the length, structure and wording of the questionnaire. The inconsistencies, deficiencies and weaknesses noted in the responses from the pilot study were corrected in the questionnaires and interview schedule. The improvements which were made in the light of recommendations from the pilot study included: First, the DEOs interview schedule was too long of 14

questions and was reduced to 10 questions. Secondly, each variable of the factors in the questionnaires were reduced to one item each.

On the other hand, content validity refers to whether an instrument provides adequate coverage of objectives under study (Ary et al. 1996). The instruments were content validated by the supervisors and experts in the Department of Educational Management and Foundations of Maseno University. Validation points were to assess the structuring of the instrument, verification of the adequacy of those instruments and the weighting of responses expected from the respondents. Their suggestions and recommendations were used to improve on the instruments as follows.

a) The number of variables was reduced to enable comfortable management of data analysis.
b) Originally the questionnaires consisted of Likert scales ranging from strongly agree to strongly disagree with an undecided option in the middle. This was changed to a rating (Interval) scales which was continuous and precise measurement, ranging from very low impact to very high impact.

The point Likert scale was in a discontinuous (ordinal or ranking) scale that did not meet the threshold for conducting a parametric text ,otherwise the tests would be non parametric involving Spearman Rank correlation and Kolmogorov-Smirnov Test instead of Pearson r correlation and chi test respectively(Kerr, Hall, & Kozub, 2002).
Later, the questionnaires were refined and rephrased accordingly. The literature review on the studies on information systems also assisted to guide on content validity especially on measurement of EMIS outcomes.

3.8 Reliability of the Instruments

A test is reliable to the extent that whatever it measures, it measures it consistently. Reliability refers to the level of dependability of the items in the research instrument, and their consistency in tapping information from more than one respondent (Ary et al. 1996), which can be generalized from one time to another (Mugenda & Mugenda, 2003). To enhance reliability, two different types of instruments on four target groups were used to collect data: Questionnaires for Data Capture Personnel and EMIS Coordinators; and interview schedules for District Education Officers and Provincial EMIS Coordinator. This ensured that the inherent weaknesses of each tool were made up for by mutually enhancing each other. In addition the responses from four different groups provided a more complete reliable picture, which might be more satisfying (Blease & Bryman, 1986).

More importantly, reliability was ascertained through a pilot study. The pilot study was conducted and questionnaires were pre-tested in about 10% of the entire population. Specifically a pilot study was carried out among; 3(8.3%) District EMIS coordinators, 7(10.2%) data capture personnel and 3(8.3%) DEOs. Consequently, the Cronbach's alpha (α) coefficients which measures the internal consistencies of the questionnaires were assessed for both District EMIS Coordinators' Questionnaire (DECQ) and Data Capture Personnel Questionnaire (DCPQ) using the Statistical Package for Social Sciences Version 20 (SPSS). Cronbach's Alpha reliability tests had advantage in that it was not cumbersome and the same population is used (Ary et al. 1996). According to Garson (2007), a Cronbach's Alpha coefficient of zero represents a lack of reliability and inconsistent scores with errors, if all items are perfectly reliable, then coefficient alpha is equal to 1.0 and there is no error component while a statistic equal to or

greater than 0.7 is said to be good. Hinton, Brownlow, McMurvay and Cozens (2004) suggest four points of reliability, excellent (0.90 and above), high (0.70 - 0.90), high moderate (0.50 – 0.70), and low (0.50 and below).

District EMIS coordinators Questionnaire (DECQ) yielded alpha levels of 0.77 and 0.78 for the Data Capture Personnel Questionnaire (DCPQ). The Chronbach's coefficients alpha values indicates the instruments were reliable.

3.9 Data Collection Procedure

Before undertaking the actual study, a letter of introduction to conduct research within counties of Nyanza Region was sought and obtained from the Department of Educational Management and Foundations, Maseno University (Appendix VIII). At the Nyanza Education regional office, Regional EMIS coordinator was informed of the intended study and researcher made appointment with him for interviews in two and a half weeks.

The researcher then personally visited the sub county's education offices in the sample, two weeks before the intended date of undertaking the study. The purposes of this visit was for the familiarization, introduction and informing the District Education Officers of the purpose of the study. During this visit the, the researcher personally delivered the questionnaires to all the respective the 29 EMIS coordinators and requested each EMIS coordinators to identify two most active Data Capture Personnel to complete the Data Capture Personnel Questionnaire (DCPQ). The researcher established rapport with the 29 DEOS and made appointment with them for interviews while the EMIS

coordinators and Data Capture Personnel were given time to go through the questionnaires and complete them.

After two weeks the researcher visited the districts under study to collect the filled questionnaires and administer the interviews with the sampled 29 DEOs. The researcher conducted interview schedules with the DEOs on different dates for about 45 minutes each with the help of District Education Officers Interview Schedule (DEOIS). On completion of interviews with DEOs the researcher conducted interview schedules with the Regional EMIS Coordinator at the Nyanza Regional office in Kisumu City. During the interview sessions, probing questions were used to make sure interpretations of their statements were the intended descriptions of the phenomenon under study. Notes were taken during the interviews and direct quotations were used to help readers experience the participants' world (Ary et al.2006)

3.11 Ethical Considerations

The respondents were involved in the study after seeking permission from the DEOs and after assuring them that the purpose of the study was purely for academic purpose. They were assured of confidentiality of their responses. The respondents were advised not to indicate their names and stations of work on the questionnaire. The questionnaires were collected on mutually agreed dates and time. The researcher thanked the respondents for participating in the study. They were assured that they would be free to access the final report of the findings of the study.

3.10 Data Analysis

A multi-pronged approach commonly referred to as triangulation (Cohen et al. 2000), combining both quantitative and qualitative research methods, were adopted to analyse data. The quantitative data analysis relied upon the tools of both descriptive and correlational research designs. Descriptive statistics such as frequency, mean, standard deviation and percentage were extracted and presented in either tabular form or charts to explore the prevalence of personnel, technological and organizational variables and how these variables impacted EMIS outcomes in the sub counties of Nyanza Region through the rating scale. The items in the rating scale had options with weights as follows: Very High Impact = 5, High Impact = 4, Moderate Impact = 3, Low Impact =2 and Very Low Impact =1

The mean weight was calculated using the formula:

$$\frac{\mathbf{5}\boldsymbol{a} + \mathbf{4}\boldsymbol{b} + \mathbf{3}\boldsymbol{c} + \mathbf{2}\boldsymbol{d} + \boldsymbol{e}}{\boldsymbol{n}}$$

Where ***a, b, c, d*** and ***e*** are the frequencies of ratings **5, 4, 3, 2** and 1 respectively.

n – The total sample

The calculated mean weight for the independent variables (personnel, technological and organizational factors) were interpreted as having either Very Low Impact (1.0 - 1.9), Low Impact (2.0-2.9), Moderate Impact (3.0 – 3.9), High Impact (4.0-4.9), Very High Impact (5.0) on EMIS outcomes. Whereas, the mean weight for the dependent variables (EMIS outcomes) were interpreted as either being Very Poor (1.0 – 2.0) Poor (2.0-2.9), Fair(3.0 – 3.9), Good (4.0-4.9) or Very Good (5.0)

Correlation analyses were performed to test bivariate relationships among those variables in personnel, technological and organizational factors and EMIS outcome variables. Finally, multiple regression analysis was conducted to assess the impact of components of personnel, technological and organizational factors variables on the EMIS outcome. A statistical significance was set at $p < 0.05$ to assess whether the researcher's level of confidence in the sample also existed in the population.

Quantitative methods may have failed to get beneath the surface and also limit the range of possible responses. Therefore to avert the inherent weaknesses of quantitative analysis, it was supplemented with qualitative analysis to elicit more robust or holistic data thereby providing a rich vein of analysis of factors that impacted EMIS outcomes in the counties of Nyanza region. Specifically, the responses obtained from the semi-structured interviews were transcribed and organized according to the study objectives. Data from interview schedules were used to confirm and support data obtained from questionnaires (Kerr, Hall, & Kozub, 2002). Table 3.3 presents a summary of the data analysis methods used for each objective.

Table 3.3

Summary of analytical tools

Objectives	Independent Variables	Dependent variables	Statistical Tests
Determine the impact of personnel factors on EMIS outcomes in the counties of Nyanza Region.	**PERSONNEL FACTORS** Gender, Age, Education level, Experience and Job design .	**EMIS OUTCOMES** Timeliness, Relevance, Completeness Reliability, Accessibility of information and user Satisfaction	Frequency Percentages Mean Correlation Regression
Establish the impact of technological factors on EMIS outcomes in the counties of Nyanza Region.	**TECHNOLOGICAL FACTORS** Availability IT and Functionality IT infrastructure, Maintenance and User support and Competency of staff	**EMIS OUTCOMES** Timeliness, Relevance, Completeness Reliability, Accessibility of information and user Satisfaction	Frequency Percentages Mean Chi square test Correlation Regression
Determine the impact of organizational factors on EMIS outcomes in the counties of Nyanza Region.	**ORGANIZATIONAL FACTORS** Management support , Decision making structures and management style, Managerial EMIS/ IT knowledge, Resources allocation and Motivation mechanisms	**EMIS OUTCOMES** Timeliness, Relevance, Completeness Reliability, Accessibility of information and user Satisfaction	Frequency Percentages Mean Correlation Regression

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 Introduction

This chapter covers the presentation, analysis and discussion of results for the study. The purpose of this study was to establish the impact of selected factors on the outcomes of Education Management Information Systems in Nyanza Counties, Kenya.

The chapter was organized according to objectives that guided the study which were to:

(i) Determine the impact of personnel factors on EMIS outcomes in the counties of Nyanza Region.

(ii) Establish the impact of technological factors on EMIS outcomes in the counties of Nyanza Region.

(iii) Determine the impact of organizational factors on EMIS outcomes in the counties of Nyanza Region.

4.2 Impact of Personnel Factors on EMIS Outcomes

The first objective of the study was to determine the impact of personnel factors on EMIS outcomes in the counties of Nyanza Region. Meeting this objective entailed analysis of; demographics of EMIS personnel and their impact on EMIS outcomes as well as, the ratings of EMIS outcomes from Data Capture Personnel and EMIS coordinators, correlations and multiple regression analyses between and Personnel factors and EMIS outcomes in addition to interview responses from DEOs and Regional EMIS coordinator.

4.2.1 Analysis of the demographics of EMIS personnel and their impact on EMIS outcomes in counties of Nyanza Region.

These personnel factors were analysed in terms of gender, age, education level, and experience and job design. The independent variable, personnel factors was addressed in Sections B of the questionnaires (Appendices I and II) using five-point rating scale ranging from 1=very low impact to 5=very high impact. Both District EMIS coordinators and Data capture personnel indicated their ratings on the one item statements about the EMIS personnel factors. Responses on the ratings of the impact of personnel factors were as shown in Table 4.1.

Table 4.1

Ratings of the Impact of Personnel Factors by Data Capture Personnel (n =58) and EMIS Coordinators (n= 29)

Variable	Statement	Respondents		Ratings VL=1	L=2	M=3	H=4	VH=5	Mean($\overline{\overline{X}}$)	S.D
Education level	EMIS personnel with higher level education are more conversant with gathering and use of EMIS data	DCP	f	14	18	3	18	5	2.69	1.37
			%	(24.1)	(31.0)	(5.2)	(31.0)	(8.6)		
		EC	f	4	8	2	12	3	3.07	1.31
			%	(13.8)	(27.6)	(6.9)	(14.4)	(10.3)		
Age	The age of EMIS personnel affects EMIS data gathering processes	DCP	f	0	10	9	26	13	3.72	1.01
			%	(0.0)	(17.2)	(15.5)	(44.8)	(22.4)		
		EC	f	0	7	4	10	8	3.66	1.14
			%	(0.0)	(24.1)	(13.8)	(34.5)	(27.7)		
Gender	The gender of the EMIS coordinator determines the effectiveness of EMIS program	DCP	f	4	12	4	22	16	3.59	1.28
			%	(6.9)	(20.7)	(6.9)	(37.9)	(27.6)		
		EC	f	0	1	2	11	15	4.38	0.77
			%	(0.0)	(3.4)	(6.9)	(37.9)	(51.7)		
Experience	Those who have been involved with EMIS earlier are more conversant with data capture	DCP	f	4	17	9	23	5	3.14	1.15
			%	(6.9)	(29.3)	(15.5)	(39.7)	(8.6)		
		EC	f	4	14	3	8	0	2.52	1.36
			%	(13.8)	(48.3	(13.8)	(24.1)	(0.0)		
Job design	Job design and other commitments is important in deciding who works with EMIS	DCP	f	0	6	10	37	5	3.71	0.77
			%	(0.0)	(10.3)	(17.2)	(63.8)	(8.6)		
		EC	f	4	10	3	8	4	2.98	1.33
			%	(13.8)	(34.5)	(10.3)	(27.6)	(13.8)		
Overall Mean responses on personnel variables		**DCP**	**f**	**3.4**	**10.4**	**5.4**	**20.6**	**7.2**	**3.37**	**1.12**
		EC	**f**	**1.8**	**5.8**	**2**	**7**	**4.4**	**2.77**	**0.96**
		Total	**f**	**2.6**	**8.1**	**3.7**	**13.8**	**5.8**	**3.35**	**1.15**

INTERPRETATION: Very Low Impact = 1.0 -1.9 Low Impact = 2.0-2.9 Moderate = 3.0 – 3.9 High Impact = 4.0-4.9 Very high impact = 5.0

KEY: **DCP –** Data Capture Personnel **EC –** EMIS Coordinators

f - Frequency **% -** Percent

The results obtained in Table 4.1 shows that the Data Capture Personnel indicated that 'Age'($\bar{X} = 3.72$) was the most influential personnel factor on EMIS outcomes, this was followed by 'Job design'($\bar{X} = 3.71$), 'Gender' ($\bar{X} = 3.59$) and 'Experience'($\bar{X} = 3.14$). In other words, Job design, other commitments and gender were important in deciding who works with EMIS while those who had been involved with EMIS earlier were more conversant with data capture, thereby having foremost impact on EMIS outcomes according to Data Capture Personnel. Concurringly, the EMIS coordinators considered 'Gender' and 'Age' to be the most influential personnel factors on EMIS outcomes. Conversely, on their part 'Gender' ($\bar{X} = 4.38$) was the most preferable factor followed by 'Age' ($\bar{X} = 3.66$) to other personnel factors in terms on their impact on EMIS outcomes.

The Data Capture Personnel further indicated that 'Education level' ($\bar{X} = 2.69$) was the least influential personnel factor on EMIS outcomes, while on the contrary, the EMIS coordinators rated 'Educational level ('$\bar{X} =$ (3.07) to be the third influential personnel factor on EMIS outcome (Table 4.1). Dived and All (2007) argue that individuals that have educational qualification are more likely to adopt new innovations. Similarly, Venkatesh et al. (2000) reported a positive correlation between the level of education, technology ownership and usage. This result agreed with Choudrie and Lee (2004) and Choudrie and Papazafeiropoulous (2006) who submitted that the level of education is one of the most important drivers of IS success. However, another peculiarly dissimilar finding was that of Al-Shafi and Weerakkody (2009) who found that the majority of non-adopters of IS/IT had higher levels of education.

A noteworthy discrepancy was noted that while Data Capture Personnel indicated that 'Experience' ($\bar{X} = 3.14$) and Job design'($\bar{X} = 3.71$) were among the four personnel factors that had high impact on EMIS outcomes, according to the EMIS coordinators, 'Experience' ($\bar{X} = 2.52$) had the least impact on EMIS outcomes followed by 'Job design' ($\bar{X} = 2.98$). The general views expressed by the EMIS coordinators on 'experience' as having low impact was highly heterogeneous amongst EMIS coordinators as indicated by high standard deviation of 1.36. It can be seen in Table 4.1 that as much some EMIS coordinators indicated that experience had very high impact (13.8%) and others high impact (48.3%), a similar proportion of them had a view that it had low impact (13.8%) and while some felt it had very low impact(24.1%).

More importantly, taking all the personnel factors together Table 4.1 shows that on average, they had moderate impact on EMIS outcomes ($\bar{X} = 3.35$), with both the Data capture personnel and EMIS coordinators indicating a mean rating response of 3.37 and 3.27 respectively. However, a high standard deviation of 1.13 depicted diverse views of the respondents. Further to this, incompletion, inaccessibility of data, lack of satisfaction on part of EMIS personnel and lateness in the submission of data and information could be held responsible for the poor EMIS outcome in the Nyanza region (Table 4.4).

To put these findings into perspective, this study sought to identify the characteristics of the EMIS personnel in the counties of Nyanza Region. It was important to characterize the EMIS personnel so that trends in these demographics are apparent. An understanding of such personnel characteristics would assist to identifying strategies to improve EMIS outcomes that are personnel specific. Studies on IS have

been found IS to be strongly correlated with the demographic factors including; gender (Igbaria & Chidambaram, 1997; Mcmullin & Dryburg , 2011; Wong & Hanafi, 2007; Huotz and Gupta, 2001), age (Morris & Venkatesh, 2000; Mcmullin & Dryburg, 201; Al-Shafi & Weerakkody, 2009) , education level (Choudrie & Lee, 2004; Choudrie & Papazafeiropoulou, 2006), experience (DeLone & McLean, 2003) and job level or design (Havelka, 2002; Havelka, Conrad & Glassberg, 2002). Therefore the characteristics of the respondents reported included their gender, age, job design, levels of education and experience with EMIS.

Table 4.2 provides the distribution of District EMIS coordinators and EMIS data capture personnel by gender and age.

Table 4.2

Respondents' Distribution Gender and Age

Age (Years)	**District EMIS coordinators (n = 29)**			**Data capture personnel (n = 58)**		
	Male	**Female**	**Total**	**Male**	**Female**	**Total**
	f (%)	**f (%)**	**f (%)**	**f (%)**	**f (%)**	**f (%)**
Below 30	1(3.4)	0 (0.0)	1(3.4)	14(24.1)	21(36.2)	35(60.3)
Between 31 to 40	7 (24.1)	3 (10.3)	10(34.5)	11(18.9)	8(13.8)	19(32.8)
Between 41 to 50	11 (37.9)	4(13.8)	15(51.7)	1(1.7)	3(3.45)	4(6.9)
Above 50	3 (10.3)	0 (0.0)	3(10.3)	0(0.0)	0(0.0)	0(0.0)
Total	22 (75.9)	7 (24.1)	29(100.0)	26(44.8)	32(55.2)	58(100.0)
Mean	41.43 years			32.66 years		
S.D	0.73			0.67		

According to the results in *Table 4.2*, the first column shows that the 29 EMIS coordinators 22 (75.9%) were male while 7 (24.1%) were female. The majority of the EMIS coordinators respondents 15(51.7%) were aged between 41 to 50 years, while 10(34.5%) were aged between 31 to 40 years. Those above 50 years were 10.3% while those aged below 30 years represented 3.4%. From the data in *Table 4.2*, the sample of the District EMIS coordinators as a whole was relatively of medium age ($\bar{X}$= 41.43, SD = 0.73).

Table 4.2 also shows that slightly more than half of the Data Capture Personnel respondents, 31 (55.3%) were female. In addition more than half of the Data Capture Personnel 35(60.3%) were below 30 years old, followed by 19(32.8%) who were between 31 to 40 years old and 4(6.9%) who were between 41 to 50 years old. The sample of Data Capture Personnel as a whole was relatively young ($\bar{X}$= 32.66, S.D = 0.67). This was quite consistent with Mcmullin and Dryburg's (2011) data from Canada, Australia, England and the United States which showed that highly skilled IT workers were predominantly young men. In contrast to earlier findings by Ruossos (2007) that age had no significant relationship with attitudes towards computing.

Figure 4.1 illustrates the breakdown of both District EMIS coordinators (n = 29) and Data capture personnel (n=58) by highest level of Education.

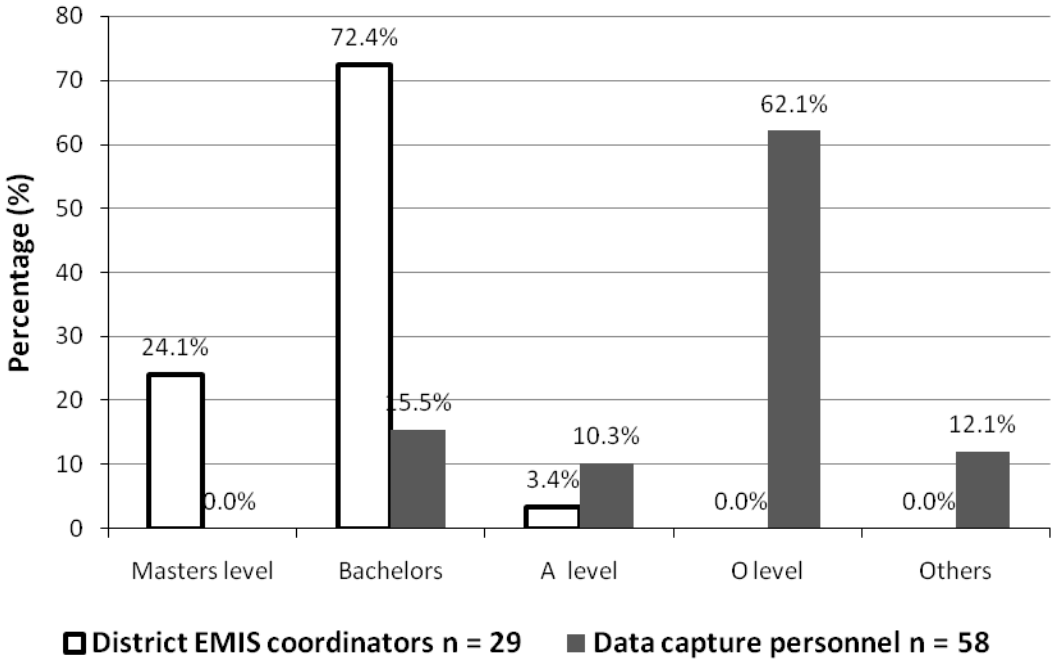

Figure 4.1 Respondents distribution by Education level

From *Figure 4.1* almost three quarters of the District EMIS coordinators (72.4%) had Bachelors degree, 24.1% of District EMIS coordinators had Masters Degree, while 3.4% had 'A' level of education, an indication that they were considerably well educated to comprehend government policies. With respect to Data capture personnel, majority of them (62.1%) had an 'O' level certificate, followed by 15.5% with Bachelor's degree and another 12.1% who had 'A' level certificates. There were other 10.3% who probably had lower level academic qualifications; which could have affected performance of the Data capture personnel, given that individuals with higher educational qualification are more likely to adopt new innovations (Dwivedi & Lal, 2007).

Figure 4.2 illustrates the distribution of District EMIS coordinators (n = 29) and Data capture personnel (n=58) by their experiences with EMIS

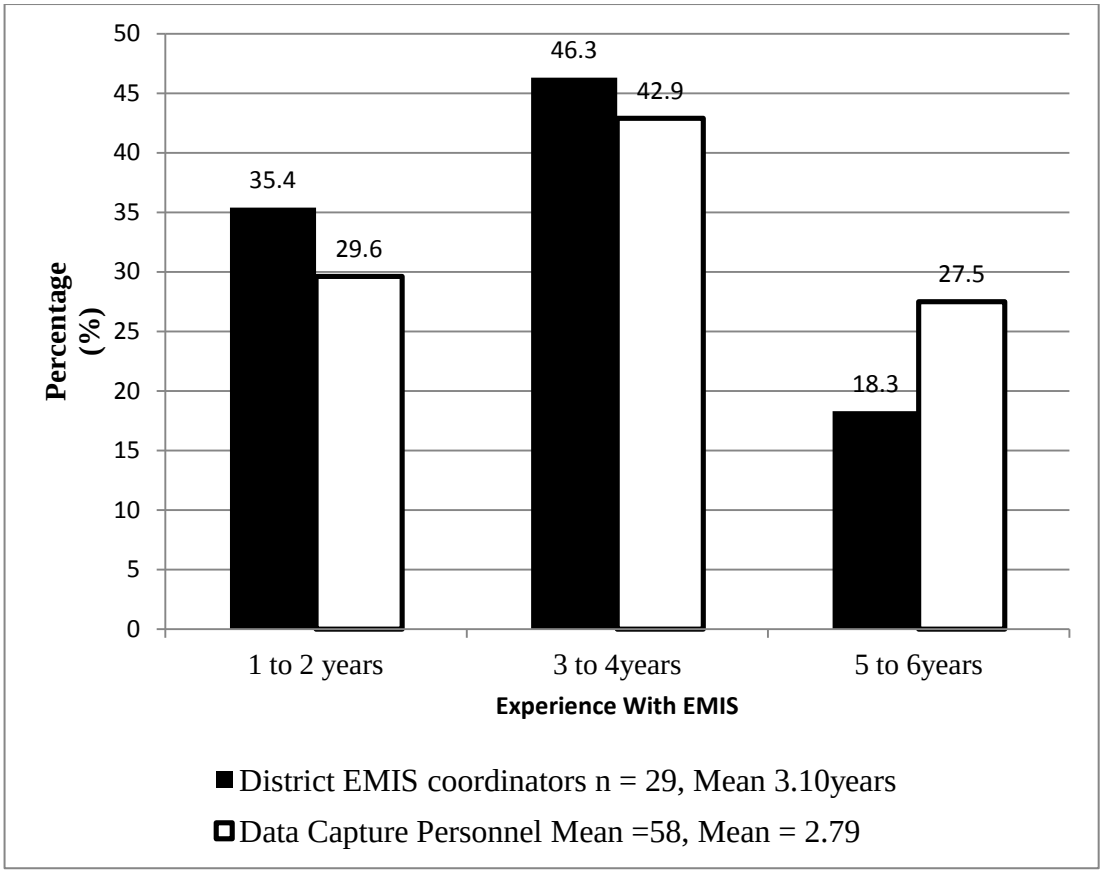

Figure 4.2 Respondents' distribution by Experiences with EMIS

The histogram in Figure 4.2 illustrates that the highest percentage of District EMIS coordinators (46.3%) had had an experience with EMIS of between 3 to 4years followed by those who had served between 1 to 2 years (1 to 2 years) and between 5 to 6years (18.3%).

Experiences of Data capture personnel with EMIS are also presented in Figure 4.2. The results shown indicates that 42.9% had experience of 3 to 4years, 29.6% had been working with EMIS between 1 to 2 years and 27.5% for between 5 to 6years 12.6%. From Figure 4.2, it can be implied that the average 3.1 years and 2.79 years experience of EMIS coordinators and Data capture personnel respectively was vital in contributing positively towards EMIS outcome (Figure 4.2). No wonder Data Capture Personnel

indicated that 'Experience' (3.15) was amongst personnel factors that had high impact on EMIS outcomes(Table 4.1)

The distribution of the respondents by designation was also captured and presented in Table 4.3.

Table 4.3

Respondents' Distribution by Designation

Designation	**District EMIS coordinators n = 29**	**Data capture personnel n = 58**
	f (%)	**f (%)**
Support staff	0 (0.0)	5 (8.6)
Clerks	0 (0.0)	31 (53.4)
Secretaries	0 (0.0)	22 (37.9)
Staffing officer	15 (51.7)	0 (0.0)
Education officer	6(20.7))	0 (0.0)
Quality assurance & standards officer	8 (27.6)	0 (0.0)

Table 4.3 indicates that the sample of the District EMIS coordinators consisted of mainly; District Staffing officers 15 (51.7%), followed by 8 (27.6%) Quality Assurance and Standards Officers and 6 (27.6%) Education Officers. A possible explanation for this might be that District Staffing Officers were equally involved in a parallel data capture platform for Teachers Service Commission; therefore transference of skills to the MOE EMIS was habitually easy.

On the other hand more than half of the Data capture personnel 31 (53.4%) were Clerks, while secretaries were 22(37.9%), and 5(8.6%) of them were support staff. It seems possible that these results are due to the fact that computer use in most government offices in Kenya are predominantly used by office secretaries, therefore their competence in computer use was handy in EMIS data capture.

Indeed, during the interviews with DEOs, they were asked to state the factors they considered in identifying personnel who worked on EMIS program. The majority 21 (72.4%) of DEOs who responded pointed out that they looked at technical expertise or knowledge on IT or personnel who had computer basics. The outstanding response that emerged from one of the DEOs was that; diligence, concern for detail and ability to withstand long hours of work was necessary in appointing the EMIS personnel. This gave an implication that EMIS data capture process was a highly intricate and exhaustive exercise. While another DEO respondent opined that low number of EMIS staff slowed down data capture, over half of those DEOs surveyed reported that the number of EMIS personnel was not enough and there was need to train more and give several refresher courses continuously to help remind the trained staffs. The Regional EMIS coordinator further expressed concern that there were few staff members who are proficient in computers. This had an implication of delays in keying in data into the computers.

4.2.2 Analysis of the EMIS Outcomes in the Nyanza Region

The dependent variable in this study was the EMIS outcome. The study appraised EMIS outcomes in the counties of Nyanza as a precursor to identifying the factors that impacted on these outcomes. The EMIS outcomes were operationally defined into six

dimensions; timeliness, relevance, completeness, reliability, accessibility of information and satisfaction of personnel. One item each was used to operationalize the six dimensions of EMIS outcomes. To explore the state of EMIS outcomes in the Counties of Nyanza region, Data capture personnel (n =58) and EMIS coordinators (n= 29) responses were recorded. Table 4.4 shows the descriptive statistics for the responses on ratings of EMIS outcomes in counties of Nyanza Region measured in a 1 to 5 scale ranging from 'Very Poor' to 'Very Good'.

Table 4.4

Ratings of EMIS outcomes in counties of Nyanza Region by Data capture personnel (n =58) and EMIS coordinators (n= 29)

Variable	Statement	Respondents		Ratings VP=1	P=2	F=3	G=4	VG=5	Mean $(\overline{\overline{X}})$	S.D
Timelines of information	Information gathering is always timely	DCP	f	17	9	16	9	7	2.66	1.39
			%	(29.3)	(15.5)	(27.6)	(15.5)	(12.1)		
		EC	f	10	5	7	4	3	2.48	1.37
			%	(34.5)	(17.2)	(24.1)	(13.8)	(10.3)		
Relevance of information	Data collected relevant to the needs of the district.	DCP	f	4	12	12	18	12	3.38	1.23
			%	(6.9)	(20.7)	(20.7)	(31.0	(20.7)		
		EC	f	3	4	4	11	7	3.52	1.29
			%	(10.3)	(13.8)	(13.8)	(37.9)	(24.1)		
Completeness of information	Data collection is always complete.	DCP	f	15	12	7	15	9	2.83	1.08
			%	(25.9)	(20.7)	(12.1)	(25.9)	(15.5)		
		EC	f	8	7	4	7	3	2.66	1.4
			%	(27.6)	(24.1)	(13.8)	(24.1)	(10.3)		
Reliability of information	Information collected from the schools is always reliable.	DCP	f	5	11	16	15	11	3.28	1.08
			%	(8.6)	(19.0)	(27.6)	(25.9)	(19.0)		
		EC	f	3	4	11	5	6	3.24	1.04
			%	(10.3)	(13.8)	(37.9)	(17.2)	(20.7)		
Accessibility of information	Information is easily accessible	DCP	f	14	16	7	13	8	2.74	1.39
			%	(24.1)	(27.6)	(12.1)	(22.4)	(13.8)		
		EC	f	7	8	4	6	4	2.72	1.42
			%	(24.1)	(27.6)	(13.8)	(20.7)	(13.8)		
Personnel satisfaction	There is general satisfaction in the use of EMIS facilities.	DCP	f	8	21	20	9	0	2.52	0.88
			%	(13.8)	(36.2)	(34.5)	(15.5)	(0.0)		
		EC	f	6	7	4	5	7	3.00	1.18
			%	(20.7)	(24.1)	(13.8)	(17.2)	(24.1)		
Overall mean rating on EMIS outcomes		**DCP**	**f**	**8**	**11.2**	**10.8**	**11.3**	**5.7**	**2.90**	**1.24**
		EC	**f**	**4.2**	**4.2**	**4.8**	**5.3**	**2.7**	**2.93**	**1.28**
		Total	**f**	**6.1**	**7.7**	**7.8**	**8.3**	**4.2**	**2.92**	**1.26**

Interpretation: Very Poor = 1 .0 -1.9 **Poor** = 2.0-2.9 **Fair = 3.0-39**

Good = 4.0 - 4.9 **Very Good = 5**

KEY: **DCP –** Data Capture Personnel **EC –** EMIS Coordinators

f - Frequency **% -** Percent

Results in Table 4.4 show that the Data capture personnel indicated that the best EMIS outcome in the Nyanza region was 'Relevance of information' ($\bar{X} = 3.38$) followed by 'Reliability of information'($\bar{X} = 3.28$). Similarly, according to the EMIS coordinators, these two EMIS outcomes; 'Relevance of information' ($\bar{X} = 3.52$) and 'Reliability of information' $\bar{X} =$ (3.24) were found to be the best in addition to 'Personnel Satisfaction' ($\bar{X} = 3.00$). It is encouraging to compare these results with the response from Regional EMIS Coordinator and DEOs during the interviews, whose responses corroborated the EMIS personnel feeling that EMIS data was relevant and reliable.

Regional EMIS Coordinator said,

> The EMIS information is relevant, especially in regard to access to school, equity and transition rate. EMIS data assisted in calculation of gender parity and determination of teacher shortage. In addition data are made consistent and reliable by verifying with already captured information.

This view was on the same breadth supported by about than two thirds 19(65.5%) of the DEOs. A District Education Officer was categorical in his comment when he said; "EMIS helps in effective intervention, policy implementation, feedback and decision making."

While another DEO observed that: "EMIS data helps in determination of state of infrastructure such classrooms and toilets." Besides, another observed that: "This data had assisted to reveal the extent to which the various ministerial policies on infra-structure have been implemented and areas that still suffer underachievement and hence need for reinforcement and follow up".

Indeed there was evidence from the 15 (51.7%) DEOs interviewed that there were attempts to make EMIS data relevant at their offices.

For example one said:

> The Zonal Officers do follow-up and ensure timely submission of the forms; there is always a personnel in charge who is held responsible for ensuring that data is captured routinely and is relevant.

Data capture personnel further indicated in Table 4.4 that 'Personnel Satisfaction' ($\bar{X} = 2.53$) was poor followed by 'Timeliness of Information' ($\bar{X} = 2.66$), 'Accessibility of information' ($\bar{X} = 2.74$) and 'Completeness of data' ($\bar{X} = 2.83$). This view was shared by EMIS coordinators who suggested that the poor EMIS outcome in the Nyanza region were attributed to poor; "timeliness of Information' ($\bar{X}$ =2.48), completeness ($\bar{X}$ =2.62) and accessibility ($\bar{X} = 2.71$) of data.

Similarly, results from interviews with DEOs revealed that maintaining data timeliness and consistency was hard. In their unequivocal response, 17(58.6 %) of DEOs said: "it was quite difficult to beat the deadlines". To that effect, one DEO explained that; "deadlines could not be met because Ministry of Education submits EMIS forms late to the DEOs thus they remit them to the educational institutions late too." This view was supported by Regional EMIS Coordinator who proposed that; "when data capture forms are given to DEOs offices in time from headquarters then data capturing can be timely."

A considerable disparity was noted that whereas Data Capture Personnel indicated that 'Personnel Satisfaction' ($\bar{X}$ =2.53) was the poorest, yet according to the EMIS coordinators, 'Personnel Satisfaction' ($\bar{X}$ =3.00) was the third best EMIS outcome

(Table 4.4). Data Capture Personnels' views of poor 'Personnel Satisfaction' was supported by a DEO's comment that:

> The EMIS personnel are not motivated, they do the work reluctantly and many are unenthusiastic to work given that they are expected to work overtime including weekends yet EMIS data capture was not their core duty, unless money is set aside to motivate them.

It can also be seen from the data in Table 4.4 that the mean response on relevance ($\bar{X} =$ 3.43, S.D = 1.24) and reliability ($\bar{X} = 3.26$, S.D = 1.06) of data and information were significantly higher though with greater dispersion. This implied that data and information collected is relevant to the needs of the district and information collected from the schools is always reliable.

By and large, EMIS outcomes in Nyanza Region were poor ($\bar{X} = 2.91$, S.D=1.25) with both the Data capture personnel and EMIS coordinators indicating a mean rating response of 2.90 and 2.93 respectively. Preliminary descriptive results in Table 4.4 which suggest that the poor EMIS outcome in the Nyanza region were attributed to incomplete, inaccessibility, delay in the submission of data and lack of satisfaction on part of EMIS personnel, were further backed up by the views of the DEOS and Regional EMIS coordinators.

4.2.3 Relationship between Personnel Factors and EMIS Outcomes

To show the relationships between the personnel factors and EMIS outcomes, further statistical analyses in the form of Pearson's moment correlation and multiple regressions were carried out. The analyses were based on the responses on the five personnel factors (Table 4.1) and the six EMIS outcome variables (Table 4.4) which were summarized in Table 4.5.

Table 4.5 Summary of Mean Weight Responses on Personnel Factors and EMIS Outcomes (N = 87)

Factors	Variables	Mean	SD
Personnel factors	Education level	2.88	134
(Independent variables)	Age	3.69	1.07
	Gender	3.98	1.03
	Experience	2.83	1.24
	Job design	3.35	1.09
Overall mean response Personnel factors		**3.35**	**1.15**
EMIS outcomes	Timeliness of Information.	2.57	1.38
(Dependent Variable)	Relevance of information.	3.45	1.26
	Completeness of data.	2.75	1.24
	Reliability of information.	3.26	1,06
	Accessibility of information.	2.73	1.41
	Satisfaction of personnel.	2.76	1.00
Overall mean response on EMIS outcomes		**2.92**	**2.26**

Correlation analysis between the five personnel factors and the six EMIS outcome variables were run and the results shown Table 4.6:

Table 4.6 Pearson Moment Correlation between EMIS Outcome and Personnel Factors (N = 87)

Independent Variables (Personnel factors)		Dependent Variables (EMIS Outcomes)					
		Timeliness	**Relevance**	**Completeness**	**Reliability**	**Accessibility**	**Satisfaction**
Gender	r	.635	.654*	.418	.571*	.358	.339
	p	.009	.004	.076	.039	.097	.102
Age	r	694*	.452	.586*	.674*	.435	.641*
	p	.002	.059	.028	.004	.069	.007
Education level	r	.377	.279	.503*	.543*	.258	.438
	p	.088	.120	.058	.043	.127	.089
Experience	r	.598*	.480	.312	.430	.326	.578*
	p	.021	.070	.112	.092	.109	.033
Job design	r	.618*	.344	.781*	.603*	.399	.566*
	p	.015	.104	.001	.012	.082	.039

r – Pearson correlation coefficient p – significance level

* Correlation is significant at the 0.05 level (2-tailed).
** Correlation is significant at the 0.01 level (2-tailed).

In analyzing the relationships between personnel factors and EMIS outcomes, several meaningful findings were obtained that were in agreement with the descriptive statistics in Table 4.1. Result in Table 4.6 shows that positive and strong relationship existed between Job design and EMIS outcomes like; timeliness (r = 0.618, p = 0.015) Completeness(r = 0.781, p = 0.001), reliability(r = 0.603, p = 0.012) personnel Satisfaction (r = 0.566, p = 0.039). This meant that Job design contributed significantly to timeliness, completeness, and reliability of EMIS data and personnel satisfaction. Similarly, previously in Table 4.1, Data Capture Personnel indicated that 'Job design' ($\bar{X}$ =3.70) was among the four organizational factors that had high impact on factors on EMIS outcomes. However, according to the EMIS coordinators, 'Job design' (2.95)

was among the lowly ranked in terms of their impact on EMIS outcomes. This could explain why in Table 4.6, Job design had the low correlation with EMIS outcomes: 'relevance' (r = 0.344, *p* = 0.104) and 'accessibility'(r = 0.399,*p* = 0.082) of data. This was expected as 'accessibility' and 'relevance' of data is an administrative function of an organization that may not be subject of personnel factors. Earlier data *in Table 4.3* had revealed that District EMIS coordinators, whose job designation was mostly District Staffing officers, were equally involved in a parallel data capture platform for Teachers Service Commission, could find it trouble-free to relate their TSC EMIS skills to the MOE EMIS. Similarly Data capture personnel whose job designation was largely office secretaries were competent in computer use found it easy and satisfying to apply their IT skills to the MOE EMIS. Thus making job design a significant personnel factor.

Table 4.6 also indicate that 'Gender' had a significant positive relationship with 'timeliness' (r = 0.635, *p* = 0.009), 'Relevance' (r = 0.654, *p* = 0.004), and 'Reliability' (r = 0.571, *p* = 0.039) of EMIS data. However no significant relationship was depicted between 'gender' and 'Completeness' (r = 0.418, p = 0.076), 'Accessibility' of data (r = 0.358, p = 0.097) and personnel Satisfaction (r = 0.339, p = 0.102). It follows that, lack of completion of data, inaccessibility of data, lack of satisfaction on part of EMIS personnel and lateness in the submission of data and information could been held responsible for the poor EMIS outcome in the Nyanza region (Table 4.4)

Equally, the study revealed that there were significant relationships between age and four EMIS outcomes, namely: Timeliness (r =.694, *p* = 0.002) Completeness (r = 0.586, *p* = 0.028), Reliability(r =0.674, *p* = 0.004) and Satisfaction (r =0.641, *p* =

0.007). The results obtained in Table 4.1 shows that both the Data Capture Personnel and EMIS coordinators indicated that Age was amongst the most important personnel factor that highly impacted EMIS outcomes. In fact, at the same time, according to Table 4.1 the EMIS coordinators considered 'Gender' (4.38) to be the most influential personnel factor on EMIS outcomes followed by 'Age' (3.67).

According to the results in Table 4.2 the sample of the District EMIS coordinators were relatively of medium age ($\bar{X} = 41.43$, SD = 0.73) while Data Capture Personnel was relatively young ($\bar{X} = 32.66$, S.D = 0.67). Similarly it had been revealed that slightly more than half of the data capture personnel respondents were female and consisting of mainly office secretaries (Table 4.2). This could have explained why age of EMIS personnel and Gender was significantly correlated with satisfaction of EMIS personnel.

Therefore, the findings in Table 4.1 and 4.6 underscore the importance of age, gender and job design as a predictor of EMIS outcomes. The results regarding age, gender and job design were very consistent with findings elsewhere in the literature of personnel factors that would lead to good IS outcome. For example, research by: Choudrie and Lee (2004), Houtz and Gupta(2001), Margolis and Fisher (2002)as well as Shashaani and Khalili (2001) on gender; including those by Morris and Venkatesh, (2000) Mcmullin and Dryburg (2011) Al-Shafi and Weerakkody (2009) concerning age; as well as Buabeng-Andoh (2012) Samarawickrema and Stacey (2007) and Neyland, (2011) studies of job design established that gender, age, and job design as salient predictors of IS outcomes.

The study also showed that both the 'experience' and 'Education level' had no significant relationship with four out of six EMIS out comes. For example while 'experience' of personnel did not contribute significantly to relevance(r =.580, *p* = .070), Completeness (r =0.312, *p* = 0.112), Reliability (r =0.430, *p* = 0.092) and Accessibility (r =.326, *p* = 0.109) of data. Education level, on the other hand no significant relationship with Timeliness (r =0.377, *p* = 0.088), Relevance (r =.279, *p* = 0.120), Accessibility (r =.258, *p* = 0.127), personnel Satisfaction (r =.438, *p* = 0.089). Neither did both 'experience' and 'Education level' have any significant effect on relevance or accessibility of data at p = 0.05. While Experience contributed only to Timeliness of data (r = 0.598, *p* = 0.021), personnel Satisfaction (r = 0.578, *p* = 0.033), notably, education level was only correlated significantly with two aspect of EMIS outcome namely: reliability (r = 0.543, p = 0.035) and timeliness of information(r = 0.577, p = 0.125). Therefore the revelation in Table 4.6 was in agreement with previous finding in Table 4.1 where the Data Capture Personnel indicated that 'Education level' was the least influential personnel factor on EMIS outcomes.

Surprisingly, in Table 4.1 the EMIS coordinators rated 'Educational level' to be the third influential personnel factor on EMIS outcome, in converse to results in *Table 4.6,* where no significant relationships was realized between educational level (r =0.588, p = 0.067) and experience (r =0.394, p = 0.083) with EMIS outcomes. An earlier demographic analysis in *Figure 4.1* revealed that more than half of the District EMIS coordinators (72.4%) had Bachelors degree and 24.1% had Masters Degree, at the same time majority (62.1%) of the data capture personnel had an O level certificate, followed by 15.5% having bachelor's degree. In addition they had average experience with EMIS of 3 years. These were an indication of educated and experienced

personnel, yet these could not have significant relationship with EMIS outcomes. This finding of a non significant relationship between educational level, experience and EMIS outcome also accords with our earlier observations in Table 4.1, which showed that those who have been involved with EMIS earlier were not necessarily more conversant with data capture and EMIS personnel with higher education level were not necessarily more conversant with gathering and use of EMIS data.

Reliability and timelines were the top EMIS outcomes that were impacted significantly by a greater (4) number of personnel factors. Specifically, gender(r =.694, p = 0.002), age(r =.694, p = 0.002), job design (r =.694, p = 0.002) contributed significantly to both timeliness and reliability of data (Table 4.6). However whereas experience was the fourth personnel that equally contributed to timeliness of data, but to 'reliability', education level was its fourth significant personnel factor. Similarly Table 4.1 shows that both Data capture personnel and EMIS coordinators indicated that the best EMIS outcome in the Nyanza region was 'Reliability of information.' In contrast ,while both EMIS coordinators and Data capture personnel suggested that the poor EMIS outcome in the Nyanza region were attributed to poor reliability (Table 4.1), correlational analysis in Table 4.6 depict that reliability was significantly related to majority of personnel factors including gender, age, job design and education level.

The contribution of personnel factors to accessibility, completeness of data and personnel satisfaction were also investigated. As shown in Table 4.6 three personnel factors including; Age, Experience and Job design contributed significantly to both Completeness and personnel satisfaction, while Gender contributed only to Relevance of information. Remarkably, no significant relationship was depicted between

accessibility and with any of the personnel factors; this was quite congruent with findings in Table 4.4 that revealed that 'inaccessibility of data', could have been a significant indicator of the poor EMIS outcome in the Nyanza region.

A complementary regression analysis was performed to identify which personnel factors had the greatest impact on EMIS outcomes. The regression model consisted of five personnel variables; gender, age, education level, experience and the mean rating of EMIS outcomes variables with arithmetic mean = 2.91 and standard deviation = 1.25 as in Table 4.5. Table 4.7 shows linear regression model summary of personnel factors and EMIS outcomes.

Table 4.7

Linear Regression Model Summary of Personnel Factors and EMIS Outcomes

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.412	.1697	.152	.50055

a. Predictors: (Constant), Job design (P_5), Experience (P_4), Age (P_2), - Education level (P_3), - Gender (P1)

According to Table 4.7, the correlation between the dependent variable and the predictors (Job Design, Experience, Age, Education Level, and Gender) was low (r = .469) and yielded an R Square (R^2) of 0.169. This implied 16.9% of the total variance in EMIS outcomes was accounted for by the personnel factors (gender, age, education level, experience, and job design explained), and some other factors constituting 83.1% apart from these personnel factors, equally contributed to the variation in EMIS outcomes.

Consequently, the ANOVA test for the significance of the regression model of personnel factors including; gender, age, education level, experience, and job design on EMIS outcomes as measured by the enter method, was given in Table 4.8.

Table 4.8

ANOVA Test for Personnel Factors and EMIS Outcomes [a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	7.15	4	1.788	9.460	.014[b]
	Residual	15.534	82	0.189		
	Total	16.248	86			

a. Dependent Variable: EMIS outcomes

b. Predictors: (Constant), Job design (P_5), Experience (P_4), Age (P_2), Education level (P_3), Gender (P1)

In Table 4.8, the analysis of variance (ANOVA) tests shows that EMIS outcome in counties of Nyanza were significantly predicted by personnel factors ($F(4, 82) = 9.460$, $p = 0.014$).

Table 4.9 shows the unstandardized regression coefficient (*b*), the standardized regression coefficient (ß), and the observed t-values (*t*).

Table 4.9

Regression Analysis Summary for Effect of Personnel Factors in EMIS Outcomes (n= 87)

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	**Std. Error**	**Beta**	**t**	**Sig.**
1	(Constant)	13.258	0.251		52.777	.000*
	Education level (P_3)	0.098	0.09	0.101	1.089	.256
	Age (P_2),	0.216	0.083	0.223	2.602	.014*
	Gender (P1)	0.287	0.082	0.291	3.500	.006*
	Experience (P_4)	0.198	0.191	0.198	1.037	.071
	Job design (P_5),	0.319	0.066	0.322	4.833	.001*

a. Dependent Variable: EMIS outcomes

Table 4.9 shows that out of the five variables, three were statistically significant at 0.05 levels. The variable of 'age' was significant (p = 0.014), indicating that age of EMIS personnel was a significant predictor of EMIS outcomes. Similarly, 'Gender' and 'job design' had a significant relationship with EMIS outcomes (p = .006) and (p =.001) respectively. It can be seen from the data in Table 4.9 that 'education level' (p = .256) and 'experience' (p = .071) were not statistically significant predictors of EMIS outcomes.

The results in Table 4.9 showed that only three variables Age (β = 0.223), gender (β = 0.291) and job design (β = 0.322), contributed significantly and meaningfully to the prediction of EMIS outcomes while experience (β = 0.198) and education level (β = 0.101) had no significant impact on EMIS outcomes. Each of the independent variables in the regression tests exhibited the anticipated effect as it had been revealed from

descriptive statics and correlation analysis, that age, gender and job design of personnel were important driving factors of EMIS outcomes.

The efficient prediction of EMIS outcomes by age in this study is in line with the findings of Mcmullin and Dryburg (2011), Fraser (2010), Morris and Venkatesh, (2000) as well as Venkatesh et al. (2003) Al-Shafi and Weerakkody (2009) but was in contrast with Ruossos' (2007) which showed that age had no significant relationship with attitudes towards computing. Additionally, a correlation analysis yielded significant relationships between age and four EMIS outcomes, namely: timeliness , completeness , reliability of data and personnel satisfaction (Table 4.6) as much as both the Data Capture Personnel and EMIS coordinators indicated that Age was amongst the most important personnel factor that highly impact EMIS outcomes (Table 4.1)

*C*correspondingly, both Mcmullin and Dryburg (2011) and Fraser (2010) identified age as a significant predictor of success of Information systems. Mcmullin and Dryburg (2011) data shows that highly skilled IT workers are predominantly, young. Specifically they noted that in Australia 77 percent of highly skilled workers are under the age of forty, which compares with 72 percent in Canada, about 75 percent in the United States 80 percent in the United Kingdom. Similarly, Fraser (2010) was categorical that 'there is tremendous fascination with twenty-year-olds in the IT/IS related jobs' while older workers are by and large characterized as less technologically adept and less interested in new technologies.

Similarly research by Al-Shafi and Weerakkody (2009) Venkatesh, (2000) as well as Venkatesh et al. ., (2003) have yielded results consistent with these findings. Al-Shafi and Weerakkody (2009) observed that the majority (66%) of Qatar citizens adopting e-government are in the age groups from (25) years to (44) years. Morris and Venkatesh, (2000) as well as Venkatesh et al. (2003) in their studies reported that age difference impacted adoption and usage behaviours in favour of younger users. Venkatesh *et al.* (2003) found that the majority age group adopting computers in the USA is 15-17 years, followed by the group of 26-35 years.

Though the aforementioned studies predominantly recognized age as a predictors of IS, according to Shasshani and Khalili, (2001) computer experience, education level and socioeconomic status play a very important role in narrowing the age gap. According to Ruossos (2007), age had no significant relationship with attitudes towards computing. Fraser (2010) in his classic critique of age bias in IT/IS related work, opined that it is an ageist attitude and negative stereotypes about older workers' abilities to adapt and train on new technologies to impact hiring practices, thereby leaving older workers highly vulnerable to unemployment and redundancy in the IT/IS industry.

The regression results show that gender was yet another personnel factor that had a significant relationship with EMIS outcomes (Table 4.7). Furthermore, the Data Capture Personnel indicated that gender was the third most important personnel factor, while in concurrence; the EMIS coordinators considered gender as the most preferable factor that had impact on EMIS outcomes (Table 4.1). More importantly, correlation

analysis revealed that ‘Gender’ had a significant positive relationship with ‘timeliness’ and ‘relevance’ of EMIS data.

This finding agreed with Bross (2005) Havelka, (2002) Choudrie and Lee (2004) as well as that of Morris and Venkatesh (2000) ,Houtz and Gupta (2001) , Margolis and Fisher, (2002), Mcmullin and Dryburg(2011), Shashaani and Khalili (2001) and Wong and Hanafi (2007) but contrasted that of Norris, Sullivan, Poirot and Soloway, (2003) who revealed that gender variable was not a predictor of ICT integration into teaching, a finding which agreed with Kay’s (2006) that no causal relationship exist between gender and IT/SI adoption.

In conformity with these finding, Mcmullin and Dryburg (2011) data showed that men compromise 81 percent in the United Kingdom, 80 percent in the USA, 75 percent in Canada and 78 percent in Australia’s jobs related to IT/IS. Secondly, according to OECD (2008) although women received more than half of university degrees in the OECD area, women account for only 30% of degrees in IS/IT. Similarly, women conducting ICT-related research accounted for less than 35% of the total in the OECD area while share of women receiving computing-related degrees varies more across countries, ranging from just under 10% for Belgium, Switzerland and the Netherlands to 40% in Sweden and Finland (OECD, 2008).

While in the teaching profession, Buabeng-Andoh (2012) cited Volman and van Eck (2001) to have found that female teachers had low levels of computer use due to their limited technology access, skill and interest. Similarly, in this study the 75.9% District EMIS coordinators were male, however slightly more than half of the Data Capture

Personnel (55.3%) were female (Table 4.2). This contrast was expected as majority of Data Capture Personnel were office secretaries who were proficient in computer use as a tool in their job design. Office secretarial job have been found to be dominated by the females (ILO, 2010 & OECD, 008), a particularly important factor in the feminization of the office work force.

Other studies whose findings were in accord with this study include those by Choudrie and Lee (2004) as well as Morris and Venkatesh (2000) who investigated the role of gender in the adoption and usage of IT/IS. They revealed that gender had an important effect and role when considering technology adoption and usage in organisational context. Venkatesh et al. (2000) showed that male users use a computer more than females. Similarly, Igbaria and Chidambaram (1997) found that women were on average, less experienced than men in IT/IS lower-level positions and receive lower salaries than do men even when age, work experience and job level were controlled.

The main reasons advanced by studies towards females' underrepresentation in the IT sector gravitate around two schools of thought. Whereas Shashaani and Khalili, (2001) champion the aptitude factor, on the other hand OECD (2008), Wong and Hanafi (2007) argued for attitude factor while Huotz and Gupta (2001) are for both. The aptitude advocates like Shashaani and Khalili (2001) found that female undergraduates had significantly lower confidence than males in their ability to use computers. Huotz and Gupta (2001) found that males rated themselves higher in their ability to master technology skills. However OECD (2008) posits that IT/IS gender gap relates more to attitudes than to aptitudes. Classic example in point is Bross' (2005) significant finding that gender differences, favouring males in terms of attitudes towards new technology,

the extent of computer use and self-perceived computer experience. According to Wong and Hanafi (2007) females exhibit more negative views and perception towards the use of computers than males, a finding that even Huotz and Gupta (2001) affirmed that males rated their attitude towards IS higher than females. Shashaani and Khalili (2001) noted that females felt helpless, nervous and uncomfortable around computers as Bross (2005) reports that females expressed higher anxiety levels compared to males. As such, Fraser (2010) criticizes gender bias in IT/IS related work as a sexist conjecture about female workers abilities to adapt to influence hiring practices in the IT/IS industry.

Interestingly Jamieson-Proctor, Burnett, Finger and Watson, (2006) and Kay, (2006) found that female teachers were integrating technology into their teaching less than the male teachers integration of ICT in schools in Queensland State. They noted that females' self-perceptions about technology competence improved while males' self-perceptions about technological dominance remained unchanged as female teachers applied ICT more than the male teachers.

The impact of Job design on EMIS outcomes has been a major finding in this study as it contributed significantly and meaningfully to the prediction of EMIS outcomes. Although, most of the reviewed studies never considered job design as a feasible personnel variable, except for those studies on the IT integration in teaching, since those studies targeted a population that were homogeneously IS/IT specialist. In the contrary in this study, the EMIS programme involved personnel recruited from the DEOs office with diverse job design. The regression tests exhibited the anticipated effect similar to descriptive and correlation analysis that job design of personnel was

an important driving factor of EMIS outcomes. Similarly Table 4.1 shows that the Data Capture Personnel indicated that Job design was the second most important personnel factor.

Two arguments could support the reason behind the impact of Job design on EMIS outcomes in Nyanza region. First the office secretary effect; given that more than a quarter (37.9%) of Data capture personnel were secretaries (Table 4.3), it seems possible that these results were due to the fact that computer use in most government offices in Kenya are predominantly used by office secretaries, therefore they could readily be involved in EMIS data capture due to their competence in computer use. The second factor that could have contributed to the significant impact of job design to EMIS outcomes was the District Staffing officer factor; given that most of the District EMIS coordinators were by job designation District Staffing officers (Table 4.3), they were equally involved in a parallel data capture platform for Teachers Service Commission, and could find it trouble-free to relate their TSC EMIS skills to the MOE EMIS. Therefore transference of skills to the MOE EMIS was easy. This could have been the reason why the correlation results revealed that Job design contributed significantly to majority of EMIS outcomes timeliness, completeness, and reliability of EMIS data and personnel satisfaction. Similarly previously in Table 4.1, Data Capture Personnel indicated that 'Job design' was among the four organizational factors that had high influential on factors on EMIS outcomes.

The results regarding job design were very consistent with findings of Buabeng-Andoh (2012), Samarawickrema and Stacey (2007) and Abuhmaid, (2011) in IS/IT integration in education. Buabeng-Andoh (2012) reports the workloads of teachers influenced

their acceptance of IT in classrooms, while Samarawickrema and Stacey, (2007) found that increased workload coupled with teaching with IT was critical in a large Australian multi-campus urban university. They argued that increased workload of teachers was alarming and asking them to take on board yet another task in an already overcrowded curriculum and extremely busy work day is pushing many teachers to the limit. Similarly, in the Jordanian education system teachers were already overloaded and they could not cope with the pressure from ICT training (Abuhmaid, 2011).

Based on Samarawickrema and Stacey's (2007) and Abuhmaid's (2011) arguments, indeed this study confirms Hua and Herstein's (2003) observation that EMIS staff may have additional responsibilities unrelated to EMIS, which they may view as their "official" jobs thus "extra" responsibilities such as EMIS may suffer. However, according to the EMIS coordinators, 'Job design' was among the lowly ranked in terms of their impact on EMIS outcomes. This could explain why in Table 4.6, Job design had the low correlation with EMIS outcomes: 'relevance' and 'accessibility' of data. This was expected as 'accessibility' and 'relevance' of data is an administrative function of an organization that may not be subject of personnel factors.

This study did not find 'experience of personnel' as a statistically significant predictor of EMIS outcomes (Table 4.6). Similarly, responses from EMIS coordinators revealed that managerial experience had 'low impact' on EMIS in the counties of Nyanza (Table 4.1). According to the EMIS coordinators, 'Experience' had the least impact on EMIS outcomes, even though 9 (42.9%) District EMIS coordinators had had an experience with EMIS between 2 to 4 years followed by those who had served over 5years with a percentage of about 28.6% which was long enough to have had an effect

on EMIS outcomes(Figure 4.2). The correlational results further confirmed that 'experience' of personnel did not contribute significantly to relevance, completeness, reliability and accessibility of data. While it contributed only to timeliness of data and personnel satisfaction (Table 4.6)

This finding agreed with DeLone and McLean (2003) who found that individuals with longer experience in an organization, have less positive attitudes towards Information Systems but contrasted that of Havelka, (2002) and Havelka et al. (2002) findings that IS outcomes, especially satisfaction is strongly related to length of service. This implies that that those who have been involved with EMIS earlier were not necessarily more conversant with data capture and EMIS personnel with higher education level were not necessarily more conversant with gathering and use of EMIS data. However, both components are important in explaining IS outcome among the most replicated studies of information systems. Similarly, according to Ang et al. (2001b) senior management experience, background and knowledge on IT, awareness and recognition of IS activities and potentials, has been found to have had an impact on successful IS outcomes. On the same note DeLone and McLean (2003) observed that a priori involvement with MIS has positive correlation with user satisfaction thus MIS Success. These arguments seemed to have resonated with the views of Data Capture Personnel who indicated that their 'Experience' had impact on EMIS outcomes, no wonder 44.8% of the Data Capture Personnel had experience of 2 to 4 while 23.3% had been working with EMIS over 5 years(Figure 4.2).

In contrast with other studies by according to DeLone and McLean (2003), Al-Shafi and Weerakkody (2009) Choudrie and Lee (2004) and Choudrie and

Papazafeiropoulou (2006), the regression analysis of the data from Nyanza region suggested that educational level was not a statistically significant predictor of EMIS outcomes (Table 4.9). The regression tests exhibited the anticipated effect as it had been noted by Data Capture Personnel in the descriptive statics and correlation analysis that education level of personnel was among the least influential factors of EMIS outcomes, even though contrary, the EMIS coordinators rated 'Educational level' to be the third influential personnel factor on EMIS outcome (Table 4.1). But still the correlational analysis showed that 'Education level' had no significant relationship with four out of six EMIS out comes namely: timeliness, relevance, accessibility and personnel satisfaction.

Dwivedi and Lal (2007) argues that individuals that have educational qualification are more likely to attain better occupation and are more likely to adopt new innovations. Similarly, Venkatesh et al. (2000) reported a positive correlation between the level of education, technology ownership and usage. This result agreed with Choudrie and Lee (2004) and Choudrie and Papazafeiropoulou (2006) who submitted that the level of education is one of the most important drivers of IS success.

There seems to conflicting results obtained from research studies on the casual relationship existing between Education level and IS/IT adoption or success. According to Al-Shafi and Weerakkody (2009) they found that the majority of non-adopters of IS/IT were reported to have higher levels of education while DeLone and McLean (2003) found that less educated subjects have less positive attitudes towards Information Systems positive correlation with user satisfaction thus MIS Success. In this study majority of Data capture personnel (62.1%) had an O level certificate,

followed by 12.1% having Bachelors degree, while more than half of the District EMIS coordinators, 72.4% had Bachelors degree, 24.1% of District EMIS coordinators had Masters Degree (Figure 4.1)

In summary, the factors that impact outcomes of EMIS in the counties of Nyanza region, Kenya, include age, gender and job design of personnel. In identifying feasible strategies for improving EMIS outcomes, therefore, it is important that both age, gender and job design, are considered especially deciding who to work as an EMIS personnel, but neither experience nor education level of the officers would be necessary.

4.3 Impact of Technological Factors on EMIS Outcomes

The second objective of the study was to establish the impact of technological factors on EMIS outcomes in the counties of Nyanza Region. To attain this objective data was analyzed: First, descriptively to show prevalence and the ratings by Data capture personnel and District EMIS coordinators on the impact of technological factors on EMIS outcomes. Secondly correlations and multiple regressions analyses were carried out to show the relationships between and technological factors and EMIS outcomes. Similarly, interview responses from DEOs and Regional EMIS coordinators were gathered to augment the descriptive and inferential statistics.

4.3.1 Analysis of the technological factors and their impact on EMIS outcomes in counties of Nyanza Region.

To examine whether technological factors had impact on EMIS outcomes in Nyanza Counties, both Data capture personnel and District EMIS coordinators were asked to rate in a five-point rating scale ranging from 1=very low impact to 5=very high impact how the listed items had impacted EMIS outcomes in the Counties of Nyanza region. The EMIS technological factors with one item each were; staff competency, availability of IT infrastructure, functionality of IT infrastructure as well as maintenance and user support. Table 4.10 shows the responses from both Data capture personnel and District EMIS coordinators.

Table 4.10

Ratings of the Impact of Technological Factors on EMIS Outcomes by the EMIS Personnel (n= 58)

Variable	Statement	Respondents		Ratings VL=1	L=2	M=3	H=4	VH=5	Mean $(\overline{\bar{X}})$	S.D
Staff competence	The staff is competent on EMIS	**DCP**	f	1	9	2	31	15	3.86	1.04
			%	(1.72)	(15.5)	(3.4)	(53.4)	(25.9)		
		EC	f	0	4	0	15	10	4.07	0.97
			%	(0.0)	(13.8)	(0.0)	(51.7)	(34.5)		
Availability of IT infrastructure	Computers, internet facilities and other it infrastructure are sufficient	**DCP**	f	5	20	3	18	12	3.22	1.36
			%	(8.6)	(34.5)	(5.2)	(31.0)	(20.7)		
		EC	f	3	11	0	8	7	3.17	1.44
			%	(10.3)	(37.9)	(0.0)	(27.6)	(24.1)		
Functionality of IT Infrastructure	The computers, LAN, printers are functional	**DCP**	f	22	16	5	15	0	2.22	1.22
			%	(38.0)	(27.6)	(8.6)	(25.9)	(0.0)		
		EC	f	8	4	2	5	6	2.48	1.58
			%	(38.1)	(19.0)	(9.5)	(23.8)	(9.5)		
Maintenance and User support	Maintenance, servicing and user support is available and I do not experience operational difficulties	**DCP**	f	23	16	5	9	5	2.26	1.36
			%	(39.7)	(27.6)	(8.6)	(14.9)	(8.6)		
		EC	f	14	8	1	6	0	1.97	1.27
			%	(48.3)	(27.6)	(3.4)	(20.9)	(0.0)		
Overall mean rating on technological factors		**DCP**	**f**	**10.5**	**12.3**	**3**	**14.8**	**6.5**	**2.89**	**1.24**
		EC	**f**	**5**	**5.3**	**0.8**	**6.3**	**3.5**	**2.75**	**1.29**
			f	**7.75**	**8.8**	**1.9**	**10.6**	**5**	**2.82**	**1.27**

INTERPRETATION: Very Low Impact = 1.0 -1.9 Low Impact = 2.0-2.9 Moderate = 3.0 – 3.9

High Impact = 4.0-4.9 Very high impact = 5.0

KEY: **DCP –** Data Capture Personnel **EC –** EMIS Coordinators

f - Frequency **% -** Percent

The results obtained in Table 4.10 shows that the Data Capture Personnel indicated that 'Staff competence' ($\bar{X} =$ 3 .86) and 'Availability of IT infrastructure' ($\bar{X} = 3.22$) were the leading technological factors in terms of their impact on EMIS outcomes. Similarly, Table 4.10 shows that according to EMIS Coordinator, 'Staff competence'

($\bar{X} = 4.07$), had the highest impact on EMIS outcomes, followed by 'Availability of IT infrastructure' ($\bar{X} = 3.17$).

While EMIS Coordinators considered 'Maintenance and User support' ($\bar{X} = 1.97$) to be least influential technological factors on EMIS outcomes, with a low standard deviation of 0.92, signifying almost similar opinion by respondents, the Data Capture Personnel rated 'Functionality of IT Infrastructure' ($\bar{X} = 2.22$) to be the least influential technological factors on EMIS outcomes. Among the Data Capture Personnel, 'Functionality of IT Infrastructure' had the second lowest mean of 2.48 with a highest standard deviation of 1.58, indicative of a divergent view amongst the respondents. On the other hand EMIS coordinators considered Maintenance and User support ($\bar{X} = 2.26$) to be the second least influential technological factor.

On overall, this study found that EMIS technological factors had low impact on EMIS outcomes ($\bar{X} = 2.82$, S.D = 1.27), even though the staff were competent on EMIS and computers, internet facilities and other IT infrastructure were reported to be sufficient and had high impact. This reveals that functionality of IT infrastructure and maintenance and user support were not sufficiently influential to enable technological factors impact positively on EMIS outcomes.

Whilst these findings in Table 4.10 based on opinion of the respondents were not confirmatory to the sufficient availability of IT infrastructures, functionality of IT infrastructure and maintenance and user support in the sub counties of Nyanza region, it did partially substantiate possible justification for low impact of technological

factors on EMIS outcomes. Therefore turning now to the descriptive statistical evidence, the study sought to find out the prevalence of number of computers and internet access a cross the location divides of the DEOs offices in the sub counties of Nyanza region shown in Tables 4.11 and Figure 4.2 respectively.

Table 4.11

Number of Computers in DEOs Office by Location as Reported by EMIS Coordinators (N = 29)

Number Of Computers	Office location			Total
	Urban f (%)	Peri-urban f (%)	Rural f (%)	f (%)
None	1(3.4)	0 (0.0)	3 (10.3)	4 (13.8)
1 - 3	1(3.4)	3 (10.3)	3 (10.3)	7 (24.1)
4 - 6	3 (10.3)	4 (13.8)	6(20.7)	13 (44.8)
7 - 9	3 (10.3)	0 (0.0)	1 (3.4)	4 (13.8)
Above 10	0 (0.0)	0 (0.0)	1 (3.4)	1 (3.4)
Total	8 (27.6)	7 (24.1)	14 (48.3)	29 (100.0)

Mean = 2.71 ≈ 3 computers in every DEOs office Std. Deviation = 1.056

Table 4.11 shows that out of the 29 DEO's offices, majority 13 (44.8%) had 4 to 6 computers in their offices, followed by 7 (24.4%) offices which had at least 1 to 3 computers, 4 (13.8%) had 7 to 9 computers, 4 (13.8%) had none while 1 (3.4%) had more than 10 computers in their offices. Further analysis showed on average there were three computers in every DEOs office, indicative of sufficient availability of computers. The respondents were therefore justified to have opined in their responses in Table 4.13 that IT infrastructure were sufficient. The present findings seem to be

consistent with Republic of Kenya (2009a) that pointed out that the MOE had equipped the District Education Offices with computers, printers and Local Area Networks (LAN) for data capture.

When the respondents were asked whether they had Local Area Network (LAN), most (51.7%) of those surveyed indicated '*Yes, but not functional.* ' Other responses to this question included, 34.3% and 13.8% who indicated '*YES, in working condition'* and '*No, not yet connected'* respectively as illustrated by Figure 4.2. This also accords with our earlier observations in Table 4.11 which showed that that functionality of IT infrastructure and maintenance and user support were not sufficiently supportive to EMIS outcomes.

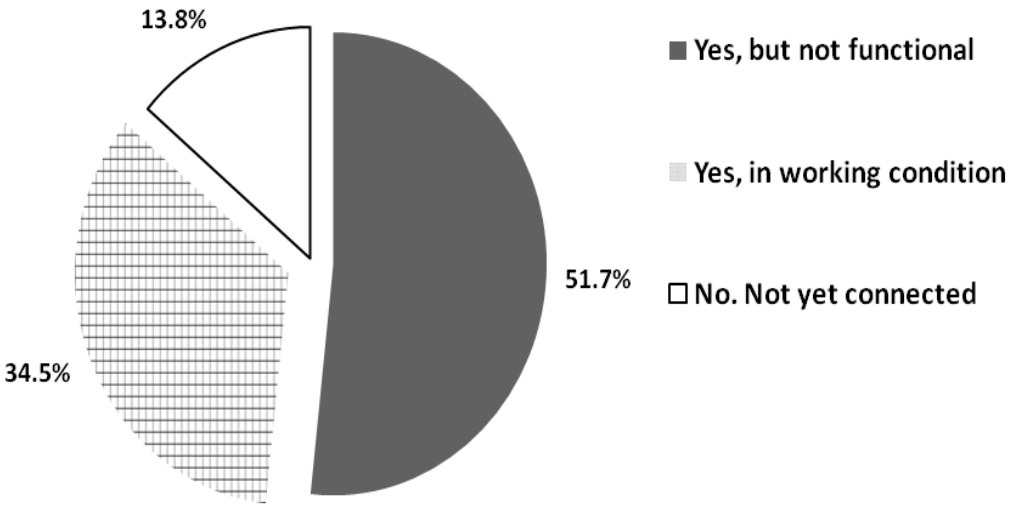

Figure 4.3. Availability and Functionality of Local Area Network (LAN), at the DEO's offices n = 29

Similarly, as highlighted in Figure 4.4, evidence of internet accessibility was found in more than 90% of the DEOs offices, this was consistent with previous findings in Table 4.10 on availability of IT infra-structure.

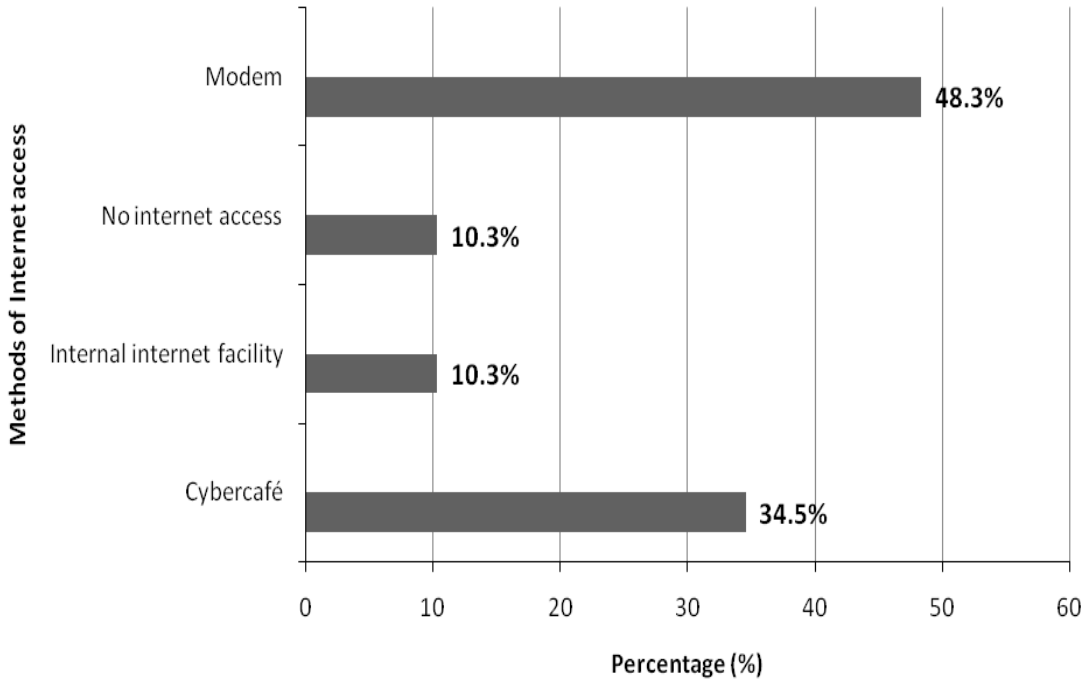

Figure 4.4 Internet access at the DEOs office (n = 29)

As shown in Figure 4.4, there were variabilty in mode of acces to internet; almost a half (48.3%) of the sub counties used modem to access internet, 34.5% accessed through cybercafés, 10.3% had internal internet facilities. A minority of sub counties 3 10.3% had no access to internet facilities.

Subsequently, a chi square test was carried out to establish whether the location of the DEOs' offices as rural, peri-urban or urban was associated with the availability IT infrastructure namely: number of working computers, internet accessibility, and availability of local area network. The chi square test results were as summarized in Table 4.12.

Table 4.12

Chi Square Tests of Location of DEOs' office and Technological Factors. (n = 29)

Technological factors	Chi-Square	df	Asymp. Sig. (2-sided)
Number of working computers	5.662[a]	8	.685
Internet accessibility	7.170[a]	6	.035
Availability of local area network	1.139[a]	4	.488

As indicated in Table 4.12 the Chi-square test did not show any significant association between location of DEOs' offices and number of working computers (Chi-square (8) = 0.152, *P* = 0.697) as well as availability of Local Area Network (Chi-square (6) = 0.152, *P* = 0.697). These results in Table 4.12 were interpreted to mean that the availability of computers and local area network were not dependent on the location of the DEOs office. This chi test analysis confirms that the availability of IT infrastructure was well spread across the sub counties, their locations notwithstanding.

Similarly this view was evident when the Regional EMIS Coordinator said that:

> Computers are available in almost all the sub counties especially the old districts, each has at least 5 computers donated by Ministry of Education, internet connectivity is as about 60% though usage is very irregular.

Other responses to this question during the interviews were those by the DEOs. One DEO stated that, "MOE has worked well towards ensuring availability of computers." These results provided further support for the government policy that led to the provision of computers, printers and Local Area Networks (LAN) for data capture form the purposes of EMIS (Republic of Kenya, 2009a).

The results emanating from Table 4.12, however shows that there was statistical significant association at p = 0.05 between location of DEOs office and Internet accessibility (Chi-square (6) = 7.170[a], *P* = 0.035). The offices of rural locations did not have access to internet facilities or used modems. While those based in urban and peri urban areas accessed to internet through an internal facility, cybercafé or modem. This analysis corroborates the results in Figure 4.4, that revealed that there were variabilty in mode of acces to internet; and that 48.3% of the sub counties used modem to access internet, 34.5% accessed through cybercafés, 10.3% had internal internet facilities and 10.3% of sub counties had no access to internet facilities.

The findings of this study are consistent with those of Hussein et al., (2007a) who found that a higher level of IS competency relates to a higher degree of satisfaction and information quality. Similarly, this finding is in agreement with Ang et al.'s (2001) findings which showed that the level of IS competency among the staff exhibited high levels of IS usage to support TQM processes in the Malaysian public sector. On the same note, it corroborates the ideas of Saunders and Jones (1992) who previously indentified IS competency to be one of the top ten dimensions for assessing IS function performance.

However another DEO commented that;

> Though the computers are available, the maintenance of the same in many stations is poor due to lack of technical competence of users. A numbers of the computers are underutilized or have been vandalized. Computers are available, no internet facilities and maintenance is not very good due to insufficient funds.

This combination of findings from the DEO's interviews and the EMIS personnel questionnaires produced results which corroborate the findings of a great deal of the

previous work by Gaible (2008) who found that despite the completion of EMIS initiatives in Jamaica funded by United States Agency for International Development (USAID), limited access to computers and inadequate connectivity was the main barrier that led to limited information access and utilization.

4.3.2 Relationships between Technological Factors and EMIS Outcomes.

The study sought to establish the relationships between technological factors and EMIS outcomes, based on the descriptive statistics of responses by the EMIS personnel on four technological factors and the six EMIS outcome variables summarized in Table 4.13.

Table 4.13

Summary of Mean Weight Ratings on Technological Factors and EMIS Outcomes (n = 87)

Factors	Variables	Mean	SD
Technological factors	Competency of staff	3.97	1.00
(independent variables)	Availability of IT infrastructure	3.19	1.40
	Functionality of IT infrastructure.	2.35	1.40
	Maintenance and user support.	2.12	1.32
Overall mean response technological factors		**2.90**	**1.25**
EMIS outcomes	Timeliness of Information.	2.57	1.38
(Dependent Variable)	Relevance of information.	3.45	1.26
	Completeness of data.	2.75	1.24
	Reliability of information.	3.26	1,06
	Accessibility of information.	2.73	1.41
	Satisfaction of personnel.	2.76	1.00
Overall mean response on EMIS outcomes		**2.83**	**1.26**

In order to establish the relationships between the technological factors; staff competency, availability of IT infrastructure, functionality of IT infrastructure as well as maintenance and user support and six dimensions EMIS outcomes; timeliness, relevance, completeness, reliability, accessibility of information and satisfaction of personnel, Pearson Moment correlation coefficient was used. Table 4.14 shows the matrix of the correlation results.

Table 4.14

Pearson Product Correlation between EMIS Outcome and Organizational Factors

Independent Variables (organizational factors)		**Dependent Variables (EMIS Outcomes) n = 87**					
		Timeliness	**Relevance**	**Completeness**	**Reliability**	**Accessibility**	**Satisfaction**
staff competency on EMIS	r	.672*	.411	.611*	.443	.372	.691*
	p	.006	.077	.009	.062	.092	.007
Availability of IT infrastructure	r	.575*	.374	.417	.574*	.454	.712**
	p	.041	.094	.072	.039	.052	.002
Functionality of IT Infrastructure	r	.338	.541*	.442	.403	.301	.401
	p	.109	.045	.069	.081	.112	.084
Maintenance and user support	r	.412	.315	.356	.578*	.541*	.372
	p	.076	.118	.089	.011	.043	.091

r – Pearson correlation coefficient p – significance level

r – Pearson correlation coefficient
* Correlation is significant at the 0.05 level (2-tailed).
** Correlation is significant at the 0.01 level (2-tailed).

Table 4.14 shows that there was a significant relationships between 'Staff competency' on EMIS and 'Personnel Satisfaction' (r = .691, p = 0.004), Timeliness (r = 0.672, p = 0.006) and Completeness (r = 0.611, p = 0.017) of data. However no significant

relationship was revealed between Staff competency on EMIS and Relevance (r = 0.411, p = 0.077), Reliability (r = 0.453, p = 0.062), accessibility, (r = 0.372, p = 0.092).

Table 4.14 also indicates that positive and strong relationship existed between; Availability of IT infrastructure' and 'Personnel Satisfaction' (r = 0.712, *p* = 0.002). Similarly significant relationship was noted between 'Availability of IT infrastructure' and Timeliness (r = 0.575, *p* = 0.041), Reliability (r = 0.574, *p* = *0*.039). Though no significant relationship was depicted between 'Availability of IT infrastructure' and 'Relevance (r = 0.374, *p* = 0.094), Completeness (r = 0.417, *p* = 0.072), Accessibility (r = 0.464, *p* = 0.052).

These strong positive relationships found between availability of IT infra-structure with most of the EMIS outcomes corroborate Hussein et al., (2007a), Bento and Bento (2006) and Delson (1994) studies. They found that Internet technologies were highly related to the successful outcomes of the Information processing. Hussein et al. (2007a) established that a higher level of IS competency relates to a higher degree of satisfaction and information quality. This is indeed a confirmatory test of previous study by Ang *et al.* (2001) and Saunders and Jones (1992).

Gaible (2008) observed that when Jamaica launched EMIS initiatives funded by United States Agency for International Development (USAID), limited access to computers and inadequate connectivity was cited to be one of the barriers that led to limited information access and utilization. In addition Gaible's (2008) found that lack of adequately trained staff was a challenge in implementation of EMIS among

Caribbean countries leading to over-reliance on vendor sales representatives whose contracts lacked flexibility, foresight, or protection for the purchasing organizations. Similarly, Kelegai and Middleton (2004) found out that lack of training in existing hardware or software and related technologies and inadequate education regarding new developments in MIS were found to be critical barriers to IS outcomes

Result in Table 4.6 shows that the relationships between 'Functionality of IT Infrastructure' and most (5) of technological factors including ; Timeliness(r=0.338, p = 0..109), Completeness(r = 0.442, p = 0.069), Reliability (r = 0.403, p = 0.081), Accessibility(r = 0.301, p = 0.122), Satisfaction(r = 0.401, p = 0.084) was not significant, except with Relevance (r = 0.541, p = 0.045) of data. Data Capture Personnel rated 'Functionality of IT Infrastructure' (2.22) to be the least influential technological factors on EMIS outcomes. Among the Data Capture Personnel, 'Functionality of IT Infrastructure' had the second lowest mean of 2.48

Equally, the study revealed that there were no significant relationships between Maintenance and user support and the four EMIS outcomes, namely: Relevance(r = 0.412, p = 0.076), Completeness (r = 0.315, p = 0.118), Reliability ((r = 0.356, p = 0.098) and Timeliness of data (r = 0.372, p = 0.091). These results insinuate that availability of IT infrastructure, Maintenance and user support and staff competency on EMIS did not impact relevance of EMIS data. EMIS Coordinator considered 'Maintenance and User support' (1.97) to be least influential technological factors on EMIS outcomes. On the other hand EMIS Coordinator considered Maintenance and User support' to be the second least influential technological factor. These findings further support the idea that poor EMIS outcome in the Nyanza region were attributed to lack of completion of data and satisfaction on part of EMIS personnel as well as

lateness in the submission of data and information occassioned by poor maintenance and user support (Table 4.4). It is probable that unsatisfactory state of 'functionality of IT infrastructure' and 'maintenance and user support' could have led to the poor EMIS outcomes. This connote that availability of IT infrastructure, functionality of IT Infrastructure and maintenance and user support did not have any effect on Completeness of EMIS data.

Though this study found that EMIS technological factors had low impact on EMIS outcomes (Table 4.4), nevertheless, timeliness of data could have been attributed to staff competency on EMIS ($r = 0.672$, $p = 0.006$) and Availability of IT infrastructure ($r = 0.575$, $p = 0.041$) while reliability of data could have been due to aavailability of IT infrastructure($r = 0.574$, $p = 0.039$) and Maintenance and user support($r = 0.578$, $p = 0.011$). Similarly personnel Satisfaction was due to staff competency on EMIS ($r = 0.691$, $p = 0.007$) and Availability of IT infrastructure ($r = 0.712$, $p = 0.002$) (Table 4.14)

Three of the technological factors were associated significantly with one EMIS outcome each. That is as relevance was impacted by Functionality of IT Infrastructure ($r = 0.541$, $p = 0.045$) and Completeness was impacted by staff competency on EMIS ($r = 0.611$, $p = 0.009$) while accessibility of data was impacted by maintenance and user support($r = 0.541$, $p = 0.043$ (Table 4.14). This meant that relevance, completeness and accessibility of data had been minimally affected by technological factors.

More significantly it was realized that during the interviews with both the DEOs and Regional EMIS coordinator, most of the challenges they faced in achieving the objectives of EMIS were basically technological. For example the 20(69.0%) of the DOEs observed that the personnel trained on EMIS were insufficient, 16 (55.2%) noted that virus usually attack the computers and 18(62.1%) said that submission to the headquarters is a bit challenging due to lack of modems or network problems.

Regional EMIS Coordinator observed that:

> The data capture system is still not steady; some information is rejected by the system. Data merging has not been done especially at the Regional level. Feedback mechanisms is not effective since data from the MOE headquarters is not relayed back to be used for planning progress. There has been irregular training of staff yet others leave and little involvement of the field staff in EMIS management and capacity building.

Indeed, Delson (1994) in his part revealed that availability of EMIS facilities, competency of the officers; structure and user support impacted the EMIS successful outcomes.

The study went further to conduct the regression analysis for technological factors on EMIS outcomes, to determine the technological factor that had the most impact on EMIS outcomes. The regression model consisted of four technological factors variables staff competency on EMIS, availability of IT infrastructure, functionality of IT Infrastructure and maintenance and user support the summated EMIS outcome variables. The results were as given in Table 4.15.

Table 4.15

Linear Regression Model Summary of Technological Factors and EMIS Outcomes

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.357[a]	0.127	.121	.68484

a. Predictors: (Constant), Maintenance and user support, Availability of IT infrastructure, staff competency on EMIS , Functionality of IT Infrastructure

According to Table 4.15 the correlation between the dependent variable was however low 0.357. The R^2 was 0.127, indicating that 12.7% of the variance in EMIS outcomes was accounted for by the staff competency on EMIS, availability of IT infrastructure, Functionality of IT infrastructure and Maintenance and user support in the regression model.

Table 4.16

ANOVA Test for Technological Factors and EMIS Outcomes [a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.439	3	.480	2.666	.124[b]
	Residual	14.921	83	.180		
	Total	16.460	86			

a. Dependent Variable: overall EMIS out comes

b Predictors: (Constant), Maintenance and user support, Availability of IT infrastructure, staff competency on EMIS , Functionality of IT Infrastructure

It is worth noting that according to Table 4.16 the ANOVA test for technological factors and EMIS outcomes shows that using the enter method, a non significant model emerged (F (3, 83) =2.666, p= 0.124) .

To explain the impact of the technological variables on EMIS an outcome, multiple regression analysis was conducted on the EMIS outcomes variable and staff competency on EMIS, availability of IT infrastructure, functionality of IT infrastructure and maintenance and user support.

Table 4.17.

Regression Analysis Summary for Effect of Technological Factors in EMIS Outcomes (n = 87)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	8.317	1.138		7.308	.000*
	Staff competency on EMIS	0.464	0.146	0.448	3.178	.002*
	Availability of IT infrastructure	0.256	0.091	0.258	2.813	.005*
	Functionality of IT infrastructure.	0.089	0.114	0.086	0.781	.195
	Maintenance and user support	0.157	0.145	0.152	1.083	.073

a. Dependent Variable: overall EMIS outcomes

Two out of the four variables were statistically significant at 0.05 levels even though the ANOVA test for technological factors and EMIS outcomes shows that a non significant model emerged. The variables 'Staff competency on EMIS' (p = 0.002) and 'Availability of IT infrastructure' (p = 0. 005) were a statistically significant predictors of EMIS outcomes. While, the variables 'Functionality of IT infrastructure' (p = 0.086) and 'Maintenance and user support' (p = 0.067) were not statistically significant predictors of EMIS outcomes. Table 4.17 reveals that staff competency on EMIS

(beta=0.448) and Availability of IT infrastructure' (beta=0.258) were the highest technological predictors of EMIS outcomes in the Sub Counties of Nyanza region. While, the beta magnitudes of 'Functionality of IT infrastructure' (beta = 0. 086) was the lowest followed by 'Maintenance and user support' (beta =0.152) and not statistically significant predictors of EMIS outcomes.

The significant impact of staff competency on EMIS was not a surprise. Previously, there was unanimity by both the Data Capture Personnel and EMIS Coordinator that 'Staff competence' had the highest impact on EMIS outcomes (Table 4.10). In addition correlational analysis showed that Staff competency on EMIS contributed significantly to EMIS outcomes like personnel satisfaction, timeliness and completeness of data. Indeed this was a confirmatory test of previous study by, Hussein et al. (2007a), Ang et al. (2001) and Saunders and Jones (1992).

According to Republic of Kenya (2009b) the MOE had consistently been involved in training of EMIS personnel. The focus of the training has been on role of EMIS in education delivery, sources of educational data, education statistics and indicators, data analysis and reporting as well as dissemination and publication of EMIS data. Other areas include monitoring and evaluation, technology transfer effective information systems, roles and responsibilities in EMIS ICT application in data management. These could have been reason behind significant impact IS/IT competent on EMIS in Nyanza Counties.

Hussein et al. (2007a) established that a higher level of IS competency relates to a higher degree of satisfaction and information quality which; encompasses timeliness, completeness, reliability, and accessibility of information. While Ang et al. (2001) in

their empirical exploration of the use of IS to support TQM processes in the Malaysian public sector revealed that the level of IS competency among the staff exhibit high levels of IS usage. Saunders and Jones (1992) had previously indentified IS competency as one of the top ten dimensions for assessing IS function performance. Gaible's (2008) study in the Caribbean countries and Kelegai and Middleton's (2004) work in two Papua New Guinea (PNG) organisations concurred with the finding of Ang et al. (2001) and Saunders and Jones (1992). Particularly, Gaible (2008) and Kelegai and Middleton (2004) findings were undisputed that lack of adequately trained staff on existing hardware and software as well as and new developments in MIS were critical barriers to MIS implementation. Therefore it is conceivable that these studies seem to suggest that availability of IT infrastructure per se does not guarantee IS implementation success, but having competent in-house IS personnel to effectively resolve the technological issues faced by the end users are crucial to ensure MIS success.

This study also underscored the importance of 'availability of IT infrastructure' as an influential factor on EMIS outcomes (Table 4.17). To both the Data Capture Personnel and EMIS Coordinator 'Availability of IT infrastructure' was the second best influential technological factor on EMIS outcomes (Table 4.10). In addition positive and strong relationship existed between 'availability of IT infrastructure' and 'Personnel Satisfaction, as well as between 'Availability of IT infrastructure' and timeliness and reliability of data (Table 4.17), this could have been attributed to the fact that on average there were three computers in every DEOs office and Internet accessibility was found in more than 90% of the DEOs offices, indicative of sufficient availability of IT infrastructure'. In fact, the Regional EMIS Coordinator confirmed

that Computers were available in almost all the sub counties especially the old districts with each having at least 5 computers donated by MOE.

This findings of availability of IT infrastructure as a predictor of EMIS outcomes is very consistent with findings elsewhere in the literature of adoption and implementation of IS/IT. Bento and Bento (2006), Hussein et al. (2007a) and Masrek, et al. (2009), Ang, et al. (2001) and Chung, et al. (2003) concur that availability of IT infrastructure to be highly correlated with the outcome of IS. Hussein et al. (2004) work in an e-government computing environment found strong co-relation between distributed IS structure and four dimension of IS effectiveness i.e. information quality, systems quality, service quality and perceived usefulness. This argument is further augmented by Masrek, et al. (2009) study, which showed that availability of IS structure is conducive for strategic utilization of IS in terms of product / service differentiation, cost leadership and growth advantage. While Bento and Bento (2006) found that the types of technology used in the IS, the degree of use of e-commerce and Internet technologies was highly related to the successful outcomes of the Information processing. They also found that 'Usefulness of IS' is positively related to technology like internet whereas "Effectiveness' is positively related to technological factors (Internet).

Similarly these findings corroborates research by Ang, et al. (2001) and Chung, Rainer and Lewis, (2003) who found that availability of IS facilities is influential in determining the success of IS adoption and implementation. They argued that IT infrastructure is essential in determining the extent of IS implementation since it's related to IS effectiveness. Gaible (2008) observed that despite the completion of

EMIS development, both information access and information utilization in Jamaica remain limited. Limited access to computers and inadequate connectivity was cited to be one of the barriers that led to limited information access and utilization. Therefore, Gaible (2008) findings similarly underscored the importance of availability of IS facilities as a predictor of IS success. Okiy (2005), in his analysis of the status of ICT in Africa, points out that poor and inadequate telecommunication facilities, poor level of computer literacy, poor level of computer facilities; poor level of awareness of Internet facilities among policy makers, government officials and the ruling class in general; and minimum involvement of academic institutions in network building in Africa as challenges militating against the use of ICTs.

Equally, the study revealed that 'functionality of IT infrastructure' was not statistically significant predictor of EMIS outcomes in the counties of Nyanza region (Table 4. 17). The Data Capture Personnel rated Functionality of IT Infrastructure' to be the least influential technological factors on EMIS outcomes, while the EMIS Coordinator considered 'Functionality of IT Infrastructure' to be the second least influential technological factor (Table 4.10). Therefore it was not surprising those responses from most 11(52.4%) EMIS Coordinators was that the Local Area Network (LAN) were available at the DEOS offices but not functional. Besides the relationships between 'Functionality of IT Infrastructure' and most of technological factors including timeliness, completeness, reliability, accessibility of data as well as personnel satisfaction were not significant, except with relevance of data (Table 4.14). Actually, the Regional EMIS Coordinator confirmed that, internet connectivity was about 60% though usage was very irregular. While one of the DEOs opined that a number of the computers were underutilized or had been vandalized. This was quite inconsistence

with studies by Bento and Bento (2006) who found that the types of technology used in the IS, the degree of use of e-commerce and Internet technologies was highly related to the successful outcomes of the Information processing. DeLone and McLean (2003) observe that IS outcome is affected by how well the hardware and the software work together in relation to the technical expertise.

From the regression analysis, 'maintenance and user support' was another technological factor that did not have any significant effect on EMIS outcomes (Table 4.17). The EMIS Coordinator considered 'Maintenance and User support' to be least influential technological factors on EMIS outcomes, while Data Capture Personnel considered Maintenance and User support' to be the second least influential technological factor. Again, the correlational analysis with the EMIS outcomes revealed that no significant relationships existed between Maintenance and user support and four EMIS outcomes, namely: relevance, completeness, reliability and, timeliness of data.

This finding differs from submissions of previous findings. For example Hussein et al. (2007) empirically proved that technical user support is significantly correlated with IS success such as systems quality, information quality, perceived usefulness and user satisfaction. Ang et al. 2001 demonstrated a positive contribution of technical user support on IS utilization, while Mirani and Kin, (1994) and Vijayaraman and Ramakrishna (1990) recognized the importance of technical user support in ensuring personal computer utilization.

Further to that, a response from one of the DEOs qualified this finding more clearly by substantiating that though the computers were available, the maintenance of the same in many stations was poor due to lack of technical maintenance support and insufficient funds to meet repair costs. For that reason, it was not a unique occurrence that 'maintenance and user support' did not have any significant effect on EMIS outcomes.Tong and Trinidad (2005) argued that lack of technical support for users leads to frustration resulting in their unwillingness to adopt IS/IT. While Jones (2004) cited in Buabeng-Andoh (2012) note that the frequent breakdown of computers and lack of technical assistance leads to user dissatisfaction attributable to anxiety and fear for equipment failure.

4.4 Impact of Organizational Factors on EMIS Outcomes

The third objective of the study was to determine the impact of organizational factors on EMIS outcomes in the counties of Nyanza Region. To realize this objective data was examined on prevalence and as well as the ratings on the impact of organizational factors on EMIS outcomes of EMIS, correlations and multiple regression between organizational factors and EMIS outcomes. Likewise, interview responses from DEOs and Regional EMIS coordinator were collated with respect to this objective.

4.4.1 Analysis of Characteristics of Organizational Factors and their Impact on EMIS Outcomes in the Counties of Nyanza Region.

To explore the impact of organizational factors on EMIS outcomes in Nyanza Region, Data Capture Personnel's' (n =58) and EMIS Coordinators' (n= 29) responses were recorded. The descriptive statistics on ratings on impact of Organizational factors on EMIS outcomes Nyanza Region were measured in a 1-5 scale ranging from very low

impact to very high impact. These organizational factors including; management support, Decision making structures and management style, managerial EMIS/ IT knowledge, resources allocation and motivation mechanisms had a single item measure. Their responses were as indicated in Table 4.18.

Table 4.18

Ratings on the Impact of Organizational Factors on EMIS Outcomes by Data Capture Personnel (n=58) and EMIS Coordinators (n = 29).

Variable	Statement	Respondents		Ratings						
				VLI=1	LI=2	MI=3	HI=4	VHI=5	Mean	S.D
Management support	Senior officers are supportive of EMIS activities	DCP	f	8	11	5	13	21	3.48	1.46
			%	(12.1)	(24.1)	(8.6)	(18.9)	(36.2)		
		EC	f	4	3	6	9	7	3.41	1.33
			%	(13.8)	(10.3)	(20.7)	(31.0)	(24.1)		
Decision making structures and management style	Decision making structures and management style are supportive to EMIS.	DCP	f	8	9	11	17	13	3.31	1.33
			%	(13.8)	(15.5)	(19.0)	(29.3)	(22.4)		
		EC	f	6	7	4	8	4	2.90	1.40
			%	(20.7)	(24.1)	(13.8)	(27.6)	(13.8)		
Managerial EMIS/ IT knowledge	Senior officers have good knowledge of IT to support EMIS	DCP	f	6	17	4	20	11	3.22	1.32
			%	(10.3)	(29.3)	(6.9)	(34.5)	(19.0)		
		EC	f	1	7	3	12	6	3.52	1.12
			%	(3.4)	(24.1)	(10.3)	(41.4)	(20.7)		
Resources allocation	Funds and resources are readily available for EMIS activities	DCP	f	20	22	0	16	0	2.22	1.20
			%	(34.5)	(38.9)	(0.0)	(27.7)	(0.0)		
		EC	f	9	12	0	8	0	2.24	1.22
			%	(31.0)	(41.4)	(0.0)	(27.6)	(0.0)		
Motivation mechanisms	Motivation mechanisms inspire EMIS personnel.	DCP	f	16	18	10	12	2	2.40	1.16
			%	(27.6)	(36.2)	(10.3)	(27.6)	(0.0)		
		EC	f	5	8	3	13	0	2.81	1.29
			%	(17.2)	(27.6)	(10.3)	(48.3)	(0.0)		
Overall mean rating on organizational factors		**DCP**	**f**	**8.6**	**13.8**	**4.2**	**13.2**	**7.2**	3.056	1.328
		EC	**f**	**3.6**	**5.4**	**2**	**7.6**	**2.4**	3.018	1.268
		Overall	**f**	**6.1**	**9.6**	**3.1**	**10.4**	**4.8**	3.038	1.298

Interpretation: Very Low Impact = 1 .0 -1.9 Low Impact = 2.0-2.9

Moderate Impact = 3.0 - 39 High Impact = 4.0-4.9 Very high impact = 5.0

KEY: **DCP –** Data Capture Personnel **EC –** EMIS Coordinators

f - Frequency **% -** Percent

The results in Table 4.18 shows that the Data Capture Personnel identified 'Management support' ($\bar{X} = 3.48$) as the most important organizational factor that impacted EMIS outcomes, this was followed by 'Decision making structures and management style' ($\bar{X} = 3.31$) and 'Managerial EMIS/ IT knowledge' ($\bar{X} = 3.23$). They further indicated that 'Resources allocation' ($\bar{X} = 2.21$) and 'Motivation mechanisms' ($\bar{X} = 2.40$) were the least influential organizational factors on EMIS outcomes. Intuitively, it can be concluded that EMIS personnel were less motivated; decision making structures and management style were not supportive while the funds were not readily available to support the activities of EMIS and therefore negatively impacted to EMIS outcomes in general.

According to the EMIS coordinators, 'Managerial EMIS/ IT knowledge' ($\bar{X} = 3.52$) and 'Management support' ($\bar{X} = 3.41$) were the most influential organizational factors on EMIS outcomes. Though Data Capture Personnel had a similar response on management support, but to a comparatively higher mean to EMIS coordinators' responses (Table 4.18). Similarly, results from interviews revealed that the senior officers supported EMIS activities. For example, Regional EMIS Coordinator stated that:

> My office supported EMIS activities by relaying of information from MEO head quarters to districts, identifying those districts with problems and alerting EMIS headquarter teams, providing technical support, coordinating the monitoring of EMIS progress, advising the personnel and a number of staff have been trained by MOE head quarters under my guidance.

In addition, DEOs' responses showed that they greatly supported EMIS activities. Specifically the majority 12(41.3%) DEOs indicated that they provided finances, 9(31.0%) indicated that they provided office computers or offered their personal

laptops for EMIS data capture. Besides, 7(24.1%) DEOs noted that they coordinated the data collection process from educational institutions through Teacher Advisory Centre (TAC) tutors. While another said that they give moral support and follow-up with grassroots to ensure that data collection and capture in to the computers was timely.

The observed 'high impact' of EMIS outcomes by 'management support and managerial EMIS/ IT in (Table 4.18) was in agreement with findings from interviews with the Regional EMIS Coordinator's opinions. For example when the Regional EMIS Coordinator was asked; "how has your experience and knowledge in EMIS and ICT assisted you to facilitate EMIS", he commented that;

> My experience and knowledge in EMIS and ICT assisted me to facilitate EMIS and I have been able to sort out less complex technical issues in EMIS data capture for example installation of the software system**.**

However, there was a general observation from the DEOs that due to ; inadequate sensitization 6(20.7%) and incompetence in ICT 11(37.9%), it has made it challenging for them to effectively manage EMIS data, but having realized the meaning and importance of EMIS, they have decided to set aside a computer to be used in EMIS.

These findings accord with those of Saunders and Jones, (1992), Ang, Davies and Finlay (2001) and Lawrence (2010) studies which found that top management support are fundamental predictors of the outcome of Information System in an organization. Similarly Hussein et al. (2007) documented positive effect of involvement and participation of the top-level management of the organization in IT/IS activities in their study of e-government agencies in Malaysia. This may partly be due to the fact that the

top management authorizes funds and implements an IS, they would be eager to reap positive results to ascertain whether their decisions were correct and fruitful (King & Teo, 1996)

However a closer analysis of Table 4.18 reveal that less emphasis was placed on 'Motivation mechanisms' ($\bar{X} = 2.81$) and 'Resources allocation' ($\bar{X} = 2.24$) by EMIS coordinators, they considered these factors to have had least impact on EMIS outcomes. These findings confirmed that, 'Resources allocation' and 'Motivation mechanisms' were the least influential organizational factors on EMIS outcomes as indicated by the Data capture personnel too. Interestingly, interview responses from the DEOs and Regional EMIS coordinator were in the contrary concerning resource allocation. They were unanimous that computers and some funds were put in place to facilitate the success of EMIS. One DEO emphasized that; "the funds were used for servicing computers". Another commented that; "the only hitch has been the delay of remittance of funds from the MOE, actually we are still waiting to receive the money."

It can be inferred that Results in Table 4.18 suggest that EMIS personnel were less motivated, the funds were not readily available or if not untimely to support the activities of EMIS and therefore negatively impacted to EMIS outcomes. These results were further augmented by the views of the DEOs in an attempt to respond to the questions; do you feel that the EMIS personnel are motivated to carry out their duties? What specifically motivates them? In their response, one participant said: "No, they are not motivated, they do the work grudgingly. Most are only lightly motivated when funds are availed for the same without which many are unwilling to work." Another

DEO expressed the belief that; the personnel are mostly motivated if money is set aside to facilitate the process since this was not their core duty.

But the Regional EMIS coordinator opined that:

> The EMIS personnel who had been sponsored for training were motivated, however not so much, as the MOE no longer pay for the keying in data as was the case when the programme was first introduced.

According Wixom and Watson (2001), having sufficient funds, appropriate people and enough time has had positive effects on IS/IT project's outcome. This is consistent with other studies such as Hussein, et al.'s (2007), which observed that, the Malaysian government had allocated a huge amount of funds in the national ICT projects and most of them succeeded. In deed Hussein, et al. (2007) found resource allocation to be related to system quality, information quality, perceived usefulness and user satisfaction.

However, the DEOs identified four broad categories of challenges: "Inadequate funding, late disbursement of funds, technical incompetence, limited staff and some schools do not remit correct data."

A significant disparity was noted that while, Data Capture Personnel indicated that 'Decision making structures and management style' ($\bar{X} = 3.31$) was the second most influential organizational factors on EMIS, according to the EMIS coordinators, 'Decision making structures and management style' ($\bar{X} = 2.90$) was the third least influential factor (Table 4.18), a view which was supported by a DEO's comment that: "Bureaucracies involved in decision making militate against effective observation of deadlines in EMIS".

In an interview with the Regional EMIS coordinator, he explained that: “The decision making process for EMIS is mainly up bottom approach, the headquarters develops what should be implemented and this is communicated to the lower offices.” This was evident when another DEO said that: “In many occasions we emphasize to the heads of institutions in our meetings the necessity and urgency of EMIS data, this has helped us to meet our deadlines in data capture”.

Taking all the factors together, the impact of organizational factors on EMIS outcomes was Moderate ($\bar{X} = 3.038$) however with high Standard Deviation of 1.298 gives a picture of a diverse view of the respondents. Therefore to understand the dynamics of impact of organizational factors on EMIS outcomes, it was crucial that characteristics of the District Education Offices in the Nyanza counties in terms durations since they were started, their location and total number of staff were tallied. Table 4.19 shows distribution of DEOs offices by durations since started and location

Table 4.19

Distribution of Does Office by Durations since Started and Location as Reported By EMIS Coordinators (N = 29)

Duration Since Started (years)	Office Location			Total
	Urban	Peri-urban	Rural	
	f (%)	f (%)	f (%)	f (%)
Less than 5	0 (0.0)	1(3.4)	4 (13.8)	6 (20.7)
Between 6 to 15	3 (10.3)	2 (10.3)	3 (10.3)	8(27.6)
Between 16 to 25	4 (13.8)	1 (3.4)	5 (17.2)	10 (34.5)
More than 25	1 (3.4)	1 (3.4)	3 (10.3)	5 (17.2)
Total	8 (27.6)	5(17.2)	14 (48.3)	29 (100.0)

Mean = 15.5years standard deviation 1.03

The results summarized in Table 4.19 shows that most 10(34.5%) of the DEO offices were established between 16 to 25 years ago. Those which were established between 6 to 15 years ago and less than 5 years ago were 8 (27.6%) and 6 (20.7%) respectively. Some 5(17%) of the DEOs offices had been in existence for more than 25 years. The offices had averagely been in existence for 15.5years (S.D =1.03), considerably long enough to have had an establishment of personnel, IT infrastructures and processes that could set up EMIS system in working condition.

The Table 4.19 similarly illustrates characteristics of DEOs offices by their location. Over a quarter 14 (48.3%) of the DEOs offices were identified to be in the rural set up, while 8(27.6%) of them were in urban and a minority 5 (17.2%) were found in peri-

urban set ups. Hence, it could conceivably be hypothesised that since almost half (45%) of the offices were located in either urban or peri-urban set ups access to IT infrastructure and skills was achievable.

The other organizational characteristics that are presented in this section include number of Staff in the DEOs office. From the data presented in Figure 4.5, we can see that 8.3% of DEOs offices that had more than 20 members of staff and slightly more than a third of the offices 34.5% had between 6 to 10 staff, while 27.0% offices had between 11 to 15 staff. Other 17.2% offices had between 16 to 20 members of staff and some 10.3% had less than 5 members of staff.

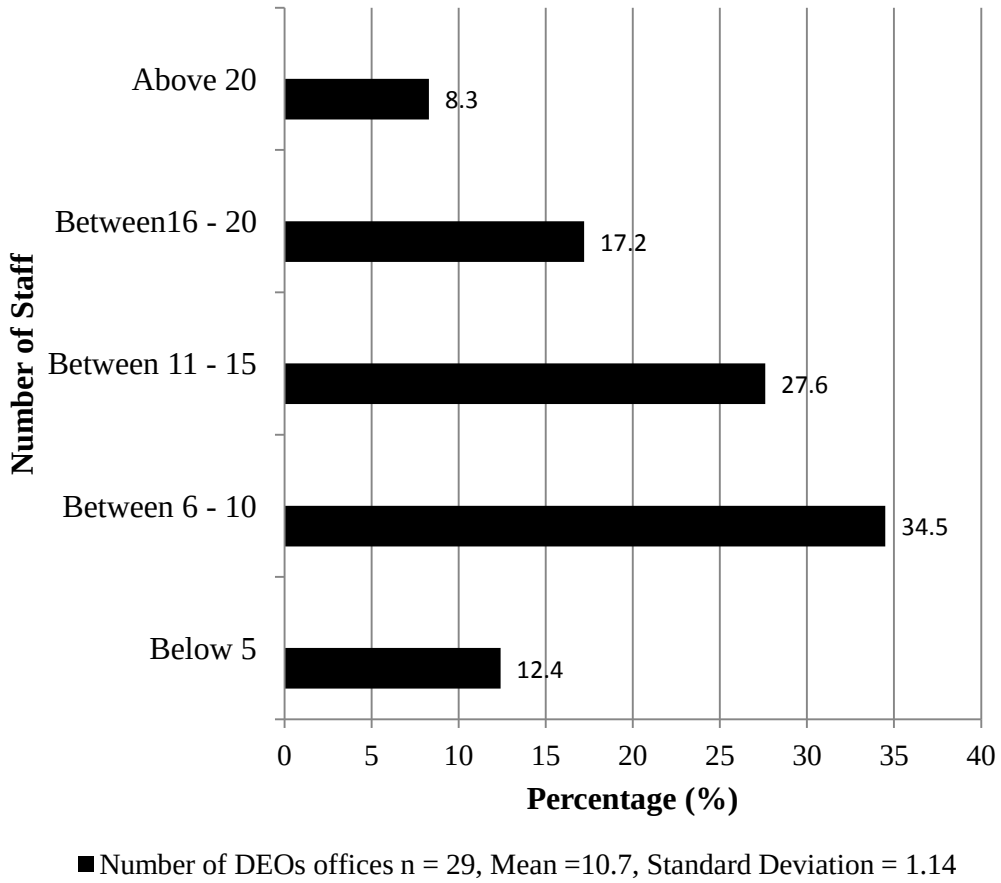

Figure 4.5 Distribution of DOEs offices by number of Staff

Contrary to expectations that the staff would be fewer just as EMIS personnel were, the results show that DEOs offices were well staffed. This may imply that even though the DEOs offices were well staffed, the personnel were either not willing to be involved in EMIS or lacked technical knowhow to carry out EMIS activities.

When the District EMIS coordinators were asked whether there were other systems for collecting data in their districts, most 86.2% of them indicated "YES", while only 4 (13.8%) the indicated "NO". The study went further to find out specifically the other data collection systems that existed in the districts, and the responses were presented in Table 4.21.

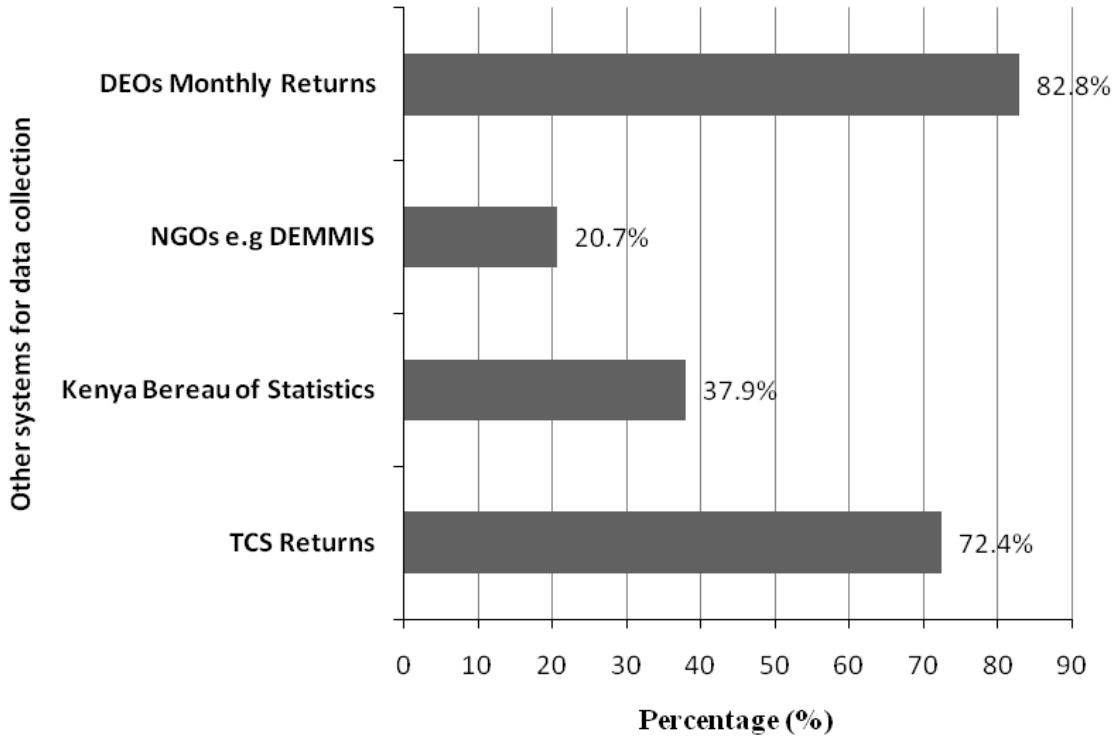

Figure 4.6 Distribution of DOEs offices by other systems for collecting data (n = 29)

The results summarized in Figure 4.6 shows other systems for collecting data included; DEOs Monthly returns (82.8%), TSC returns (72.4%), Kenya Bureau of Statistics (37.9%) and others were from Non Governmental Organizations e.g. DEMMIS (20.7%). Similarly, interview with the Regional EMIS Coordinator confirmed that; the TSC is also involved in data capture but their data majorly related to teacher staffing and enrolment in education institutions.

4.4.2 Relationships between Organizational Factors and EMIS Outcomes.

To show the relationships between the organizational factors and EMIS outcomes, further statistical analyses in the form of Pearson's moment correlation was done. The analyses were based on the responses on the five organizational factors in (Table 4.18) and the six EMIS outcome variables in (Table 4.6). They were summarized in Table 4.20.

Table 4.20

Summary of Mean Weight Responses on Organizational Factors and EMIS Outcomes (n = 87)

Factors	Variables	Mean	SD
Organizational factors	Management support	3.58	1.12
(independent variables)	Decision making structures and management style	2.06	1.36
	Managerial EMIS/ IT knowledge	3.35	1.32
	Resources allocation	2.22	0.93
	Motivation mechanisms	2.38	0.91
Overall mean response Organizational factors		**2.70**	**1.30**
EMIS outcomes	Timeliness of Information.	2.57	1.38
(Dependent Variable)	Relevance of information.	3.45	1.26
	Completeness of data.	2.75	1.24
	Reliability of information.	3.26	1,06
	Accessibility of information.	2.73	1.41
	Satisfaction of personnel.	2.76	1.00
Overall mean response on EMIS outcomes		**2.91**	**1.26**

Table 4.21 shows the matrix of the correlation results

Table 4.21
Pearson Product Correlation between EMIS Outcome and Organizational Factors (n= 87)

Dependent Variables (EMIS Outcomes)		Independent Variables (organizational factors)					
		Timeliness	**Relevance**	**Completeness**	**Reliability**	**Accessibility**	**Satisfaction**
Management support	r	.542*	.572*	.402	.311	.372	.615*
	p	.021	.020	.062	.086	.064	.004
Decision making structures and management style	r	.391	.346	.236	.568*	.193	.494
	p	.074	.067	.072	.015	.270	.067
Managerial EMIS/ IT knowledge	r	.435	.411	598*	.607*	.396.	. 623*
	p	.096	.108	.004	.002	.125	.023
Resources allocation	r	.615*	.372	.592*	.582	.458	.341
	p	.004	.02	.023	.018	.067	.094
Motivation mechanisms	r	.411	.458	.608*	.388	.341	.336
	p	.092	.043	.002	.064	.094	.072

r – Pearson correlation coefficient p – significance level

* Correlation is significant at the 0.05 level (2-tailed).

The result in Table 4.21 shows that positive and strong relationship existed between management support and timeliness (r = .542, p = 0.021), relevance (r =.572, p = 0.020), personnel satisfaction (r = 0.615, p = 0.004). This meant that management support contributed significantly to timeliness, relevance of EMIS data and user satisfaction. However no significant relationship was depicted between "Management support" and completeness, reliability and accessibility of EMIS data. Decision-making structures and Management Style had a significant positive relationship with reliability(r = .568, p = 0.015) of data alone. Neither did Decision-making structures

and Management Style, have any significant effect on timeliness, relevance, completeness, accessibility nor personnel satisfaction at p = 0.05. This signifies that Decision-making structures and Management Style had the greatest contributor to the poor EMIS outcome as it was noted in Table 4.18

There was a significant relationships between Managerial EMIS/ IT knowledge and completeness (r = .568, p = 0.015), reliability (r = .607, p = 0.002) and satisfaction (r = .623, p = 0.023). Resources allocation contributed significantly to EMIS outcomes like; timeliness(r = 0.615, p =0.004), completeness (r =0.592, p =0.023), reliability (r =0.582, p =0.018) and relevance (r =0.372, p =0.02). There was no significant relationship between resources allocation and accessibility(r =0.458, P =0.067) and personnel Satisfaction(r =0.341, P =0.094). Motivation mechanisms contributed only to completeness of data significantly (r = .608, p = 0.002), but had no significant relationships with the rest of the five EMIS outcome variables. This was a confirmation to the fact that motivation mechanisms in Nyanza counties contributed to the poor EMIS outcomes.

Therefore according to the correlation analysis results, the decision making structures and management style and Managerial EMIS/ IT knowledge and Motivation mechanisms had less impact on EMIS outcomes. This is in contrast with Hussein et al. (2007b) and Ang et al. (2001b) finding that managerial IT knowledge, awareness and recognition of IS activities and potentials, as well as their ability to plan strategically has an impact on successful IS outcomes. In this study the finding implied that tendency to promote EMIS was never dependent on whether the DEOs recognized IS/IT or not.

These finding corroborates Saunders and Jones' (1992), Ang, Davies and Finlay's(2001) as well as Lawrence's (2010) studies that showed that 'top management support' is fundamental predictors of the outcome of Information System in an organization. Similarly Hussein et al. (2007) conducted a study on organizational factors that impact information systems success in e-government agencies in Malaysia and found the successful outcomes of IS was responsive to the involvement and participation of the top-level management of the organization in IT/IS activities. Similarly, King and Teo (1996) and Jarvenpa and Ives (1991) found that managerial support of an IS system is imperative in determining its successful outcomes. King and Teo (1996) argue that since the top management authorizes, funds and implements an IS, they would be eager to reap positive results to ascertain whether their decisions were correct and fruitful.

Regional EMIS coordinator explained further that the decision making process for EMIS is mainly up bottom approach, the headquarters develops the policy and this is communicated to the lower offices for implementation. Most DEOs revealed that in many occasions they emphasized the importance of EMIS data capture in their meetings with the heads of institutions, this has helped them to meet our deadlines in data capture. One respondent DEO was categorical that: "Bureaucracies involved in decision making militate against effective observation of deadlines."

Further multiple regression analysis was used to test if the organizational factors significantly predicted EMIS outcomes. The results were as shown in Table 4.22.

Table 4.22

Linear Regression Model Summary of Organizational Factors and EMIS Outcomes

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.428	0.183	0.179	.46757

a. Predictors: (Constant), Motivation mechanisms, Management support, Managerial EMIS/ IT knowledge, Decision making structures and management style

Table 4.22 gives the linear regression model summary of organizational factors and EMIS outcome which shows that coefficient of determination (R^2) was.183. This indicates that all organizational factors explained a significant 18.3% proportion of the variance in EMIS out comes. In other words, 18.3% of the variance in EMIS outcomes was accounted for by the motivation mechanisms, management support, managerial EMIS/ IT knowledge and Decision making structures and management style; rest of 81.7% is explained by other factors not mentioned in this regression model.

Consequently, the ANOVA test for the significance of the regression model of organizational factors on EMIS outcomes as measured by the enter method, was given in Table 4.23.

Table 4.23

ANOVA Test for Organizational Factors and EMIS Outcomes [A]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2.694	3	.898	5.509	.022[b]
	Residual	13.554	83	.163		
	Total	16.248	86			

a. Dependent Variable: EMIS outcomes

b. Predictors: (Constant), Motivation mechanisms, Management support, Managerial EMIS/ IT knowledge, Decision making structures and management style

The analysis of variance (ANOVA) tests results in Table 5.23 shows that organizational factors significantly predicted the EMIS outcome in counties of Nyanza ($F(3, 83) = 5.509$, $p = 0.022$).

Finally, multiple regressions analysis was used to determine the magnitude of the differential impact of the organizational factors (motivation mechanisms, management support, managerial EMIS/ IT knowledge, Decision making structures and management style) on EMIS outcomes. These results which include beta, t, and sig values depicted the magnitude and significance of each organizational factor's impact on EMIS outcomes as shown in Table 4.23.

Table 4.24

Regression Analysis for Effect of Organizational Factors in EMIS Outcomes (n=87)

Model		Coefficient coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.764	0.29		12.979	.000
	Management support	0.292	0.07	0.295	4.171	.001*
	Decision making structures and management style	0.081	0.075	0.083	1.080	.086
	Managerial EMIS/ IT knowledge	0.034	0.044	0.036	0.773	.143
	Resources allocation	0.283	0.086	0.286	3.291	.004*
	Motivation mechanisms	0.092	0.074	0.094	1.243	.067

Table 4. 24 shows regression results which indicated that two of the five organizational variables were statistically significant at 0.05 levels. Specifically, the variables 'Management support' (p = .001) and 'resources allocation' (p = .004) were statistically significant predictors of EMIS outcomes. While, the variables 'Decision making structures and management style' (p = .086), 'managerial EMIS/ IT knowledge' (p = .143) and 'motivation mechanisms' (, p = .067) were not statistically significant predictors of EMIS outcomes.

Though the analysis of variance (ANOVA) tests results in Table 4.23 show that organizational factors explained a significant 18.3% proportion of the variance in EMIS out comes, the individual organizational factors had differential contribution

levels of magnitude and significance. It can be seen from the data in Table 4.24 that 'management support' (beta = 0.292) was the highest predictor of EMIS outcomes followed by 'resources allocation' (beta = 0.283). While, the beta magnitudes of 'managerial EMIS/ IT knowledge' (beta =0.034, p = .143) was the lowest followed by 'Decision making Structures and Management style' (beta =0.081, p = .086), and 'motivation mechanisms' (beta =0.092, p = .067) and not statistically significant predictors of EMIS outcomes.

Surprisingly, whereas 'resource allocation' had been viewed to have had low impact on EMIS from the analysis of the opinion based responses in the rating scale, the regression results proved that 'resource allocation' was a significant predictor of EMIS outcomes. This discrepancy may be attributed to variability in the responses in the rating scale (S.D = 1.35). According to Hwang et al. (2012), though the high impact of organizational factors like resource is generally recognized, their effect has been characterized as situational and their effect may be moderated by other variables.

Consistent with other studies by Saunders and Jones, (1992), Ang, Davies and Finlay (2001) and Lawrence (2010) studies, the data from Nyanza region reveals that management support was the most important organizational factor that impacted EMIS outcomes. In reference to the descriptive analysis of the ratings on impact of organizational factors, management support emerged to be the most influential factor on EMIS outcomes (Table 4.18). In addition Pearson's moment correlation revealed that management support contributed significantly to timeliness, relevance of EMIS data and user satisfaction (Table 4.21), yet again the regression analysis confirms the same. This finding corroborates the finding of Ang, Davies and Finlay, (2001) and

Lawrence (2010) which documented positive effect of top management support on the outcome of Information System in Malaysian Public Sector.

Similarly, King and Teo (1996) and Jarvenpa and Ives (1991) found that managerial support of an IS system is imperative in determining its successful outcomes. Two arguments could support the reason behind the impact of EMIS outcomes by Management support. First, King and Teo (1996) argue that since the top management authorizes funds, secondly they are the implementers of the IS, they would be eager to reap positive results to ascertain whether their decisions were correct and fruitful. According to Masrek, Jamaludin, and Hashim (2009), high degree of managerial support for IS /IT implementation demonstrates commitment and develops conducive implementation environment by providing necessary resources such as time, space, equipment and people. They add that when vision are shared within the organization and continually communicated and supported by senior management, it leads to clear common objectives toward technological advances. However no significant relationship was depicted between "Management support" and completeness, reliability and accessibility of data (Table 4.21). In addition, absence of legal provisions to guard against misinformation by heads of learning institutions that provided inaccurate data to suit their unique circumstances (Republic of Kenya, 2012).

Young and Jordan (2008) agreed with Hwang, Lin and Lin's (2012) results and concluded that top management support amongst organizational factors is the most critical factor to Information systems' implementation success. Similarly Hussein et al. (2007) documented positive effect of involvement and participation of the top-level management of the organization in IT/IS activities in their study of e-government

agencies in Malaysia. However, not all empirical evidence supports the critical role of top management support (Dong, Neufeld, & Higgins, 2009). Sharma and Yetton (2011) asserts that effect of top management support on IS could be situational.

But still the correlation results showed that resources allocation contributed significantly to EMIS outcomes like; timeliness, completeness, reliability and relevance of data (Table 4.21). No wonder, 'Relevance of information' followed by 'Reliability of information' were the best EMIS outcomes in the Nyanza region (Table 4.18). These findings on resources allocation support the previous work of Gaible (2008), Wixom and Watson (2001), Hua and Herstein (2003) and Ang, et al. (2001), Sepahvand and Arefnezhad (2013) and Masrek, Jamaludin, and Hashim, (2009) which showed that resources allocation was a fundamental factor in the IS implementation and success. According to Masrek, Jamaludin and Hashim, (2009) availability of resources aid in the IS implementation and success in three ways; first it contributes to technical and organizational preparedness through previous expenditures, acquire resources that aid in implementation, such as securing the services of managerial or technical talent from a consulting firm and pursue more risk due to the cushion of assets that will lessen the blow of a failure should it occur. More so, having sufficient funds, appropriate people and enough time have positive effects on project's outcome because it leads to a better organizational commitment and also overcome organizational obstacles (Wixom & Watson, 2001). For example, the Malaysian government had allocated a huge amount of fund in the national ICT projects and most of them succeeded such that resource allocation significantly system quality, information quality, perceived usefulness and user satisfaction.

In their review of integrated data and information systems and their implications in educational management at Harvard University, Hua and Herstein (2003) pointed out that availability of sufficient funds; appropriate people and enough time have positive effects on EMIS project's outcome. Gaible's (2008) experience in Jamaica and Trucano's (2006) study in Nigeria revealed that early EMIS work in those countries were incomplete and not sustained, partly due to lack of resources and high costs associated with acquisition, operation and maintenance of ICT infrastructure. In fact, Gaible (2008) attributed impediments in the process of acquisition of ICT infrastructure to protracted procurement procedures, differing accounting systems, and priorities by donors and inter-ministry coordination. Furthermore, some researchers, such as Hua & Herstein, (2003) and Hwang, Lin and Lin (2012) have observed that implementation of information systems is usually resource intensive, but the results are often less than satisfactory due to organizational factors.

Wixom and Watson (2001) also found significant relationship between resources and IS implementation. Hussein, et al. (2007) found resource allocation to be related to system quality, information quality, perceived usefulness and user satisfaction. However, there was no significant relationship between Resources allocation and accessibility, and personnel Satisfaction. Hussein, et al. (2007) observed that, the Malaysian government had allocated a huge amount of fund in the national ICT projects. Hua and Herstein (2003) noted that EMIS activities have been frequently funded initially through one-off disbursements by donor organizations with little hope of funds for sustainability thus prevent realization of the anticipated goals.

The bivariate analysis in Table 4.21 revealed that 'management support' contributed significantly to majority 3(50%) out of 6 EMIS outcomes including; timeliness, relevance of EMIS data and user satisfaction, while 'resources allocation' contributed significantly to 4 (66.7%) of EMIS outcomes like; timeliness, completeness, reliability and relevance of information. On the same note results in Table 4.17 showed that 'availability of IT infrastructure' was a significant predictor of EMIS outcomes ($t = 2.50$, $p = .005$). Therefore, it is only logical to conclude that 'availability IT infrastructure' could only be actualized under 'sufficient resource allocation' by a 'supportive top management.'

A significant difference was noted that while, Data Capture Personnel indicated that 'Decision making structures and management style' was the second most influential organizational factors on EMIS, to the EMIS coordinators, 'Decision making structures and management style' was the third least influential factor, a view which was supported by a DEO. This discrepancy may be due to bottlenecks brought about the three-tier-decision making structure within MOE, leading to time delays in actualizing EMIS activities. It is worth noting that decision making structure at the MOE in Kenya is a hybrid of a centralized system at the MOE headquarters and decentralized to county-level, DEOs offices and school level. Following O'Reilly and Pfeffer's (2000) assertion that highly centralized organizations tend to have more bureaucratic traits, it could have been possible that feedback from institutional heads on the EMIS was hardly ever sought by MOE headquarters, yet thrust of implementation of any education policy lies with institutional heads (Digolo, 2013). Indeed this argument is supported by Gaible's (2008) observation that lower tier authorities may complain about their participation in EMIS managed by a central

governmental authority, especially where there is no history of sharing information and receiving anything useful in return.

Inconsistent with other studies by Hussein et al. (2007), Saunders and Jones (1992) and Ang et al. (2001) regression analysis of, the data from Nyanza region suggested that Decision making structures and management style was not a statistically significant predictor of EMIS outcomes (Table4.24). Hussein et al. (2007), Saunders and Jones (1992) and Ang et al. (2001) found management style to be highly correlated to information system's reliability and usability, information relevance, timeliness and user satisfaction.

Evidence by Bento and Bento's (2006) and Ang et al. (2001) studies, considered decision-making style to be related to three critical outcomes of IS; information quality, effectiveness, and usefulness. However, the findings of the current study do not support these previous researches. In this study, Decision making structures and management style only had a significant positive relationship with reliability. This signifies that 'Decision making structures and management style' had the greatly contributed to the poor EMIS outcome in Nyanza Region (Table 4.18).

While Hussein, et al. (2007) found successful outcomes of an IS in public sector environment which adopts the traditional style of centralized IS structure, Trucano's (2006) on the other hand in Nigeria found that the development of standardised software augured well for state-level EMIS to provide comprehensive information in support of decentralised management. It seems that there is no conclusive evidence as to which of decision making systems has effect on IS outcome (Trucano, 2006), and

since this study did not find decision making structures to be significant predictor of IS, it is only prudent to resort to collaborative management style amongst the central coordinating body, lower tiers of management and stakeholders for EMIS success (Hua & Herstein, 2003).

Contrary to Ang et al. (2001) and Hussein et al. (2007b) findings, this study did not find 'managerial EMIS/ IT knowledge' as a statistically significant predictor of EMIS outcomes (Table 4.24). Similarly, responses from Data capture personnel and EMIS coordinators revealed that managerial EMIS/ IT knowledge had 'low impact' on EMIS in the counties of Nyanza (Table 4.18). The non-significant relationship between managerial EMIS/ IT knowledge and the EMIS outcomes could be ascribed to what Gaible (2008) referred as 'slow adoption of ICT policies in education sector by policymakers and lack of understanding of ICT issues'. Moreover, World Bank (2010) draws our attention to the fact that management information systems in the education sector are often designed by technical people, ignorant of prevailing educational policies and with insufficient input from education specialists. Yet, according to Ang et al. (2001b) senior management experience, background and knowledge on IT, awareness and recognition of IS activities and potentials, has been found to have had an impact on successful IS outcomes.

This is in contrast with Hussein et al. (2007b) and Ang et al. (2001b) finding that managerial IT knowledge, awareness and recognition of IS activities and potentials, as well as their ability to plan strategically has an impact on successful IS outcomes. This finding implies that poor EMIS outcomes could have been accentuated by the managers' limited managerial EMIS/ IT knowledge. It was therefore not surprising

that correlation results showed a non significant relationships between Managerial EMIS/ IT knowledge on key EMIS outcomes like timeliness, accessibility and relevance of data which had been illusive to attain in Nyanza (Republic of Kenya, 2009c).

Motivation mechanism is yet another organizational factor that this study did not find to be a significant predictor of EMIS outcomes (Table 4.24). Certainly motivation mechanisms contributed only to completeness of data significantly since it hard had weak and no significant relationship with the rest of the five EMIS outcome variables (Table 4.21). It was not therefore strange that motivational mechanism was not a significant predictor of EMIS outcomes (Table 4.24).

According to Table 4.18 it was implied Data capture personnel (2.40) were less motivated than the EMIS coordinators (2.81) and the funds were not readily available to support the activities of EMIS according to Data Capture Personnel and EMIS Coordinators. This finding was further augmented by the views of the DEOs that the personnel were not motivated, worked reluctantly and many were unenthusiastic to work given that they are expected to work overtime including weekends yet EMIS data capture was not their core duty, unless money is set aside to motivate them. Therefore, this situation negatively impacted to EMIS outcomes leading to poor timeliness, relevance, reliability, accessibility and personnel satisfaction.

The differentials in response between Data Capture Personnel and EMIS coordinators on Personnel Satisfaction are of concern in this study. While Data Capture Personnel indicated that ‘Personnel Satisfaction’ was the poorest and thus the least influential

organizational factor on EMIS outcomes, to the EMIS coordinators, 'Personnel Satisfaction' was the third best influential factor (Table 4.18). This disparity could be ascribed to the fact that the EMIS coordinators were the overseeing officers for their EMIS activities and were directly responsible to the DEOs, they were therefore probably keen on viewing EMIS as a success, and thus they could have felt shy to give a response of dissatisfaction even though the data capture personnel were dissatisfied.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary, conclusions and recommendations of the study based on the findings. The specific objectives of the study were to:

(i) Determine the impact of personnel factors on EMIS outcomes in the counties of Nyanza Region.

(ii) Establish the impact of technological factors on EMIS outcomes in the counties of Nyanza Region.

(iii) Determine the impact of organizational factors on EMIS outcomes in the counties of Nyanza Region.

5.2 Summary

The study set to establish the impact of selected factors on Education Management Information Systems outcomes in the counties of Nyanza Region, Kenya. The findings of the study were summarized as follows:

5.2.1 Impact of Personnel Factors on EMIS Outcomes.

(i) EMIS outcomes in the Nyanza region;

a) Data capture personnel observed that; relevance and reliability of information were the best EMIS outcomes while poor EMIS outcome was attributed to poor; personnel satisfaction, timeliness of information, accessibility of information and completeness of data.

b) According to the EMIS coordinators; relevance and reliability of information along with personnel satisfaction were found to be the best EMIS outcomes

while poor EMIS outcomes were attributed to poor; timeliness of Information, completeness and accessibility of data.

(ii) Ratings by the EMIS personnel showed that personnel factors impacted EMIS Outcomes in the following ways:

a) Personnel factors had 'high impact' on EMIS outcomes.

b) EMIS coordinators specifically considered 'Gender' and 'Age' to be the most influential personnel factors on EMIS outcomes. While 'Experience', 'Job design', 'Educational level' had the least impact on EMIS outcomes.

c) The Data Capture Personnel rated 'age' to be most important personnel factor that had impact on EMIS outcomes, followed by 'Job design' 'Gender' and Experience', while they rated 'Education level' to be least influential personnel factor.

(iii) The Pearson's correlational analysis between personnel factors and EMIS outcomes revealed that:

a) Relationships between age and timeliness, completeness, reliability as well as personnel satisfaction were statistically significant.

b) Gender had significant relationship with timeliness, relevance, and reliability of EMIS data. While relationship between gender and completeness, accessibility of data and personnel satisfaction were not significant.

c) Job design contributed significantly to timeliness, completeness and reliability of data and personnel satisfaction. However job design did not have significant relationship with EMIS outcomes like relevance and accessibility of data.

d) Experience contributed only to timeliness of data and personnel satisfaction. Similarly education level was only correlated significantly with reliability and timeliness of information. Experience did not contribute significantly to

relevance, completeness, reliability and accessibility of data, though it did contribute only to timeliness of data, personnel satisfaction

e) Education level' had no significant relationship with four out of six EMIS out comes namely: timeliness, relevance, accessibility and personnel satisfaction.

(iv) Regression analysis between personnel factors and EMIS outcomes revealed that:

a) EMIS outcome in counties of Nyanza were significantly predicted by personnel factors ($F(4, 82) = 9.460$, $p = 0.014$).

b) All Personnel factors combined (Job design, gender, education level and experience) contributed 16.9% towards EMIS outcomes variance.

c) Job design (beta=0.317), gender (beta=0.291) and age (beta=0.223) emerged as reliably significant predictors of EMIS outcomes. While education level ($\beta = 0.198$) and experience ($\beta = 0.101$) were not statistically significant predictors of EMIS outcomes.

5.2.2 Impact of Technological Factors on EMIS Outcomes

(i) Ratings by the EMIS personnel established that technological factors impacted EMIS Outcomes in the following ways:

a) EMIS technological factors had low impact on EMIS outcomes.

b) There was unanimity amongst data capture personnel and EMIS coordinators that staff competence and availability of IT infrastructure were the most influential personnel factors on EMIS outcomes. Maintenance and User support and' functionality of IT infrastructure had the least impact on EMIS outcomes.

(ii) The Pearson's correlational analysis between technological factors and EMIS outcomes revealed that:

a) Staff competency on EMIS contributed significantly to EMIS out comes like personnel satisfaction, timeliness and completeness of data.

b) Relationships between availability of IT infrastructure and personnel satisfaction, timeliness and reliability of data were statistically significant.

c) Functionality of IT Infrastructure had a significant relationship with relevance of data alone.

d) Analysis between Maintenance and User support and four EMIS outcomes, namely: relevance, completeness, reliability and, timeliness of data were not significant relationships

e) Relevance, completeness and accessibility of data had been minimally affected by technological factors.

(v) Regression analysis between technological factors and EMIS outcomes revealed that:

a) A non significant model emerged between technological factors and EMIS outcomes (F (3, 83) =2.666, p= 0.124).

b) Technological factors (Staff competency, availability of IT infrastructure, Functionality of IT infrastructure' and 'Maintenance and user support) were jointly associated with 12.7% of the EMIS outcomes.

c) The technological factors found to be significant in explaining the variation in EMIS outcomes in the Nyanza region were staff competency on EMIS (beta=0.448) and availability of IT infrastructure (beta=0.258) in the sub counties of Nyanza region. However 'Functionality of IT infrastructure' (beta =0.086) and 'Maintenance and user support' (beta =0.152) were not statistically significant predictors of EMIS outcomes.

5.2.2 Impact of Organizational Factors on EMIS Outcomes

(i) Ratings by the EMIS personnel established that organizational factors impacted EMIS outcomes in the following ways:

a) Impact of organizational factors on EMIS outcomes was moderate.

b) Data Capture Personnel indicated that 'Management support' was the most important organizational factor that impacted EMIS outcomes, followed by 'Decision making structures and management style' and 'Managerial EMIS/ IT knowledge'.

c) According to EMIS coordinators, 'Resources allocation' and 'Motivation mechanisms' were the least influential organizational factors on EMIS outcomes. 'Decision making structures & management was the third least influential factor.

(ii) The Pearson's correlational analysis between personnel factors and EMIS outcomes revealed that:

a) Management support contributed significantly to timeliness, relevance of EMIS data and user satisfaction. No significant relationship was depicted between "Management support" and completeness, reliability and accessibility of EMIS data.

b) Decision-making structures and Management Style did not have any significant effect on timeliness, relevance, completeness, accessibility nor personnel satisfaction.

c) There was a significant relationships between Managerial EMIS/ IT knowledge and completeness, reliability and satisfaction

d) Resources allocation contributed significantly to EMIS outcomes like; timeliness, completeness, reliability, and relevance. There was no significant

relationship between resources allocation and accessibility and personnel satisfaction.

e) Motivation mechanisms contributed only to completeness of data significantly.

f) Managerial EMIS/ IT knowledge' did not have a statistically significant relationship with key EMIS outcomes like timeliness, accessibility and relevance of data.

(iii) Regression analysis between organizational between technological factors and EMIS outcomes revealed that:

a) Organizational factors significantly predicted the EMIS outcome in counties of Nyanza ($F(3, 83) = 5.509$, $p = 0.022$).

b) Organizational factors (Management support, resources allocation, Decision making structures and management style' and 'motivation mechanisms' jointly contributed 18.3% to EMIS outcomes.

c) Management support (beta = 0.292) and 'resources allocation' (beta = 0.283) were the best predictors of EMIS outcomes. 'Decision making structures and management style' (beta =0.081, $p = .086$), 'motivation mechanisms' (beta =0.092) and managerial EMIS/ IT knowledge' (beta =0.034,) were not significant predictors of EMIS outcomes.

5.3 Conclusion

The study made the following conclusions based on the research objectives.

5.3.1 Impact of Personnel factors on EMIS outcomes.

The dominant personnel factors that had impact on EMIS outcomes were job design, gender and age. It was revealed that, the District EMIS coordinators were dominantly male, which confirms previous findings and contributes additional evidence that

suggests IT related jobs are gender biased against female. Contrary to expectations, Data Capture Personn**el** were mainly female. This study concludes that the impact of gender on EMIS outcomes was more accentuated by job design of personnel, the District EMIS coordinators were District Staffing officers and Quality assurance and standards officer who were predominantly male, Data Capture Personn**el** were mainly female and largely did secretarial job in the office. The EMIS personnel's experience and education level were not significantly influential on EMIS outcomes; therefore they should not be the determinants of who works for EMIS as long as the threshold for employability by the government of an 'O' level certificate is met.

5.3.2 Impact of Technological factors on EMIS outcomes.

The results of this research showed that the EMIS technological factors had low impact on EMIS outcomes. However, Staff competency on EMIS and availability of IT infrastructure were the dominant technological factors that impacted the outcomes of EMIS in the counties of Nyanza region. Availability of IT infrastructure was well spread across the sub counties, their locations notwithstanding. This confirms that the MOE had equipped the District Education Offices with computers, printers for data capture. Technological factors contributed the lowest variance on EMIS outcomes. The abysmal impact of EMIS outcomes by technological factors was mainly due to poor functionality of IT infrastructure and lack of technical support with poor maintenance. Consequently, the study concludes that the Ministry of Education should continue providing training and system support to improve maintenance and user support, staff competency on EMIS and functionality of IT infrastructure to improve EMIS outcomes.

5.3.3 Impact of Organizational factors on EMIS outcomes.

Though the impact of organizational factors was in overall low, the results of the regression indicated that of organizational factors explained largest proportion of the variance in EMIS out comes as compared to technological and personnel factors. Therefore more focus needs to be on the organizational factors to give EMIS a greater impetus. Among the organizational factors, resources allocation was the highest predictor of EMIS outcomes followed by management support. The low EMIS data capture completion rate at the DEOs offices in Nyanza region was symbolic of leadership factors affecting EMIS outcomes. Specifically, Decision making structures and management style, managerial EMIS/ IT knowledge and motivation mechanisms had low impact on EMIS outcomes. It emerged from this study that EMIS outcomes in Nyanza was poor especially with respect to data completeness, data accessibility, personnel satisfaction and timeliness of data.

5.4 Recommendations

In line with the findings of this study, the following recommendations based on the research objectives are proposed to enhance the better EMIS outcomes:

5.4.1 Recommendations on Personnel Factors.

Job design, gender and age were the dominant personnel factors that had impact on EMIS outcomes. The office secretaries tended to be more involved in data capture into the computers. The staffing officers who coordinate EMIS are more involved in teacher management issues and may not have time to manage EMIS activities. These findings suggest several courses of actions.

a) It is necessary that the MOE to recruit officers to specifically carry out the EMIS activities rather than involving personnel who are committed elsewhere due to their job design.
b) Train more personnel to manage EMIS.

5.4.2 Recommendations Technological Factors.

In the light of the findings on impact of technological factors on EMIS outcomes the researcher recommends that:

a) Ministry of Education to empower the EMIS coordinators with more IT technical expertise to carry out maintenance of the IT infrastructure.
b) Ministry of Education to promote the cooperation among semi autonomous governmental and nongovernmental organizations to participation in the process of developing an integrated platform and share new technologies for collection of educational data.

5.4.3 Recommendations on Organizational Factors.

This study has found that, generally the EMIS personnel were less motivated, a major factor leading to poor EMIS outcomes with respect to data timeliness. Given these facts, the researcher recommends that:

a) The EMIS personnel Staff should be well facilitated to carry out EMIS activities effectively and efficiently.
b) The process of data capture should be decentralized to the individual learning institutions from the DEOs offices then transmitted directly to improve timeliness. This would reduce the bulk of work of data capture at DEOs office by the limited number of EMIS personnel
c) The Ministry of Education and its agencies should provide ample opportunity for consultation with experts in the field of EMIS and other stake holders to arrive at adequate consensus on the modus operandi to avoid duplication of data collection.
d) Continuous EMIS staff development programmes and sensitization of educational managers should be done to improve managerial EMIS/IT knowledge.

5.5 Suggestions for Further Research

Although the current study suggests that the implementation of Educational Management Information System is a subjected to a series of factors that are interrelated, the findings suggest that:

a) A study should be carried out to specifically focus on the factors that impact EMIS outcomes at individual institutional level with larger sample as they are the primary sources of EMIS information. Large randomized controlled trials could provide more definitive evidence.

b) Further work is required to study technological, personnel and organizational factors separately and independently on account of inclusion of effect of more variables which were excluded.

c) In future investigations it might be possible to use specific data sets on available IT Infrastructures, personnel and organizational characteristics instead of use of rating scales.

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APPENDICES

APPENDIX I: DISTRICT EMIS COORDINATOR QUESTIONNAIRE (DECQ)

SECTION A: BACKGROUND INFORMATION

1.1 What is your designation?

1) Staffing Officer [ ] 2) Education Officer [ ]

3) Quality Assurance and Standards Officer [ ]

4) Others [ ] _____

1.2 Gender:

1) Male [ ] 2) Female [ ]

1.3 Age:

1) Below 30 years [ ] 2) Between 31 to 40 years [ ]

3) Between 41 to 50 years [ ] 4) Above 50years [ ]

1.4 Job Experience:

1) Less than 5 years [ ] 2) Between 6 to 10 years [ ]

3) Between 11 to 20 years [ ] 4) Over 30years [ ]

1.5 Experiences with EMIS:

1) Between 1 to 2 years [ ] 2) Between 2 to 3 years [ ]

3) Between 3 to 4 years [ ] 4) Between 4 to 5years [ ]

1.6 Highest level of Education:

1) Masters Level [ ] 2) Bachelors [ ]

3) O level [ ] 4) A level [ ]

5) Others [ ]

SECTION B: THE IMPACT OF PERSONNEL FACTORS ON EMIS OUTCOMES IN THE COUNTIES OF NYANZA REGION.

2.1 Listed below are some statements about **Personnel factors in the DEOs office**. Indicate with a tick (√) to rate the impact of the **Personnel** variables on EMIS outcomes in the rating scale Very Low Impact (VL) =1, Low Impact (L) = 2, Moderate Impact (M) = 3, High Impact (H) = 4, or Very High Impact (VH) = 5.

Responses to personnel factors:

Variable	Statement	Ratings				
Education level	EMIS personnel with higher education level of are more conversant with gathering and use of EMIS data	VL [ ]	L [ ]	M [ ]	H [ ]	VH [ ]
Age	The age of EMIS personnel affects EMIS data gathering processes	VL [ ]	L [ ]	M [ ]	H [ ]	VH [ ]
Gender	The gender of the EMIS coordinator determines the effectiveness of EMIS program	VL [ ]	L [ ]	M [ ]	H [ ]	VH [ ]
Experience	Those who have been involved with EMIS earlier are more conversant with data capture	VL [ ]	L [ ]	M [ ]	H [ ]	VH [ ]
Job design	Job design and other commitments is important in deciding who works with EMIS	VL [ ]	L [ ]	M [ ]	H [ ]	VH [ ]

(i) **SECTION C:** Establish the impact of technological factors on EMIS outcomes in the counties of Nyanza Region.

3.1 What is the number of working computers devoted to EMIS [ ]

3.2 How do you access Internet in your Office?

1) Modem [ ]
2) Internal internet facility [ ]
3) In a cybercafé [ ]
4) Not sure [ ]

3.3 Do you have Local Area Network (LAN?)

1) YES, In working condition [ ]

2) Yes, but not functional [ ]

3) No, not yet connected [ ]

3.4 Do you have an office structure devoted to EMIS?

1) Yes [ ] 2) Not Sure [ ]

3.5 Listed below are some statements about technological factors at **the DEOs office**. Indicate with a tick (√) to rate the impact of the technological variables on EMIS outcomes in the rating scale Very Low Impact (VL) =1, Low Impact (L) = 2, Moderate Impact (M) = 3, High Impact (H) = 4, or Very High Impact (VH) = 5.

Response to Technological factors:

Variable	Statement	Ratings				
Competency of staff	The staff is competent on EMIS	VL [ ]	L [ ]	M [ ]	H [ ]	VH [ ]
Availability of IT infrastructure	Computers, internet facilities and other it infrastructure are sufficient	VL [ ]	L [ ]	M [ ]	H [ ]	VH [ ]
Functionality of IT infrastructure	Most of the computers, LAN, printers are functional	VL [ ]	L [ ]	M [ ]	H [ ]	VH [ ]
Maintenance and User support.	Maintenance, servicing and user support is readily available and therefore I do not experience operational difficulties	VL [ ]	L [ ]	M [ ]	H [ ]	VH [ ]

SECTION D: THE IMPACT OF ORGANIZATIONAL FACTORS ON EMIS OUTCOMES IN THE COUNTIES OF NYANZA REGION.

4.1 What is the location of your office?

1. Urban set up [ ]
2. Semi Urban [ ]
3. Rural set up [ ]

4.2 When was your DEOs office started?

1) Less than 5 years ago [ ]
2) Between 6 to 15 years ago [ ]
3) Between 16 to 25 years ago [ ]
4) More than 25 years ago [ ]

4.3 What is the total number of Staff in your office? [ ]

4.4 What are the total number secondary schools in your district? [ ]

4.5 What are the total number primary schools in your district? [ ]

4.6 Are there other systems for collecting data in your district?

1) Yes [ ] 2) Not Sure [ ]

4.7 Which are the other systems for data and Information?

i. _____

ii. _____

iii. _____

4.8 Listed below are some of the Organizational factors. Indicate with a tick (√) to rate the impact of the organizational variables on EMIS outcomes in the following rating scale: Very Low Impact (VL) =1, Low Impact (L) = 2, Moderate Impact (M) = 3, High Impact (H) = 4, or Very High Impact (VH) = 5.

Responses on organizational factors:

Variable	Statement	Ratings				
Management support	Senior officers are supportive of EMIS activities	VL [ ]	L [ ]	M [ ]	H [ ]	VH [ ]
Decision making structures and management style	Decision making structures and management style	VL [ ]	L [ ]	M [ ]	H [ ]	VH [ ]
Managerial EMIS/ IT knowledge	Senior officers have good knowledge of IT	VL [ ]	L [ ]	M [ ]	H [ ]	VH [ ]
Resources allocation	Funds and resources are readily available for EMIS activities	VL [ ]	L [ ]	M [ ]	H [ ]	VH [ ]
Motivation mechanisms	Motivation mechanisms inspire EMIS activities	VL [ ]	L [ ]	M [ ]	H [ ]	VH [ ]

SECTION E: RATING EMIS OUTCOMES

4.9 5.1 Listed below are some of the statements about EMIS outcomes. Indicate with a tick (√) to rate the EMIS outcomes in the following rating scale: Very Poor (VL) =1, Poor (P) = 2, Fair (F) = 3, Good (G) = 4, or Very Good (VG) = 5.

Responses on EMIS outcomes:

Variable	Statement	Ratings				
Timeliness of Information.	Information gathering is always timely.	**VP** [ ]	**P** [ ]	**F** [ ]	**G** [ ]	**VG** [ ]
Relevance of information.	Data and information collected is relevant to the needs of the District.	**VP** [ ]	**P** [ ]	**F** [ ]	**G** [ ]	**VG** [ ]
Completeness of data.	Data collection is always complete.	**VP** [ ]	**P** [ ]	**F** [ ]	**G** [ ]	**VG** [ ]
Reliability of information.	Information collected from the schools is always reliable.	**VP** [ ]	**P** [ ]	**F** [ ]	**G** [ ]	**VG** [ ]
Accessibility of information.	Information is easily accessible.	**VP** [ ]	**P** [ ]	**F** [ ]	**G** [ ]	**VG** [ ]
Satisfaction of personnel.	There is general satisfaction in the use of EMIS facilities.	**VP** [ ]	**P** [ ]	**F** [ ]	**G** [ ]	**VG** [ ]

6. What challenges do you face in achieving the objectives of EMIS?

(i) _____

(ii) _____

(iii) _____

(iv) _____

APPENDIX II
DATA ENTRY PERSONNEL QUESTIONNAIRE (DCPQ)

SECTION A: BACKGROUND INFORMATION

1.1 What is your designation? _____

1.2 Gender: 1) Male [ ] 2) Female [ ]

1.3 Age: 1) Below 30 years [ ] 2) Between 31 to 40 years [ ]
3) Between 41 to 50 years [ ] 4) above 50years [ ]

1.4 Job Experience: 1) Less than 5 years [ ] 2) Between 6 to 10 years [ ]
3) Between 11 to 20 years [ ] 4) Over 30years [ ]

1.5 Experiences with EMIS:
1) Between 1 to 2 years [ ] 2) Between 2 to 3 years [ ]
3) Between 3 to 4 years [ ] 4) Between 4 to 5years [ ]

1.6 Highest level of Education: 1) Masters Level [ ] 2) Bachelors [ ]
3) O level [ ] 4) A level [ ]
5) Others [ ]

SECTION B: THE IMPACT OF PERSONNEL FACTORS ON EMIS OUTCOMES IN THE COUNTIES OF NYANZA REGION.

2.1 Listed below are some statements about **Personnel factors in the DEOs office**. Indicate with a tick (√) to rate the impact of the **Personnel** variables on EMIS outcomes in the rating scale Very Low Impact (VL) =1, Low Impact (L) = 2, Moderate Impact (M) = 3, High Impact (H) = 4, or Very High Impact (VH) = 5.

Responses to personnel factors:

Variable	Statement	Ratings
Education level	EMIS personnel with higher education level of are more conversant with gathering and use of EMIS data	VL[ ] L [ ] M [ ] H [ ] VH [ ]
Age	The age of EMIS personnel affects EMIS data gathering processes	VL[ ] L [ ] M [ ] H [ ] VH [ ]
Gender	The gender of the EMIS coordinator determines the effectiveness of EMIS program	VL[ ] L [ ] M [ ] H [ ] VH [ ]
Experience	Those who have been involved with EMIS earlier are more conversant with data capture	VL[ ] L [ ] M [ ] H [ ] VH [ ]
Job design	Job design and other commitments is important in deciding who works with EMIS	VL[ ] L [ ] M [ ] H [ ] VH [ ]

SECTION C: THE IMPACT OF TECHNOLOGICAL FACTORS ON EMIS OUTCOMES IN THE COUNTIES OF NYANZA REGION.

3.1 Listed below are some statements about technological factors at **the DEOs office**. Indicate with a tick (√) to rate the impact of the Technological variables on EMIS outcomes in the rating scale Very Low Impact (VL) =1, Low Impact (L) = 2, Moderate Impact (M) = 3, High Impact (H) = 4, or Very High Impact (VH) = 5.

Response to Technological factors:

Variable	Statement	Ratings				
Competency of staff	The staff is competent on EMIS	VL [ ]	L [ ]	M [ ]	H [ ]	VH [ ]
Availability of IT infrastructure	Computers, internet facilities and other it infrastructure are sufficient	VL [ ]	L [ ]	M [ ]	H [ ]	VH [ ]
Functionality of IT infrastructure	Most of the computers, LAN, printers are functional	VL [ ]	L [ ]	M [ ]	H [ ]	VH [ ]
Maintenance and User support.	Maintenance, servicing and user support is readily available and therefore I do not experience operational difficulties	VL [ ]	L [ ]	M [ ]	H [ ]	VH [ ]

SECTION D: THE IMPACT OF ORGANIZATIONAL FACTORS ON EMIS OUTCOMES IN THE COUNTIES OF NYANZA REGION.

4.1 Listed below are some of the Organizational factors. Indicate with a tick (√) to rate the impact of the Technological variables on EMIS outcomes in the rating scale very low impact Very Low Impact (VL) =1, Low Impact (L) = 2, Moderate Impact (M) = 3, High Impact (H) = 4, or Very High Impact (VH) = 5.

Responses on Organizational Factors

Variable	Statement	Ratings
Management support	Senior officers are supportive of EMIS activities	VL [ ] L [ ] M [ ] H [ ] VH [ ]
Decision making structures and management style	Decision making structures and management style	VL [ ] L [ ] M [ ] H [ ] VH [ ]
Managerial EMIS/ IT knowledge	Senior officers have good knowledge of IT	VL [ ] L [ ] M [ ] H [ ] VH [ ]
Resources allocation	Funds and resources are readily available for EMIS activities	VL [ ] L [ ] M [ ] H [ ] VH [ ]
Motivation mechanisms	Motivation mechanisms inspire EMIS activities	VL [ ] L [ ] M [ ] H [ ] VH [ ]

SECTION E: RATING EMIS OUTCOMES

5.1 Listed below are some of the statements about EMIS outcomes. Indicate with a tick (√) to rate the EMIS outcomes in the following rating scale: Very Poor (VL) =1, Poor (P) = 2, Fair (F) = 3, Good (G) = 4, or Very Good (VG) = 5.

Responses on EMIS outcomes:

Variable	Statement description	Ratings				
Timeliness of Information.	Information gathering is always timely.	VP[ ]	P [ ]	F [ ]	G [ ]	VG[ ]
Relevance of information.	Data and information collected is relevant to the needs of the District.	VP[ ]	P [ ]	F [ ]	G [ ]	VG[ ]
Completeness of data.	Data collection is always complete.	VP[ ]	P [ ]	F [ ]	G [ ]	VG[ ]
Reliability of information.	Information collected from the schools is always reliable.	VP[ ]	P [ ]	F [ ]	G [ ]	VG[ ]
Accessibility of information.	Information is easily accessible.	VP[ ]	P [ ]	F [ ]	G [ ]	VG[ ]
Satisfaction of personnel.	There is general satisfaction in the use of EMIS facilities.	VP[ ]	P [ ]	F [ ]	G [ ]	VG[ ]

6. What challenges do you face in achieving the objectives of EMIS?

(i) _____

(ii) _____

(iii) _____

(iv) _____

APPENDIX III

DISTRICT EDUCATION OFFICER INTERVIEW SCHEDULE (DEOIS)

1. Comment on the availability of computers, internet facilities and maintenance and user support.
2. What support does the office give to the EMIS personnel to facilitate the EMIS data collection and capture?
3. Explain how the decision making structures has enable your office to meet the deadlines of EMIS Data capture.
4. Which resources have put in place to facilitate the success of EMIS in your district?
5. Do you feel that the EMIS personnel are motivated to carry out their duties? What specifically motivates them?
6. How do you identify the personnel to work on EMIS program?
7. Comment on the relevance of information and data captured by EMIS to your office. In which way extent has the EMIS data enabled you to facilitate of decisions.
8. How do you ensure that the data and information collected is timely, consistent and reliable in your district?
9. Comment on the impact of number of EMIS staff on data capture in your office
10. What challenges do you face in achieving the objectives of EMIS?

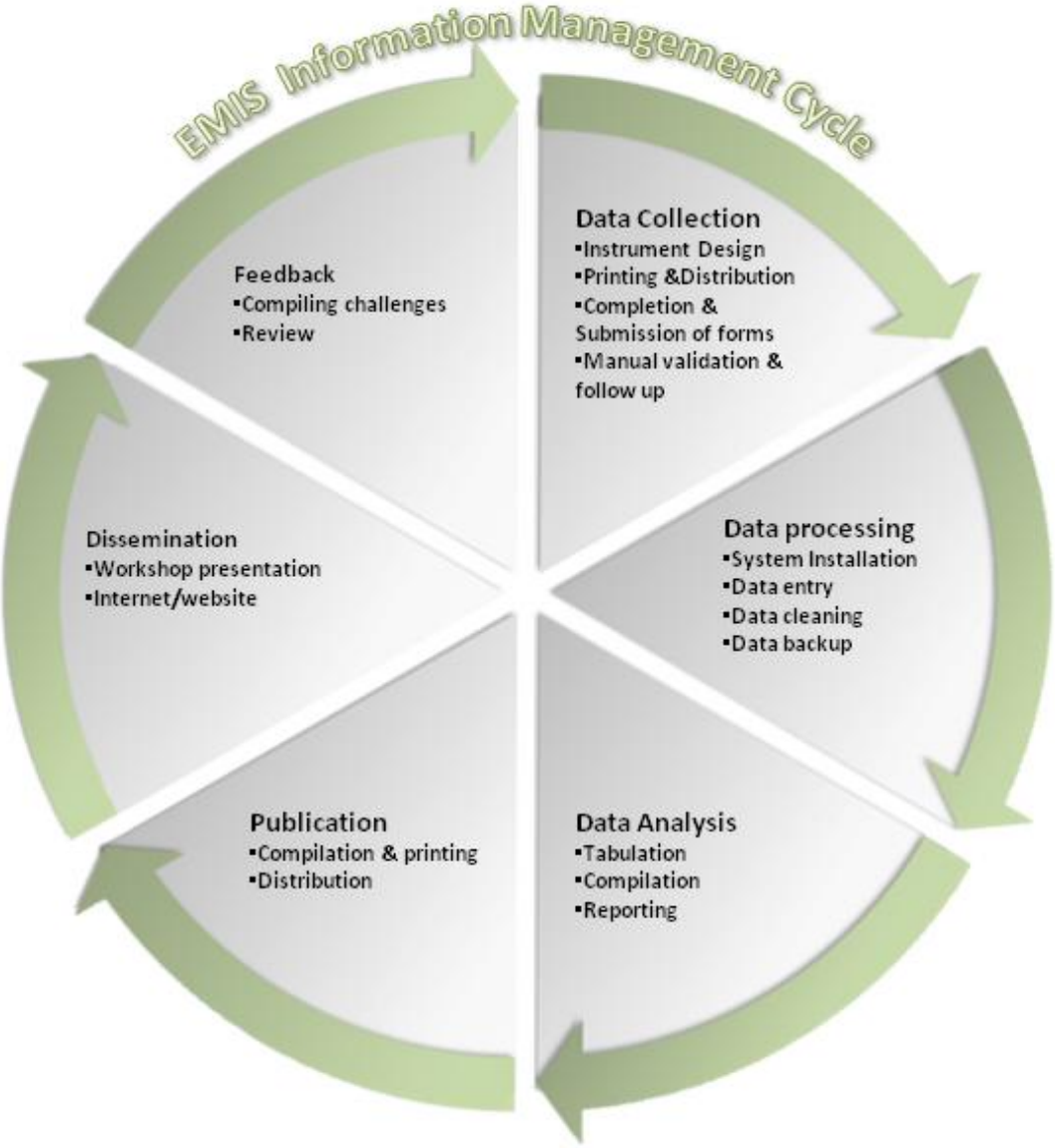
APPENDIX IV

REGIONAL EMIS CORDINATOR INTERVIEW SCHEDULE (PECIS)

1. Comment on availability of computers, internet facilities and maintenance and user support in Nyanza Counties.
2. What support does the office give to the EMIS personnel to facilitate the EMIS data collection and capture?
3. Explain how the decision making structures has enable your office to meet the deadlines of EMIS Data capture.
4. Which resources have put in place to facilitate the success of EMIS the Nyanza Counties?
5. Do you feel that the EMIS personnel are motivated to carry out their duties? What specifically motivates them?
6. Comment on the relevance of information and data captured by EMIS in Nyanza Counties.
7. In which way has the EMIS data enabled you to facilitate of decisions.
8. How does you office ensure reliability and timeliness of information by EMIS.
9. How do you ensure that the data and information collected is consistent and reliable in Nyanza Counties?
10. Comment on the impact of number of EMIS staff affect data capture in the Counties
11. What challenges do you face in achieving the objectives of EMIS?

APPENDIX V

EMIS KENYA DATA CYCLE



Republic of Kenya (2008)

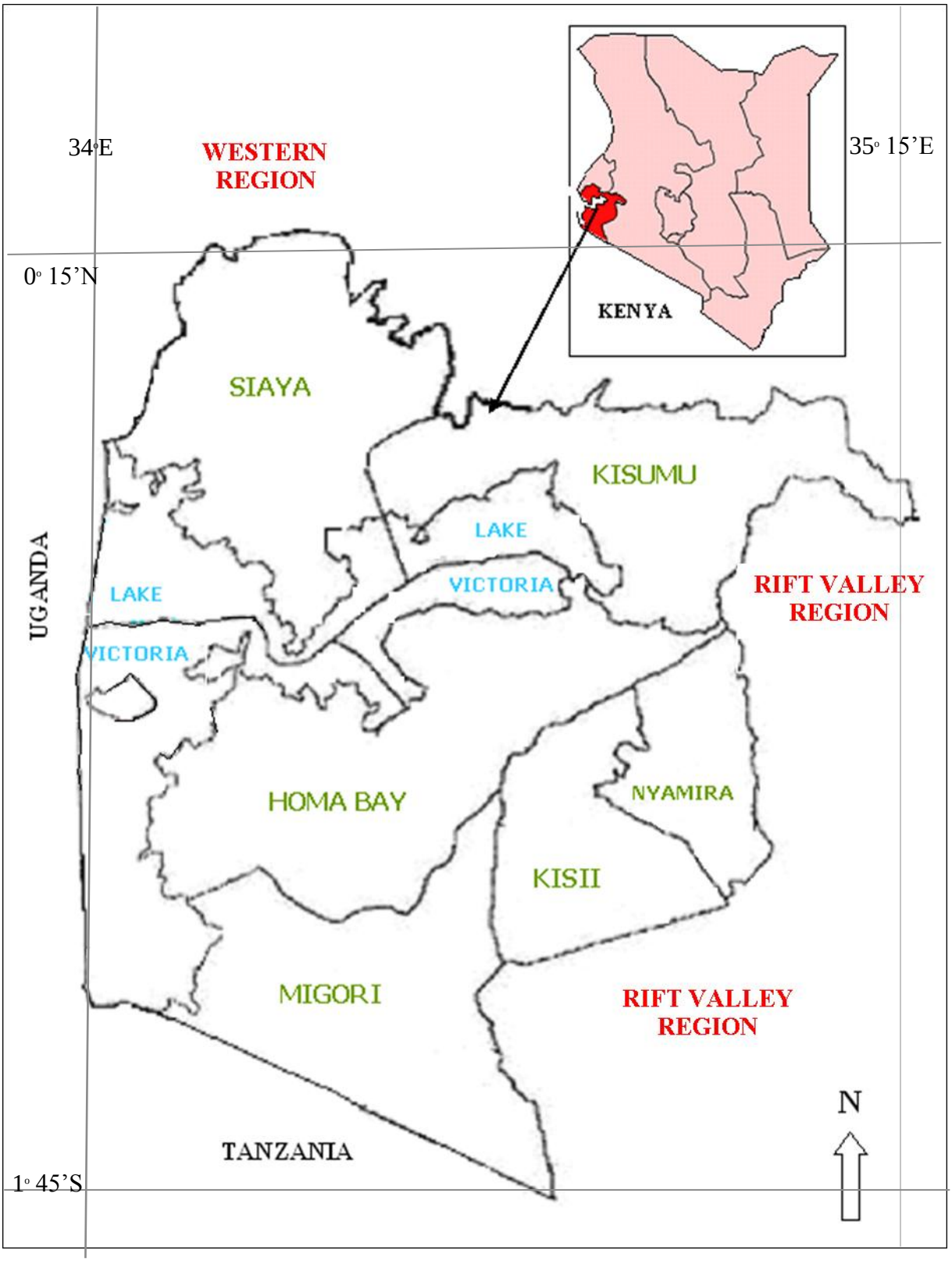
APPENDIX VI

COUNTIES AND DISTRICTS OF NYANZA

Counties	Districts
1. Siaya	1. Bondo
	2. Gem
	3. Siaya
	4. Ugenya
	5. Rarieda
2. Homa Bay	6. Rachuonyo South
	7. Rachuonyo North
	8. Mbita
	9. Homa Bay
	10. Ndhiwa
3. Kisumu	11. Kisumu East
	12. Kisumu Municipality
	13. Kisumu North
	14. Kisumu West
	15. Nyakach
	16. Nyando
	17. Muhoroni
4. Nyamira	18. Gucha
	19. Manga
	20. Nyamira
	21. Nyamira North
	22. Borabu
	23. Nyamache
5. Migori	24. Kuria East
	25. Kuria West
	26. North Masaba
	27. Migori Uriri
	28. Nyatike
6. Kisii	29. Kisii Central
	30. Kisii South
	31. Kenyenya
	32. Marani
	33. Masaba South
	34. South Gucha

APPENDIX VII

MAP OF NYANZA COUNTIES



APPENDIX VIII

LETTER OF INTRODUCTION TO CONDUCT RESEARCH

MASENO UNIVERSITY

DEPARTMENT OF EDUCATIONAL MANAGEMENT & FOUNDATIONS

Tel.: (037) 351620,351622
Fax : 51221/51462

Private Bag
Maseno
Kenya
10/05/2012

TO WHOM IT MAY CONCERN

RE: MR. COLLINS ARIKO PG/PHD/088/10

This is to confirm that Mr. Collins Ariko PG/PHD/088/10 is PhD student in the Department of Educational Management and Foundations specializing in Education Administration.

He has successfully written his proposal in readiness for data collection and thesis writing titled "Impact of Selected Factors on Education Management Information Systems Outcomes in the Counties of Nyanza Region, Kenya."

Any assistance given to him to actualize the thesis report will highly be appreciated.

Thank you.

DR. ENOSE M.W. SIMATWA
CHAIRMAN, DEPARTMENTAL POSTGRADUATE STUDIES COMMITTEE

APPENDIX X

Table for Determining Sample Size from a Given Population

N	n	N	n	N	n	N	n	N	n	N	n
10	10	85	70	220	140	440	205	1200	291	4000	351
15	14	90	73	230	144	460	210	1300	297	4500	354
20	19	95	76	240	148	480	214	1400	302	5000	357
25	24	100	80	250	152	500	217	1500	306	6000	361
30	28	110	86	260	155	550	226	1600	310	7000	364
35	32	120	92	270	159	600	234	1700	313	8000	367
40	36	130	97	280	162	650	242	1800	317	9000	368
45	40	140	103	290	165	700	248	1900	320	10000	370
50	44	150	108	300	169	750	254	2000	322	15000	375
55	48	160	113	320	175	800	260	2200	327	20000	377
60	52	170	118	340	181	850	265	2400	331	30000	379
65	56	180	123	360	186	900	269	2600	335	40000	380
70	59	190	127	380	191	950	274	2800	338	50000	381
75	63	200	132	400	196	1000	278	3000	341	75000	382
80	66	210	136	420	201	1100	285	3500	346	1000000	384

Note. *N* is population size.
n is sample size.

Source: Krejcie, & Morgan 1970).