INFLUENCE OF PUBLIC UNIVERSITY EXPANSION ON ADOPTION OF WEB BASED STUDENT MANAGEMENT INFORMATION SYSTEMS

A CASE OF MOI UNIVERSITY, KENYA

BY

JAPHETH S. O. OCHOLLA

A RESEARCH PROJECT SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF MASTER OF ARTS DEGREE IN PROJECT PLANNING AND MANAGEMENT OF THE UNIVERSITY OF NAIROBI

2015

DECLARATION

I, the undersigned, declare that this project is my original work and has not been submitted to any other institution of higher learning for examination and academic credit

Signed_____ Date_____

Japheth S. O. Ocholla
L50/75055/2014

This research project has been submitted for examination with my approval as the appointed supervisor

Signed _____ Date_____

Mr. Sakaja, Y. M.
Lecturer,
Department of Extra Mural Studies,
University of Nairobi

DEDICATION

To my beloved wife, Edna, I dedicate this work in sincere gratitude for her steadfast support and motivation. I also dedicate the work to my sons Brian and Bradley.

ACKNOWLEDGEMENTS

I am dutifully grateful to my supervisor, Mr. Sakaja, Y. M., for accepting to work with and guide me through the entire project. He has ceaselessly remained an inspiration and a great resource to me in the entire undertaking. To my lecturers, Dr. Odundo and Mr. Ochieng Owuor, I am very grateful for imparting in me knowledge on Research methods thereby positively impacting on my academic endeavor. I am greatly indebted to my wife, Edna for her critical editorial work to ensure my passages made semantic and grammatical sense. To all the students and staff of Moi University who willingly participated in this study by responding to my queries I remain sincerely thankful. The ICT Director and staff as well as IODL staff were specifically very resourceful and supportive. Finally, I acknowledge my dad, Ezra Ocholla, for his persistence that I go for a PhD.

TABLE OF CONTENTS

DECLARATION ..... **ii**
DEDICATION ..... **iii**
ACKNOWLEDGEMENTS ..... **iv**
TABLE OF CONTENTS ..... **v**
LIST OF FIGURES ..... **x**
LIST OF ABBREVIATIONS & ACCRONYMS ..... **xi**
ABSTRACT ..... **xii**
CHAPTER ONE **1**
INTRODUCTION **1**
1.1 Background of the Study 1
1.2 Statement of the Problem 4
1.3 Purpose of the study 5
1.4 Objectives of the Study 5
1.5 Research Questions 5
1.6 Significance of the study 6
1.7 Basic assumptions of the study 6
1.8 Limitations of study 6
1.9 Delimitations of the study 7
1.10 Definition of Significant Terms 7
1.11 Organization of the Study 7
CHAPTER TWO **9**
LITERATURE REVIEW **9**
2.1 Introduction 9
2.2 An overview of university expansion 9
2.3 Student Management Information Systems 11
2.4 Student enrolment and SMIS 15
2.5 ICT resources and SMIS adoption 18
2.6 Diversified Academic Programmes 21
2.7 Staffing Levels 23
2.8 Theoretical Framework 27
2.9 Conceptual Framework 28
2.10 Summary of conceptual Framework 29

CHAPTER THREE **30**
RESEARCH METHODOLOGY **30**
3.1 Introduction 30
3.2 Research Design 30
3.3 Target Population 30
3.4 Sample size and sampling procedure 31
3.5 Research Instruments 32
3.5.1 Piloting of the research instruments 32
3.5.2 Validity of the research instruments 32
3.5.3 Reliability of the research instruments 32
3.6 Data Collection Procedure 32
3.7 Data Analysis 33
3.8 Ethical Consideration 33
3.9 Operational Definition of Variables 34
CHAPTER FOUR **35**
DATA ANALYSIS, PRESENTATION, INTERPRETATION AND DISCUSSION **35**
4.1 Introduction 35
4.2 Response rate 35
4.3 Background information of the respondents 35
4.3.1 Age of respondents 35
4.3.2 Gender of respondents 36
4.3.3 Residence of student respondents 37
4.3.4 School of student respondents 37
4.3.5 Job status 38
4.3.6 Staff duration of service 38
4.4 Student Enrolment and adoption of web based SMIS 39
4.5 ICT resources and adoption of web based SMIS 43
4.6 Academic programs and adoption of web based SMIS 50
4.7 Staffing levels 54
CHAPTER FIVE **57**
SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS **57**
5.1 Introduction 57
5.2 Summary of findings 57
5.2.1 Demographic characteristics of respondents 57
5.2.2 Student enrolment and SMIS adoption 57

5.2.3 ICT resources and SMIS adoption 58
5.2.4 Diversified academic programs and SMIS adoption 59
5.2.5 Staffing levels and SMIS adoption 60
5.3 Conclusion 61
5.4 Recommendations 62
5.5 Contributions to body of knowledge 63
5.6 Areas for further study 64
REFERENCES 65
APPENDICES 71
Appendix I: Letter of Introduction 71
Appendix II: Questionnaire for Students 72
Appendix III: Questionnaire for Administrative staff 75
Appendix IV: Questionnaire for Teaching staff 77
Appendix VII: Work Plan 85
Appendix VIII: Study Budget 86
Appendix IX: Mean Annual Intake for 2011/12 to 2014/15 87
Appendix X: Research Permit 87

LIST OF TABLES

Table 3.1 Target population……..31
Table 3.2 Sample distribution……..32
Table 3.3 Operational definition of variables……..33
Table 4.1 Response Rate..... 35
Table 4.2 Age of student respondents 35
Table 4.3 Age of staff respondents..... 36
Table 4.4 Gender of student respondents..... 36
Table 4.5 Gender of staff respondents..... 37
Table 4.6 Residence of student respondents 37
Table 4.7 School of student respondents 37
Table 4.8 Job status 38
Table 4.9 Staff duration of service 38
Table 4.10 Undergraduate Student Enrolment..... 39
Table 4.11 Bachelors Student Enrolment 40
Table 4.12: Experience of overcrowding..... 40
Table 4.13: Scramble for ICT resources..... 41
Table 4.14: Student enrolment versus the existing ICT facilities 41
Table 4.15: Increased student enrolment necessitates adoption of web based information systems..... 42
Table 4.16: Availability computer and network resources 43
Table 4.17: Access to university computer with internet connection..... 44
Table 4.18: Location of computers..... 44
Table 4.19: Adequacy of computers..... 45
Table 4.20: Alternatives for internet access..... 45
Table 4.21: Availability of WiFi in the university 46
Table 4.22: WiFi Rating 46
Table 4.23: Ownership of university email accounts 47
Table 4.24: Student web services..... 47
Table 4.25 Teaching staff web services..... 48
Table 4.26: Web Service availability away from the university 48
Table 4.27: Frequency of use of MU web services 49
Table 4.28 ICT Skills and experience 49
Table 4.29: Category of Student 50
Table 4.30: Incorporation of ICT in teaching 50

Table 4.31: Adoption of Distance Learning..... 51
Table 4.32: Content for Distance Learning..... 51
Table 4.33: Adoption of e-Learning..... 51
Table 4.34: Content for E-Learning..... 52
Table 4.35: Adoption of blended mode of teaching..... 52
Table 4.36: Content for Blended Mode of Teaching..... 53
Table 4.37: Access to e-resources..... 53
Table 4.38: Submission of assignments and projects..... 53
Table 4.39: Adequacy of ICT staff……..54
Table 4.40: Staff Workload…….54
Table 4.41: Staff Accessibility……55
Table 4.42: Staff competence……. 56

LIST OF FIGURES

Figure 2.7 Conceptual framework.……..……..…...28

LIST OF ABBREVIATIONS AND ACRONYMS

AMPATH: Academic Model Providing Access to Healthcare

CUE: Commission for University Education

DVC APD: Deputy Vice Chancellor- Administration, Planning and Development

ERP: Enterprise Resource Planning

GSSP: Government Sponsored Students Program

HELB: Higher Education Loans Board

ICTs: Information and Communication Technologies

IT: Information Technology

JAB: Joint Admissions Board

MIS: Management Information System

MU: Moi University

MUSOMI: Moi University System for Managing Instruction

KU: Kenyatta University

KUCCPS: Kenya Universities and Colleges Central Placement Service

ODL: Open and Distance Learning

IODL: Institute of Open and Distance Learning

PSSP: Privately Sponsored Students Program

SIMO: Student Information Management System

SIS: Student Information System

SMIS: Student Management Information System

UoN: University of Nairobi

USA: United States of America

USAID: United States Agency for International Development

WSU: Washington State University

ABSTRACT

Universities worldwide have grown and expanded significantly since the year 1088 when the first university, believed to be Italy's University of Bologna, was established. Most countries in the world are today host to tens or hundreds of universities, most of which are multi campus. University student population has grown exponentially as a driver and result of the rapid expansion. There has been remarkable increase in personnel, university facilities, diversified academic programs and modes of delivery and use of computer based information systems for improved quality, flexibility, efficiency and effectiveness. University expansion has faced challenges including overwhelming student population, compromised quality of education, inadequate personnel, quality and quantity of facilities and inadequate funding. Taking certain services online has been seen as a way to improve and standardize service delivery. Using a case study research design, this study purposed to determine the influence of public university expansion on adoption of web based Student Management Information Systems (SMIS). Using questionnaires and interview schedules, data was collected from 380 respondents from Moi University, Eldoret between May and June 2015, analyzed using Microsoft Excel and presented in APA tables. The study found that increased student population, availability of ICT facilities, diversification of academic programs and staffing levels had some influence on adoption of web based information systems. The study also found out that management support and leadership were key to realization of fully functional SMIS. This report will be useful to university managers to rationalize the expansion programs as they adopt better ways of doing business. The government of Kenya, and in particular the Commission for University Education, should find this report useful in regulating the well intended but seemingly haphazard expansions.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Universities all over the world have grown exponentially since the founding of Italy's University of Bologna in 1088, believed to be the first. The evolution and spread of the modern universities can be traced chronologically with Western Europe dominating the 11th and 12th century while 14th and 15th centuries are dominated by Central and Eastern Europe. While the Americas and Australia marked the 16th and 19th centuries respectively, Asian (with exception of Philippines' University of Santo Tomas) and African universities appeared during the 19th and 20th centuries (Wikipedia, 2014; Sarkar, 2012)

Driven by insatiable demand for higher education, global trends, liberalized education sector, changing government policies, high number of high school graduates, job market demands, and of course, an entrepreneurial agenda of generating income, universities are adapting to the changing environment to remain relevant. As such they are expanding their capacities, spreading geographically, investing in information technologies, increasing student enrolment, expanding their academic programs and staffing (Oanda & Jowi, 2012). According to UNESCO Institute for Statistics (2014), the demand for higher education has never been greater as universities compete globally to attract students. Under intense pressure to expand universities are increasingly adopting computer based information systems to help meet their information needs and that of their students, staff and other stakeholders (Frank & Meyer, 2007; Yokaboski & Nolan, 2011).

Webometrics (2012) ranked 21,000 state funded higher education institutions, excluding those without web domains. Europe had 4000 universities with 407 in Germany, 313 in United Kingdom, 236 in Spain and 212 in Italy. The United States had 3263 universities in 2012 while Brazil had 1696; India 1636, South Africa 23, Egypt 57, Nigeria 130, Ghana 34, Kenya 44, Uganda 25, Tanzania 33). The universities have and continue to expand significantly in terms of student population, campuses, academic programs and personnel. However, many countries and even universities are unable to provide precise data on their student enrolment. The solution to this lies in adoption and proper utilization of Student Information Systems.

In the immediate postwar period, the United States of America enrolled some 30% of her 18-21 year olds in higher education while European nations maintained an elite system with fewer than 5%. By 1960s many European nations educated 15 percent or more of this age group (Okioga, Onsongo and Nyamboga, 2012). In 1970, Sweden enrolled 24%, France 17%, the United States 50% while by mid 1990s many European countries had about 50% enrolment while the USA had already hit three-quarters. Watson and Taylor (1998) attribute this to major expansion of the existing universities and establishment of new ones. In the 21st Century, movement towards mass and universal systems of higher education has been considered inevitable (Warford, 1991). While universities in developing countries continue to expand rapidly and dramatically, relative stability has been witnessed in Europe and North America (Hughes & Mwiria, 1989)

In Africa, post-secondary student population in grew from 21,000 in 1960 to 437,000 in 1983 (Okioga, et. al (2012). But between 2000 and 2010 the enrolment increased from 2,344,000 to 5,228,000. Despite this increment, the enrolment rate in the region was still only 7% compared to 29% worldwide (British Council, 2014). At the advent of democracy in South Africa, there were only 495,000 university students but in 2012 the figure had reached 900,000, which the government of South Africa plans to raise to 1.5 million by 2030 by expanding access to higher education. The 23 public universities are also set for a considerable expansion so as to take in a further 650,000 students within the next two decades. Notably, South Africa's university sector has undergone numerous changes in the recent past including mergers and incorporations that cut the number of state universities from 36 to 23 public universities (MacGregor, 2012). British Council (2014) indicates that despite the rapid expansion of higher education enrolments, there are serious concerns about the ability of Africa's universities to produce the kinds of graduates who can drive the region forward. This is due to intense pressure to expand in the face of difficult financial circumstances, inadequate facilities, exit of qualified staff to greener pastures and general brain drain.

University education in Kenya began in 1963 with just 571 students enrolled in Nairobi University College (Weidman, 1995). The expansion of university system has been considerable with more public universities being established including Moi University in 1984, Kenyatta University 1985, Egerton University 1987, Jomo Kenyata University of Agriculture and Technology 1994, Maseno University 2000, Masinde Muliro University 2007. Effectively, Kenya

had a total of 7 public universities in 2007 and 12 university colleges. All the seven public universities have experienced rapid growth and expansion with the governmental goals to improve equity, the economy, and develop an educated populace. By 2013, the number of public universities in Kenya had risen to 22 and further to 31 universities in 2014. (Hughes & Mwiria, 1990; Otieno, Kiamba & Some, 2008; Commission for University Education, 2014).

In 2009 there was an estimated 122,874 university students in the country of which approximately 80 percent were in public universities according to the Kenya National Bureau of Statistics (2009). The number of public university students rose steadily from 67,558 in 2003/04 to about 240,550 in 2013, a remarkable increase of 21.3% in overall university enrolment from 198,260 in 2011. This was attributed to the double intake implemented in 2011/12 academic year (Commission for University Education, 2014). An earlier double intake scenario in 1986/87 academic year resulted in the acquisition of property by the University of Nairobi in lower Kabete in 1986 and Parklands in 1988 and immediate establishment of the Lower Kabete and Parklands campuses (Gudo, Olel & Oanda, 2007). Clearly, any increase in student population calls for expansion of facilities.

To boost access to university education, the Joint Admissions Board increased student enrolment to public universities by 23.4% between 2008/09 and 2009/2010 from 17,000 to 21,100. By 2010/2011 the figure had hit 24,000 while in 2013 some 53,135 students were admitted to Kenyan public universities (Joint Admission Board, 2013). In 2014, Kenya Universities and Colleges Central Placement Service (KUPCCS), JAB's successor admitted 56,934 students and for the first time some government sponsored students were admitted to private universities, a clear indication that there was still need for further expansion of Kenyan public universities (Kenya Universities and Colleges Central Placement Service Kenya, 2014).

University academic programs have been significantly diversified with new programs being introduced while the old ones have been expanded into several independent programs. Wu *et. al*. (2009) argue that universities have moved from specialization to become increasingly similar in terms of disciplines and course arrangements. They term this 'isomorphism' and argue that at times there is no clear cut difference between two or more programs. With the introduction of several new academic programs, universities have come up with diverse and flexible modes of study, teaching and delivery (Okioga, et. al. 2012; Abagi, et al. 2005; Oanda &

Jowi, 2012). But the massive expansion has come with challenges of quality and academic standards, quality and relevance of academic programs as well as challenges related to ICT (Wainaina, 2012).

Moi University was established in 1984 as the second state university in Kenya. The university has experienced exponential growth in student enrolment, facilities, campuses, ICT resources, staffing and academic programs. Starting with a single faculty with 83 students the university has expanded into 15 schools offering 235 academic programs to over 40,000 students and close to 3000 staff, expansive physical facilities and equipment (Bii & Gichoya, 2006; Moi University, 2014). The university has also invested heavily on ICT infrastructure, resources and services through adoption of various information systems including financial management information system, library information system, human resource management information system, research information systems, and hostel management system.

1.2 Statement of the Problem

The rapid and ambitious growth and expansion of public universities has been occasioned by an ever swelling demand for university education resulting in massive increase in student population, this has propelled universities to put up more infrastructure including new lecture halls, libraries and hostels in an attempt to accommodate the swelling population. But the rate of infrastructure development has not kept pace with the demand so the institutions of higher learning have embarked on acquiring new premises or renting facilities to cater for their expansion needs turning themselves into giant multi campus universities (Gudo et al, 2011).

A substantial amount of literature including, Sakaja (2011), has explored the rapid university expansion and raised concerns over quality of university services including training and research, relevance of the academic programs, funding issues, governance, staffing, gender issues and Information Systems challenges. Sakaja particularly investigated the influence of public university regional expansion on service delivery in which he looked at the opening of regional centers by the University of Nairobi, increased student enrolment, library facilities and computer labs.

Amidst the rapid and tremendous expansion, Kenyan public universities have been slow to fully adopt web based information systems that could serve them across their diversely located

campuses. In some instances, only the main campuses have significantly deployed information systems with reasonable infrastructure in place. As a result, the students at the main campuses and the well established branch campuses are better placed to access and exploit the web based systems as opposed to those in the distant branches, centers or satellite campuses. Even where huge investments have been made on information systems, some remain heavily under utilized while the institutions continue to contend with traditional, methods of operations that are expensive, labor intensive and largely paper based (Dhliwayo, 2014; Gonçalves and Sapateiro, 2008). Butcher (2008) also points out a profound and pervasive disconnect between employing new ICTs and truly leveraging them to enhance quality.

1.3 Purpose of the Study

The main purpose of this study was to examine the influence of public university expansion on adoption of web based Student Management Information System. Specifically, this study sought to establish how student enrolment, ICT facilities, diversified academic programs, and staffing levels influence adoption of web based student management information systems.

1.4 Objectives of the Study

The study was based on the following objectives:

1. To assess the influence of student enrolment on adoption of web based SMIS
2. To establish the influence of university ICT resources on adoption of web based SMIS
3. To examine the influence of diversified academic programs on adoption of web based SMIS
4. To establish the influence of university staffing levels on adoption of web based SMIS

1.5 Research Questions

The study will be guided by the following questions:

1. How does student enrolment influence adoption of web based SMIS?
2. What is the influence of ICT resources on adoption of web based SMIS?
3. How do diversified academic programs influence adoption of web based SMIS?
4. What is the influence of university staffing levels on adoption of web based SMIS?

1.6 Significance of the study

This research report will help establish facts about the technological challenges brought about by rapid expansion of public universities in terms of increased student enrolment, ICT resources, diversified academic programs and staffing levels. This research report will guide the decision makers of the universities in making appropriate decisions while undertaking the seemingly inevitable expansions for better rationalization. This will ensure that the expansion programs factor in proper adoption of ICTs for more efficient and effective operations in the increasingly multi campus university systems. This report underscores the importance of more insightful planning that integrates all aspects of a university in a systemic manner. Again, the Commission for University Education should find this study useful in its audit, monitoring, evaluation and general oversight task. Hopefully, the report will inform the commission's job to ensure that the ambitious expansions undertaken by public universities do not compromise quality of service, especially in the newly established campuses. Finally, to the existing body of knowledge, this research will add objective, informed and data based perspectives on the influence of university expansion programs on the information systems that are meant to help the universities run more efficiently, effectively and competitively.

1.7 Basic assumptions of the study

The first assumption of this study was that the universities had already implemented student management information systems which were being used to offer services to the students. Secondly, it was assumed that the sampled respondents would willingly participate in the study. Thirdly, the study assumed that records and figures of student enrolment and university staffing would be easily accessible.

1.8 Limitations of study

The study was conducted in Moi University using a limited number of respondents since it was not possible to reach every diverse member of the university. And as had been anticipated access to some institutional documents especially information regarding finances and staffing proved quite challenging. Again, limited time for data collection presented a challenge prompting hiring of extra research assistants at extra costs. That some sections of students initially targeted by the study had just closed for long holidays made it difficult to include them in the study. Finally, getting as many part time and female students as possible to respond to the

questionnaires was quite a challenge hence just a smaller percentage of the respondents represented the categories.

1.9 Delimitations of the study

The study was conducted between May and June 2015 and focused only on undergraduate degree (Bachelors) students in 7 selected schools in Main, Eldoret West and Town Campuses. Again, the study involved only a few ICT staff, a section of the teaching and administrative staff and selected officers of the university. The ideal situation would have been to involve students and staff from all schools and campuses of the university.

1.10 Definition of Significant Terms

Adoption of Student Management Information System: Implementation and utilization of interactive, self service systems through an online interface

Public university expansion: increase in student population, ICT resources, diversified academic programs and staffing levels

ICT resources: Computers, computer networks and allied facilities and Internet connectivity

Multi campus university system- University with geographically spread campuses, far or nearby

Student: A person enrolled in a university to pursue a degree, diploma or certificate course

Web based Student Management Information System: Student Management Information System accessible through an online interface

Shadow systems: Stand alone applications that are already in use as are modules/subsystems of SMIS

1.11 Organization of the Study

This thesis comprises five chapters whereby chapter one, gives the background of the study, statement of the problem, purpose of the study, research objectives, research questions, significance of the study, basic assumptions of the study, limitation and delimitation of the study, definition of significant terms as used in the study and the organization of the study. Chapter

Two presents a critical desktop review of literature from related studies while Chapter Three gives the research design, the target and sample population, research instruments, their validity and reliability; the data collection procedures, operational definition of variables and finally the ethical considerations. Chapter Four covers data analysis, presentation and discussion while Chapter Five gives the summary of findings, recommendations, conclusions and proposes areas for further study.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

In this chapter, a detailed examination and critical review of relevant literature has been presented. The literature includes existing research reports, university strategic plan documents, ICT policy documents, and university internet resources. Again, relevant institutional publications including bulletins, workshop or conference proceedings have been examined as well as documents of the Commission for University Education and United Nations Education Scientific and Cultural Organization, UNESCO.

2.2 An overview of public university expansion

Globally, universities are expanding rapidly and ambitiously to adjust to the high demand for university education. The desire to move from an elite system of university education, to mass and universal systems has propelled governments and institutions of higher learning to adapt accordingly. Trow (2000) coined the terms elite, mass and universal higher education, with elite higher education representing a national enrolment ratio of up to 15% of the eligible population. While mass enrolment represents a ratio of up to 50%, the universal system represents 50% enrolment of the eligible population. At this level of enrolment expansion rates begin to slow down (Kogan, 1993).

In the immediate post war period most European nations maintained an elite system of higher education of less than 5% enrolment. By 1960s many European nations educated 15 percent or more of the eligible age group (Okioga *et al*, 2012). In 1970, Sweden enrolled 24%, France 17%, but by mid 1990s they had recorded 50% enrolment of the eligible population. Italy, in particular, witnessed a 217% increase in university enrolment in a period of 8 years. By 2012, Europe had 4000 universities with 407 in Germany, 313 in United Kingdom, 236 in Spain and 212 in Italy. Most of these universities were state funded and had branches spread in diverse parts of Europe. Watson &Taylor (1998) attributes this rapid growth to major expansion of the existing universities and establishment of new ones.

Universities in the United States of America expanded rapidly to include 30% of 18-21 year olds in the immediate post war era and continued to take an early lead in expanding access

to higher education with some 75% of her eligible population enrolled in higher education by mid 1990s (Bianchi, 2014). To effectively manage the swelling student population, American universities invested in student information systems. For instance, the Washington State University, heavily reliant on information systems, has run a student information system since 1980. Noting that a world class university cannot stand on shaky IT foundations, WSU undertook to revise the existing systems in 2009 to provide contemporary agile and more reliable systems, capable of meeting needs of students, staff and management into the unforeseeable future. The Student Information System project was seen as a key component to the University's overall effort to enhance WSU's ability to deliver improved and expanded information technology services to the University community (Washington State University, 2009).

In China, a rise from 3% in 1977 to 9.8% in 1998 was experienced in higher education enrolment. A significant transformation of China's higher education resulted in rapid growth in enrolment to 6.29 million in 2009, growth in the number of higher universities, upgrade of polytechnics, and merger of institutions to better respond to market demands. Chinese universities underwent reorganization and restructuring, invested in new subject areas and fields of specialization. There was also a shift from full funding to co-funding of undergraduate programs. The former was faulted for fortifying elite system while the later enhanced mass and universal access to university education (Bianchi, 2014).

Since 1960s, student enrolment in Africa has grown tremendously, especially from 2.7 million in 1991 to 9.3 million in 2006 occasioning a huge mismatch between student population and university resources. World Bank (2010) reported that higher education enrolment in most sub-Saharan African countries had grown faster than financing capabilities, reaching a critical stage where the lack of resources has led to a severe decline in the quality, the capacity to modernize and ability to undertake capital development. South African universities have made great attempts to enhance quality through adoption of reliable information systems touted to have catapulted University of South Africa to join the ranks of mega universities with students running into hundreds of thousands (McGregor, 2012).

Kenya had only 7 public universities by 2012 but an ambitious program to admit more students saw 15 technical colleges upgraded to university status. Currently there are over 30 public universities in Kenya and 10 University Colleges admitting more and more students

underscoring the importance of higher education and the public demand for it (Abagi, Nzomo & Otieno, 2005). They view the quantitative expansion of schooling, at all levels, as a major achievement in the development of education and note that the Kenyan society has invested considerably in quantitative expansion of education, an expansion that has nevertheless overstretched available resources.

Shibanda (2002) identifies distinct periods of development of Kenya's public universities. He associates 1956-1984 with planned and controlled expansion of a single university institution, 1985-1990 with changes in the University system; increase in the number of public universities and student enrolment, and 1991 onwards with improved quality of teaching and research. But Yego (2013) thinks that the rapid expansion has compromised quality, overworked and demotivated lecturers, led to overcrowding and use of inferior facilities while putting a strain on the limited finances available. Other challenges of expansion include cheating in examinations, incessant rivalry between government and self sponsored students, occupation of old, poorly maintained and dilapidated structures and lack of prioritization of ICT projects.

2.3 Web Based Student Management Information Systems

Kroenke (2011) defines an information system as a group of components (computer hardware, software, data, procedures and people) that interact to produce information. Management Information Systems (MIS) are an organized approach to gathering information about company operations and making strategic management decisions. A good MIS must be relevant, accurate, timely, complete, useful and cost effective (McLeod & Schell, 2007). Organizations are investing in computerized MIS to provide solutions to their ever growing information needs. When properly conceptualized, planned, developed, implemented, operated and maintained, these systems offer immense capabilities and benefits to an organization. Universities are deploying a myriad of information systems including SMIS or its subsystems to deliver better quality and more efficient services (Bharamagoudar, Geeta and Totad, 2013).

With ever growing student numbers, increased academic programs, geographically spread campuses and not so impressive staffing, SMIS has become extremely crucial. SMIS takes advantage of ICTs with extraordinary impact on records management, teaching and learning, administration and finance, external relations, library services, research production and dissemination, and student life (Guri-Rosenblit, 2009). SMIS may vary greatly in size, scope,

capability and terminology including Student Information Management System (SIMS), Student Information System (SIS), Students Information Management Online (SIMO) and Students Management Information System (SMIS) to refer to the same concept. (Washington State University, 2014; www.ox.ac.uk; www.cam.ac.uk; University of Nairobi, 2014)

A web based SMIS has an online interface (student portal), embedded on the college's website (Bharamagoudar et al, 2013) through which users access one or more interactive functionalities including admission request and processing, enrolment, course registration, fee payments and statements, refunds, course transfer, deferments, hostel booking, academic exchange, access to lecture materials, timetables, managing and viewing results and facilitating communication between students and university administration, lecturers and among the students themselves using student mail services. These services require a versatile, tested and reliable information system resulting in a smooth and efficient university system (Babatunde et al, 2012).

Kochtanek (2002) noted that organizations adopt technology at different rates and highlighted possible adoption patterns including bleeding edge, leading edge, wedge and training edge. Bleeding edge organizations are willing to be the first in technology adoption and experimentation. Occasionally, such organizations will have scars and bandages testifying their adventuresome efforts. Leading edge organizations are willing to embrace new technologies but cautiously, systematically and incrementally. The wedge organizations will wait for evidence that a system is stable, proven and well tested before embracing it. The training edge organisations are true laggards that continue to use older technologies when newer and better products exist.

SMIS is becoming indispensable in gaining competitive advantage, enhancing customer satisfaction, cutting operational costs and managing data of the increasing student numbers (Bharamagoudar et al, 2013). Effective adoption of SMIS must consider factors like conducive organizational environment, management support, leadership, financial resources, user involvement and training, effective communication, security and safety (Moorthy et al, 2006). Then, an institution of higher learning can benefit from improved access, increased range and depth of service, reduced operational costs, enhanced communication, improved control and productivity, reduced staff, increased user satisfaction and a wide range of by products (Lynch 2002)

In a study, 'Aspects for Information Systems Implementation: challenges and impacts: A higher education institution experience', Gonçalves and Sapateiro (2008) hold the position that changes in an organization almost always call for changes in work practices. As universities continue to expand to widen access, they must think seriously about taking certain services on a web based platform dedicated to enhancing efficient service delivery, while also cutting costs. A system that enables students to request and receive admission online, effectively eradicates costs incurred in printing and posting admission documents to the thousands of prospective students. Bharamagadour *et al* (2013) confirm that SMIS provides a simple interface for maintenance of student information easily, accurately and in an up to date fashion. SMIS deals with all kinds of student details, course details, curriculum, academic related reports, college details, faculty details, placement details and can track all details of a student from day one to the end of the course and beyond. By logging to the system, a student can access notifications by university administration, explore all college activities and connect to other related informational or service websites (Gonçalves and Sapateiro, 2008)

A study on Statistical evaluation of the impact of ICT on Nigerian universities found that Information systems contributions to the university educational system included quick access to information, improved response time, greater reliability and availability. The study by Babatunde et al (2012) is of great relevance to this study due to its emphasis on students as a major clientele of any university, so is the utmost importance of their participation and satisfaction. According to DeLone and McLean (2003), user satisfaction is jointly determined by information quality, service quality, system use, distributive fairness, procedural fairness and interactional fairness. Closely related are system use and user satisfaction. The later determines users' intention to continue using the system. Figure 2 below best illustrates some of the functionalities of a student management information system:

Babatunde et al (2012) Posit that ICT is indeed a tool for finding, exploring, analyzing, exchanging and presenting information responsibly and without discrimination. According to UNDP (2007), ICT is presently a veritable tool for quick access to ideas and experiences from a wide range of people, communities and cultures and also offers solid support for improved and enhanced service delivery. As universities expand ambitiously, they have even greater need for reliable, efficient and effective student information systems (Gartner, 2011).

Most African public universities continue to perform poorly in global web ranking due to the relatively poor state of ICT, poor funding of ICT projects and lack of stable power supply - an essential ingredient for stable ICT systems. For web based systems to be effective and truly beneficial, there is need for smooth, fast and reliable internet connectivity and access. Numerous studies have been carried out on the impact of university expansion on quality of service delivery and they seem to agree on the practicality of ICT as a tool for service delivery especially in the wake of explosive student enrolments (Wescott et al, 2007; Bach et al, 2011). While Akinyokun et al (2011) view ICT is a tool for proper planning, monitoring, implementation and management in any system for active participation of community of users, it is imperative that SMIS stakeholders participate appropriately in the implementation, adoption and utilization of SMIS.

Various information systems have been embraced by public universities for their operations including Library Information System, Financial Information systems, Academic Register Information Systems, Human Resource Management Information Systems among others. Previous studies on such systems have been found relevant to this study. Shibanda (2002) on 'Development Strategy of a Technological University Library Management Information System: A Case of Moi University, Kenya' concluded that there was need for greater adoption and use of information resources and ICTs to enhance quality of services in a university like Moi whose campuses are scattered in diverse locations. He decried the slow pace of ICT infrastructure growth that he observed was not at par with the pace of university expansion. The study emphasized the need to integrate the systems as opposed to the stand alone approach that was prevailing to the extent that ICT infrastructure growth was geared towards meeting needs of individual faculties or departments.

Bii and Gichoya, (2006) studied 'The Challenges of Establishing and Managing an IRM Centre in Kenyan Public University: A Case of Moi University' and revealed that adoption and utilization of ICT at Moi University and other Kenyan public universities was at its infancy. They emphasized the need for an institution of higher learning to be a torch bearer in the use of ICTs for creation, processing, storage, retrieval and dissemination of information. While acknowledging a number of impediments (resistance to change, lack of funds, tedious procurement procedures) faced by universities in fully implementing, adopting and utilizing information systems, the researchers took interest in the challenge posed by geographically

spread campuses (a manifestation and result of university expansion) in the utilization of available databases and applications.

2.4 Student enrolment and web based Student Management Information System

Mwiria and Nyikuri (1994) attribute the rapid university expansion to double intake of Government sponsored students in 1986/87 and 1990/91 academic years. The first scenario was due to prolonged closure of University of Nairobi due to a coup attempt at the Kenya government and other strikes which caused admission backlog while the second was due to the shift of education system from 7-2-2-3 to 8-4-4 in 1990/91 academic year. Universities responded to the double intake by expanding tuition and boarding facilities amidst inadequate financial resources so student congestion in all relevant areas- libraries, lecture halls, hostels- remained a critical problem. According to The Public Universities Inspection Board, accelerated growth in student population in public universities has not been matched by expansion of physical facilities and academic infrastructure. Some of the existing infrastructure is inadequate, dilapidated and in bad state of repair (Republic of Kenya, 2006). A third double intake in 2010 was as a result of Kenya government's directive that KCSE graduates should no more wait for two years to join university.

Demand for university education continues to swell as many secondary school graduates join university (Gudo et al, 2011). In 2013 the Joint Admissions Board (JAB) admitted some 53,135 students to Kenyan public universities. Moi University got the lion's share of 5,792 students followed by University of Nairobi's 5,496 students. In his article 'Moi University to Host Most Joint Admissions Board Students', Jamah (2013) also reported that Kenyatta University admitted 5,491 students; Egerton University, 3500 students; Jomo Kenyatta University of Science and Agriculture, 2,151 and Maseno University, 3,096 students. The newly established University of Eldoret would admit 2923, while 7,257 students would be shared among the 9 university colleges (The Standard, August 9, 2013). In 2014, The Kenya Universities and Colleges Central Placement Systems (KUCCPS), admitted 56,937 students to the public universities, with Kenyatta University getting 5,480 students, University of Nairobi 5,053, Moi University 5030, Egerton 2767, JKUAT 2583 and Maseno 2926 (KUPPCS, 2014). Even though these figures were generally lower, than the previous year, they still exceeded the declared capacities of the individual universities.

The one approach that has tremendously increased student enrolment is the running of parallel programs for which a university charges full economic cost fees for those students who are unable to gain access to the institution by the normal admission process and criteria (Mohamedbhai, 2008). The introduction of the module II programs in 1990 starting with the University of Nairobi has contributed to increased student population in Kenyan public universities. In Moi University, PSSP enrolment rose from 7,113 to 13,354 between academic years 2006/07 and 2009/10 a clear indication of the popularity of the program. Currently, the university has over 20,000 parallel students. According to Oanda and Jowi (2012), the number of students on government subsidy is declining in the universities while that of self-sponsored students has been on the increase, across all academic programmes.

A study, *The Impact of Expansion of the Privately Sponsored Students Programme on the Quality of Education offered at Moi University, Kenya* underscored the importance of the parallel programs to the universities as a source of the much needed funds. Faced with declining government support, the universities were operating under very difficult circumstances within huge deficits prior to the launch of the module II programs. The funds, however, were not invested in improving the academic environment and facilities but in other projects not related to university academic functions. As a result, the self sponsored students, especially those away from the main campuses got very little value for their money (Yego, 2013).

Government of Kenya increased funding to the Higher Education Loans Board (HELB) from Kshs. 867million in 2007/2008 academic year to Kshs. 1.367million in 2008/2009 academic year effectively enabling thousands more students to access educational loans (ICEF, 2013). Despite opposition by some members of parliament and regular students, the government changed the loan's policy in 1998 to enable students in chartered private universities to access HELB loans. However, by 2004 the loans were still only limited to government sponsored students which, Otieno (2004) observed amounted to serious inequity. Njeru & Odundo (2003) and Otieno (2004) seem to have influenced the extension of HELB loans to parallel students in public universities in 2008. This has empowered more eligible students to seek university admission. HELB also reviewed upwards the maximum loan award to Kshs. 60,000 from Kshs. 55,000 (Capital FM, 2008). The impact of this move is that more needy students have enrolled for university programs.

Statistics released by the Commission for University Education, CUE, in February 2013 revealed that university student numbers had risen to 218,832 from 140,000 in 2010. (CUE, 2013; University World News, March 30, 2013). Kenyatta University was the country's biggest with 61,928 students while the University of Nairobi had 57,162 students. Moi University was reported to have 34,477 students up from just over 22,500 students in 2010, attributed to a 16% annual student growth rate at the university (Jamah, 2013). Currently, Moi University has 47,701 students of whom 40,665 are undergraduates (Moi University, 2015)

In an article titled, *Academic Shortage as Student Numbers Soar,* Nganga (2013) decried the swelling student population. Earlier, Oketch (2004) noted that university education is crucial for development, admitting that public universities have faced new challenges such as enrolment beyond their capacity to plan and finance, fiscal challenge beyond their control and a decline in quality beyond their anticipation. Gudo et.al (2011) raise concerns about the capacity of Kenyan public universities to effectively offer quality services to the existing student body and recommended careful investment in physical facilities, teaching and research resources and, of particular interest to this study, innovative information and communication technology. While increased student population readily calls for proper information systems to better serve the students, high and uncontrolled enrolment rates, haphazard establishment of campuses make it even harder for the university to deliver on this mandate. The result is that certain sections of students are more or less predisposed to benefit from SMIS (Gudo et al, 2011).

A development in university expansion is the demographic composition of students in terms of age profiles (Oanda & Jowi, 2012). Previously, university entry age group was predominantly and predictably singular. The student population today comprises learners from diverse age groups. Changes in the composition of students have brought together youths in the age bracket of 18-21 with older and mature learners, some of whom experienced workers from diverse backgrounds. Opening up university access to all has significantly driven the enrolment levels. In Canada, the numbers of the 18-21 year olds cohort peaked in 2011 but analysts predicted a decline of 10% over the next decade with a rebound in 2020 as more pools became available for the universities to draw new students (AUCC, 2012). The older cohorts of students (25-40+ years) have been viewed as more attractive due to their financial capacity to pay full cost of their studies. Retig (2003) observed that college students are increasingly getting familiar and confident with ICTs. This has created expectations of immediacy, interactivity,

personalization and mobility. Attributes such as convenience, affordability, versatility, portability and simplicity of use make ICTs and allied systems more attractive to students.

Traditionally, more men than women pursued university education but women have made important strides at accessing higher education. Many countries have also implemented policies of affirmative action like lowering admission cut offs for females to ensure more of them are enrolled in institutions of higher learning. In the early 2000, women's share of enrolment at undergraduate studies stood at 55% in the US and UK but they did not represent majority of the students in the academic disciplines (AUCC, 2012). UNESCO (2009) shows that worldwide, women are roughly half of the enrolment but with uneven distribution across the fields of study. In 2003/04 there were 47,087 males against 25,464 females in Kenyan public universities while in 2008/09 the figures stood at 62,753 and 37,896 respectively (Oanda & Jowi, 2012).

2.5 Information and Communication Technology (ICT) resources and adoption of web based Student Management Information Systems

Globally, several studies have been done on ICT resource availability and use (Gitonga, Ndirangu & Githeko, 2013). There is evidence to prove that the top universities in the world have occupied their prestigious positions because of their high levels of investments in and adoption of ICTs. They have and continue to install latest, functional facilities and equipment in all offices and lecture halls and established data centers as well as fully interlinked campuses. In 2008, the student to computer ratio stood at 3:1 down from 12:1 in 1998, suggesting that the US was on an inexorable march towards having a computing device available for all students (Warschauer, 2010) with unmatched internet speeds, availability and interractiveness. Altbach, Reinsberg & Rumbley (2009) acknowledge that new technologies are key to realizing cost effective strategies for increased access to higher education. Youssef et al (2008) indicated that in the last two decades high education institutions have invested heavily in ICT which has had a major impact in the university context in terms of university processes, teaching and learning. This argument was further that buttressed by Nadira et al (2010) who noted that the world was moving rapidly into digital media and information making the role of ICT in education to be more and more important. There is intense interest in the way technology can be used to support students in higher education institutions (Issroff & Scanlon, 2002).

Tremendous growth and development in the use of ICT in higher education in Africa has been witnessed even though there is still a lot more room for improvement. Expanding the use of ICT in African higher education has been hampered by poor ICT infrastructure, low penetration of telephony, very low internet bandwidth, low internet connectivity, inadequate number of Personal Computers and very high costs of expanding the use of ICT in African higher education (Minishi-Majanja,2007; ITU, 2009). South African universities have, however, made remarkable progress in their ICTs adoption and web presence and are at an advanced stage of development, equaling counterparts in more developed countries (Onyancha & Ocholla, 2007). Edarlier, Eman (2000) pointed out that a major success factor for ICT in higher education is the availability of good equipment. It is important that both students and tutors have regular access to up-to-date ICT equipment. This calls for functional and sufficient computer labs, university wide data and communication networks, central network services, high speed internet service and proper knowledge and skills on how to use the resources. Little expertise makes university managers, staff and students to become reluctant take the first step in using the resources of equipment and applications. Equally important are the financial resources to buy the computing devices and requisite software (that can't be developed in house); and to set up and operate international and internal connectivity on a sustainable basis; and maintain and upgrade the equipment and applications are very crucial (Emans, 2000).

With the completion of the Kenya Education Network (KENET) connectivity project, the ICT situation in Kenyan public universities was expected to change but a study by Bii and Gichoya (2006) concluded that the KENET initiative did not yield much since the internet connectivity was frustratingly slow. Mwiria (2007) noted that most of the universities lacked adequate computer facilities; thus the level of computer literacy was generally low in spite of the rapid expansion. Gitonga, Ndirangu and Githeko (2013) acknowledge that the government of Kenya through East African Marine System, (TEAMS), Kenya Education Network, (KENET), Kenya Transparency Communication Infrastructure Project (KTCIP) has invested heavily in ICT. While the initial ICT equipments were largely donations, Kenyan universities are increasingly investing in modern computers and data networks. They are making heavy investments in ICT by buying computers and connectivity, while at the same time enhancing their other infrastructure to harness the potential benefits of this technology. This is due to the proven ability of ICT to bring about a number of efficiencies in the teaching and learning process, communication and other aspects of university management.

CPS surveyed universities in the East African region to establish how they have embraced and institutionalized the use of ICT in teaching and enhancing quality for effective university education. Rankings from the survey based on adoption of information technology indicated that Kenyan public universities were out performed by their private counterparts. Even though Kenya took 6 of the top ten positions, 20 out of the 37 Kenyan institutions that made it to the top 100, were private universities, a clear indicator that private universities have generally invested more in ICT than public universities in all the East African countries. That the bulk of government sponsored students are admitted to business and other related social science courses overstretches the ICT resources (The CPS International Educational Index 2012).

Universities have adopted multi-campus university model to decentralize academic services, human resources and support facilities (Harman &Harman, 2003). But Mwiria (2007) noted that the rate of growth and expansion of public universities was not commensurate with their physical planning. Universities have established campuses faster than they can equip with desired facilities and infrastructure. The multiple campuses also present a complexity of pedagogical, economic and logistical challenges (Ezarik, 2009) to the extent that students and staff view satellite campuses as less attractive locations as compared to the main campuses which have better facilities. Despite CUE's directive that a university campus shall have facilities and services comparable to those at the main campus (CUE, 2014), the campuses are at different levels in terms of infrastructure. Certain newly established campuses operate for years without even the most basic ICT facilities and this technically challenges the implementation and distribution, access and use of SMIS. The students, however, continue to pay computer fees even where they are obviously nonexistent. ISIMS Report (2006) recommended that the inequities must first be addressed by dramatically enhancing the existing infrastructures. The relative inequity in level of ICT investments in multi campus systems is echoed by Gartner (2011) while acknowledging the high cost of ICT infrastructure, equipment and related accessories for online services.

Ranking of universities using their websites has become a common practice. Webometrics ranking, one of the better known ranking of world universities is based on their online visibility through their websites; their content, design and web traffic. The university's website must be proven to be available to students, lecturers and the world at large and its content enriched for good communication with students, staff and the external environment

(Gitonga et al, 2013). One approach of enriching the websites is to introduce self service information systems that require the users to log on to the appropriate portal and accomplish certain tasks including emailing and also get links to other useful websites. Such information systems provide direct interface for service delivery (Khawaja & Abdinnour, 2011).

2.6 Diversified Academic Programs and adoption of web based Student Management Information Systems

Globally, universities have tended towards mass enrolment creating the need for expansion and diversification of academic programs (Altbach et al, 2009). The existing courses are getting diversified and differentiated in line with market demands to expand learning options, relevance and marketability in the belief that the more the academic programs on offer the more likely a university will attract a new cohort of students (Effa, 2005). Global trends, diversified student population and the transformative influence of ICT has made it possible for universities to introduce flexible approaches to teaching and learning through adoption of open and distance education in connection with worldwide campaigns towards education for all and lifelong learning. As a result, multiple modes of study and delivery have been popularized as alternatives to face to face mode. These include modular, open and distance learning, e-learning and blended modes. Students who would not get study leave or who wish to maintain their regular work schedules while pursuing further studies have been attracted by the variety. Such programs have enhanced flexibility in the university education system and have seen thousands of knowledge thirsty students realize their academic dreams. Part time enrolment has grown steadily for decades and is substantial in almost all sectors of higher education (Komives & Voodard, 2013).

Distance learning has been in existence for generations undergoing significant transformations with the advancement and application of new technologies. The rationale for engaging in distance education activities include revenue generation, broadening and expanding access, improving educational quality and raining institutional profiles. Online and Distance Learning (ODL) has grown in popularity as a mode of content delivery. Guri-Rosenblit (2009) defines distance learning as involving any effort that does not require students to assemble in a particular location but reaches out to them wherever they live or wish to study. ODL gives students flexibility and choice over what, when, where and how they learn while providing them with extensive support (wikipedia.org). Africa's leading ODL institution, University of South Africa (UNISA), has taken advantage of ODL to become a mega-university with 328,179

students by 2011, and over 400,000 students currently (unisa.ac.za). The programs that started in 1946, cater for over a third of all university enrolments in South Africa, thus easing the burden on higher education institutions to provide on-campus education (Mohamedbhai, 2008). Despite real risks and challenges that must be recognized and addressed, distance education presents enormous potential for higher education systems around the world. Although distance education has been in existence for generations, it has emerged as an extremely important option for higher education expansion in 1990s following rapid and ground breaking innovations in ICTs (Altbach et al, 2009).

Kenya has not been left behind as a wider spectrum of courses are on offer by the universities which are steadily introducing a wide range of pioneering courses leading to certificates, diplomas, degrees and higher degrees to tap into the increasing number of working students (Oaga and Jowi, 2013). Mwiria et al (2007) observed that most public universities have radically changed their administrative and academic structures, introduced new academic programs while old ones have been broken down into several independent programs. However, certain programs have very low enrolment and are not cost effective, and are better off offered only at one university leading to evolution of centers of excellence.

Manyasi (2010) studied how using IT could increase access to higher education through distance learning in Kenya and found that institutions of higher learning lacked the necessary technology. The institutions had only a few computers, which were used by lecturers to access internet services. Again, lecturers and administrators lacked instructional competencies and information design for distance learning associated with delivery of high quality services. Online courses have also provoked opposition from some sections of the academics, who fear that they will accelerate cuts to university staffing. But the immense potential of e-learning cannot be overstated as more and more students can share access to fewer personnel, whose time will be spared so as to put the courses together but financial incentives, digital seminars and reassurance of job security as well as increasing level of interactivity are a must.

Tarus, Gichoya and Muumbo (2010) investigated the challenges experienced by Kenyan public universities in implementation of e-learning and observed that most Kenyan public universities have adopted e-learning as a new approach to teaching and learning but are faced by implementation challenges which hinder effective utilization. They reckon that while the benefits and opportunities e-learning far outweigh the challenges, such hurdles that must be addressed by

the universities before successful implementation can be realized. Noting that e-learning is in infancy stages in Kenya like other developing countries, Mwangi and Shikhuyu (2012) noted that the few universities in Kenya which have adopted e-learning are using blended mode in teaching and learning. They cited lack of infrastructure, lack of e-learning awareness, problems of content development and management, question of ethical usage of e-learning platforms, lack of policies, control and monitoring, inadequate ICT skills and lack of management support as the main challenges that Universities face in quest to integrate e-learning in the learning process. They advocated for an e-learning implementation framework monitored by the government for compliance. They concluded that e-learning has to be made an integral component of education system for Kenyan university education to be competitive globally.

At Moi University an Institute of Open and Distance Learning was established in 2007 to spearhead the implementation of ODL in the university. By 2013, the Institute had 5 departments, 10 members of staff and an academic board with representatives from each school. An e-learning platform, Moi University System of Managing Instruction (MUSOMI), has been installed and is being used for blended learning (Moi University, 2013).

2.7 Staffing Levels and adoption of web based Student Management Information Systems

Globally, adequate, highly qualified and dedicated staff are considered a great treasure to higher education institutions in order to support university operations, services, initiatives and activities. While top notch universities are able to attract and retain sufficient quality staff, brain drain continues to be a threat to university staffing in developing countries as universities continue to lose highly qualified staff to other universities offering better remuneration, and other deployments. Yet other staff members go for further studies outside the country and fail to return upon completion of the studies, negatively impacting on the universities' staff strength. University human resources were more or less fixed and didn't fully adjust to enrolment changes (Bianchi, 2014).

Tettey (2009) analysed the staffing needs of various public universities in Africa and concluded that student-staff ratios in various countries have generally risen over the years and incommensurate staff and student growth rates have put a tremendous burden on academic staff. Developing and retaining ICT human resource is still a major challenge particularly in African universities (Aguele, 2004). Low salaries and poor conditions of service, coupled with incessant

power outages, costly but inadequate bandwidth are attributed to this. Like the case of teaching staff, best ICT minds are susceptible to brain drain as top companies offer far better terms than the cash trapped universities. Lack of ICT maintenance staff was a real problem at university campuses. Majority of those employed were ignorant and minor technical hardware or mere software updating problems easily led to prolonged computer downtimes. Mohamedbhai (2008) recommends that increased enrolment of students requires an increase in academic staff to maintain the quality of teaching and expansion. In most institutions this has not taken place. His study on the effects of massification on higher Education in Africa revealed that public universities experienced an annual increase in student enrolment in the range 15-25%. Yet, mostly because of lack of funds, this was not accompanied by a corresponding increase in teaching staff. The staff/student ratio in most of the institutions was of the order of 1:30 but with some departments having ratios of up to 1:100. Already the situation had resulted in an increased teaching load and administrative duties of the staff, affecting their contribution to research. It has also affected the quality of teaching, the large cohorts resulting in overcrowded lecture theatres and, in some cases, abandonment of tutorials and practicals (Mohamedbhai, 2008).

Generally, Kenyan public universities were considerably overstaffed in 1990s with very low staff/student ratios (Mwiria, 2006). Mwiria noted that non-academic staff represented 74 per cent of the total number of staff in the Kenyan public universities while the academic staff made up 26%. Accepting that there was need to develop a model for determining optimal staffing size, some universities were obviously overstaffed prompting the government to force the public universities to downsize their staff. However, the scenario is much different currently with the privatization of public universities leading to massive student enrolments.

The Commission for University Education (CUE) recommended full time staff: student ratios as 1:10 for Applied Sciences, 1:15 for Arts and Humanities, 1:7 for Medical and Allied Sciences, 1:10 for Pure and Natural Sciences, and finally 1:18 for Social Sciences. These rations are far from being attained as university staffing levels continue to unmatch the high student populations. CUE also recommended that the maximum number of students an academic staff shall supervise in any given academic year shall be 5 for Masters and 3 for Doctorate based on a combination of his/her teaching load recommended at 40 hours per week, administrative duties, supervision experience and capacity (Commission for University Education, 2014). An

assessment of supervision schedules indicated that some lecturers supervised up to 30 Masters students at the same time.

Oanda and Jowi (2012) noted that even though the number of university staff at all levels has grown tremendously, there is still acute shortage of professors and adequately qualified personnel while the demand for teaching staff continues to outstrip the supply. Nganga (2010) observed that universities are weighed down with overflowing classes, strained facilities and a shortage of lecturers. Presenting similar sentiments, Johnson (2013) conferred that African universities have often expanded too fast, hosting 10.9 million students in 2011 up from 2.8 million in 1991. Such expansion, he noted, inevitably comes at the expense of faculty wages and leads to declining investment in research and a diminishing ability to retain qualified staff. This leads to faculty moonlighting in other jobs and doing no research, or emigrating.

University Academic Staff Union data indicates that there were 9,000 lecturers in 2010 in both public and private universities, up from 7,000 in 2006. But during the same period, student enrolment grew from 91,541 to 200,000 (Nganga, 2013). Yet, the caliber and sufficiency of teaching staff are a measure of quality in a university. Lack of adequate qualified staff limits the capacity of the universities to contribute to economic and social development as could be expected with such expansion. The rapidly expanding public universities share a few qualified lecturers with their private counterparts. And with strained budgets, the universities have focused on physical expansion with little attention paid to staff development.

The proliferating satellite campuses do not enjoy the same level of staffing, with regard to qualifications and numbers as the main campuses. University expansion has taken place in the context of acute staff shortage implying inadequacy of the existing staff to service the growing number of students, campuses and academic programs Oanda & Jowi (2012). Hughes & Mwiria (2007) observed that while student population doubled, that of professors, and other staff remained more or less constant.

A study by Gudo et al (2010) showed that there was shortage of staff in all departments of the University of Nairobi and that the number of lecturers was only 44.54% of the expected number leaving the 55.46% to be filled with part time lecturers. Masinde Muliro University had only 53.18% of its teaching staff requirement. The scenario was similar across the universities with private ones worse off. They concluded that shortage of lecturers reduced efficiency of

lecturers in offering effective services for quality education in the universities. Again, part time staff are available for the scheduled lecturing hours but not for consultations with students. Adoption of web based SMIS is capable of addressing this problem by offering platforms for academic consultations and exchanges.

At Moi University, the staffing increased from 143 in 1984 to 4370 in 2010 of whom 1424 were academic staff. There is still inadequate number of staff in some programs forcing the university to rely largely on part time lecturers. Enrolment into some programs, like Master of Philosophy in Information Technology, have been temporarily put on hold due to inadequate staffing (Moi University, 2013). Attempts at accelerated recruitment of teaching staff to serve the many students negatively impacted on merit, need to research and publish, and the universities ability to properly and competitively remunerate the staff. This inevitably led to numerous lecturers' strike and threats of the same (ICEF, 2013). Staffing remains at the centre of quality crisis in the expanding universities.

2.8 Theoretical Framework

This study will be premised on the General Systems Theory propounded by Ludwig Von Bertalanffy in 1968. This theory has been more recently used by Dhliwayo (2014) in his study on the Internal Customers Perceptions of a Multi-Campus University System in the Great Zimbabwe University. According to this theory all systems are composed of interrelated parts or subsystems and the system can only be explained as a whole. Second, systems are hierarchical: a system has sub systems and the sub systems are also made up of other smaller parts. Third, the parts of a system cannot be altered without affecting other parts. Ignoring this principle leads to many organizational problems. Fourth, sub systems should work towards the goal of their higher systems and not pursue their own independent objectives.

Systems theorists see organizations as complex social systems that interact with their environment and which must respond to numerous interdependent variables, of which the people, tasks, technology, organization structure and environment are the most important (Lucey, 2005). To be successful and remain in existence organizations must be flexible and adapt to change by making adjustments in its internal methods and structures as well as its relationship with the external environment. This adaptation occurs as a result of management decisions and action and to be successful, change must be planned and considered. The effects on the organization as a whole must be considered when making changes to part of the organization. For instance, while increasing student numbers, a university should consider the implications of that on staffing, existing facilities and the programs.

In the systems theory, sub systems may belong to more than one system (shared sub systems). There is need to recognize this overlap and design operations and processes accordingly. In the context of this study, the twinning arrangements and academic partnerships come to mind. Lucey (2005) recognizes that overlap is often an efficient and economical arrangement but may also increase communication difficulties and delay response times because of the need to coordinate activities and obtain several approvals for change. Due to the objective-oriented nature of the systems theory, it has been deemed suitable for this study. Universities are large diverse and complex organizations operating in an uncertain and fast changing environment but have to meet competing demands from their clients (largely students), employees, suppliers and government agencies.

2.9 Conceptual Framework

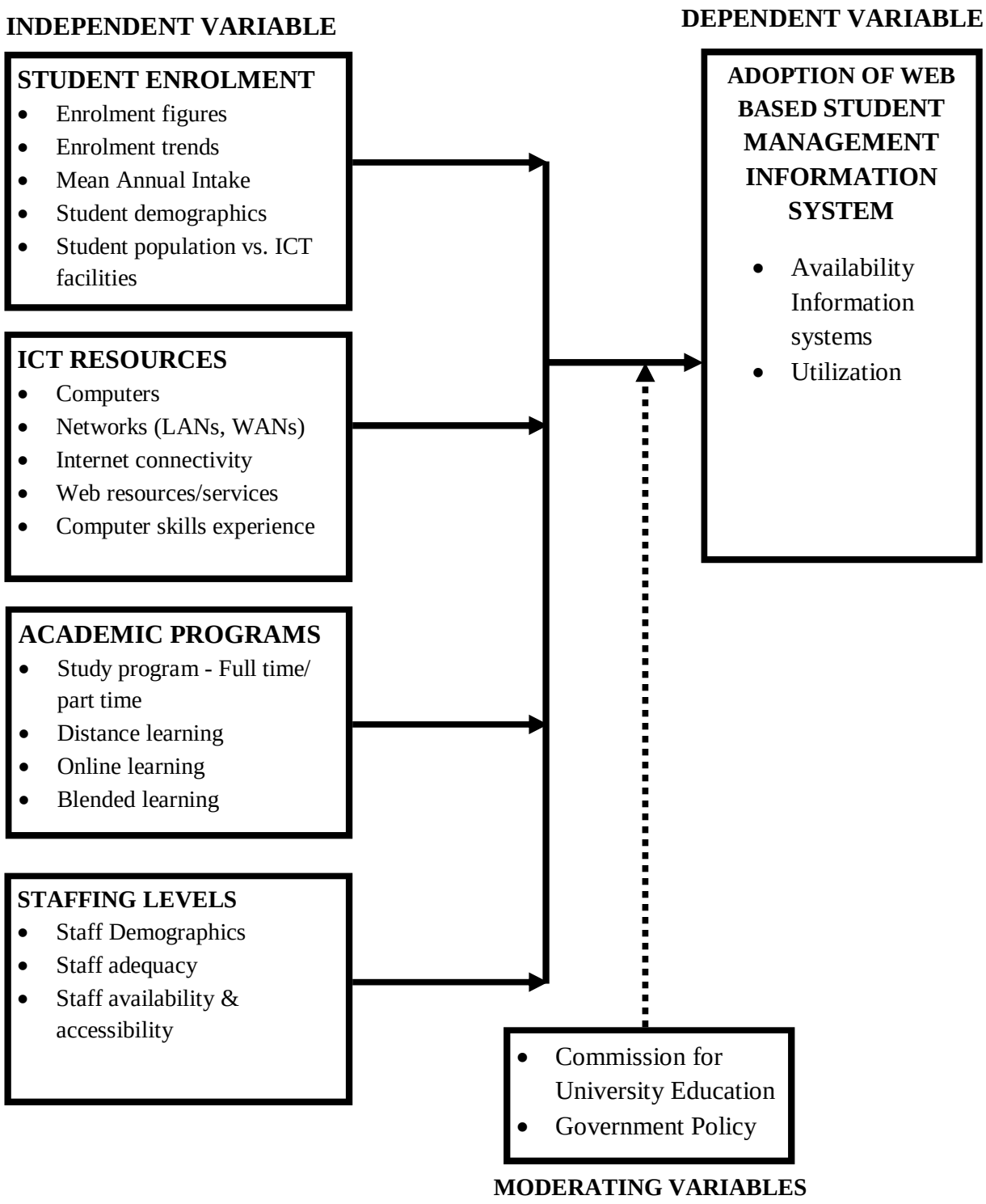


Figure 3: Schematic Diagram of the relationship between the study variables:

From the conceptual framework, the independent variables of the study were student enrolment, ICT resources, diversified academic programs and staffing levels. The study sought to establish the influence of the mentioned variables on adoption of web based student information system. The influence of ICT resources, their availability and utilization were assessed with specific regard to computers, data networks, internet connectivity and computer literacy levels. The influence of diversified academic programs on SMIS adoption in terms of mode of study and adoption of distance, e-learning and blended methodology were assessed. Finally, the study attempted to link staffing levels to web based SMIS adoption and looked at adequacy, availability and accessibility of university ICT, teaching and administrative staff. The dependent variable of the study is adoption of SMIS. The research established the level of adoption, purpose of use, frequency of use, availability and accessibility of SMIS.

2.10 Summary of literature review

Chapter two of this report has presented literature on the expansion of public universities with regard to adoption of SMIS. It was noted that top world universities ventured early into Student Information Systems for better management of their increasing student populations and remained competitive, consistently ranking top globally. Kenyan public universities too must fully embrace web based student management information system to remain competitive and offer quality services and be able to serve both on-campus and off-campus students. The rapid university expansion must be accompanied by adoption of fully functional university wide information systems for better quality services that are not locations specific.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This study investigated the influence of university expansion on adoption of web based student management information systems. The study was conducted at Moi University, Kenya. Chapter three of this report outlines the research design, target and sample population, sampling procedure, research instruments, data collection procedure as well the methods employed in data analysis.

3.2 Research Design

Researcher adopted descriptive survey methodology using a case study approach. Questionnaires, interview schedules and observation were used in data collection from the university students and staff. A case study was adopted due to its unique strength and ability to deal with a full variety of evidence, including documents, artifacts, interviews and observation since it involves a careful and complete examination of a social unit, institution, family, cultural group or an entire community and embraces depth of a study (Kothari, 2004). Kothari further explains that a survey is an attempt to collect data from members of a population in order to determine the current status of that population with respect to one or more variables. Surveys are only concerned with conditions or relationships that exist, opinions that are held, processes that are going on, effects that are evident or trends that are developing.

3.3 Target Population

The target population was 49,919 students and staff of Moi University comprising 47,071 students and while the members of staff were 2,848 including teaching staff, administrative staff and officers of the university (Moi University 2014). For the purposes of data collection, the study targeted only undergraduate students pursuing Bachelors degrees only.

Table 3.1: Target population

Category	Target Population
Students	47,071
Staff	2,848
Total	**49,919**

3.4 Sample Population and Sampling Procedure

3.4.1 Sample population

The study used a sample of 380 respondents as determined by Krejcie & Morgan (1970). The 380 respondents were distributed as shown in Table 3.2.

Table 3.2: Study Sample Distribution

Category	Population	Sample
Students	47,071	295
Staff	2,838	80
University officers	10	5
Total	**49,919**	**380**

3.4.2 Sampling Procedure

Stratified sampling was used to get respondents from purposively formed strata of students, ICT staff, teaching and administrative staff, and university officers. 7/15 schools and 5/10 officers of the university were determined using the formula recommended by Nassiuma (2000):

$$n = \frac{NC^2}{C^2 + (N-1)\,e^2}$$

Where n = Sample, N= Population, C=Covariance (20%) and e=margin error (0.05)

The 295 student respondents were derived from the 7 schools in proportion to the enrolments thereof: 30 students came from School of Medicine, 35 Information Sciences, 30 Engineering, 55 Business and Economics, 65 Education, 30 Law and 45 School of Human Resource and Development. The 53 staff included 20 from ICT, 16 teaching and 17 non teaching staff. 5 officers of the university were interviewed.

3.5 Research Instruments

Research data was collected using questionnaires measured using a combination of Likert-type response scale, closed and open ended questions. The researcher then enlisted the aid of 6 research assistants to administer 375 questionnaires to the respondents. Interview schedules were used to collect data from 5 officers of the universities while observation, through physical visits to the department and computer labs, was used to confirm the findings.

3.5.1 Piloting of the research instruments

A pilot administration of the questionnaires was done to ascertain their suitability for the study in a clear and unambiguous manner. 20 students, 4 lecturers, 5 school administrators and 3 ICT staff were involved in the pilot study. The results from the piloting were analyzed and used to improve the instruments for validity and reliability.

3.5.2 Validity of the research instruments

Validity aims at ascertaining the extent to which the research instruments collect the necessary information which they are supposed to measure (Serem, Boit & Wanyama, 2013). The researcher developed the instruments in consultation with the supervisor to ensure validity of the instruments. Ideas were also borrowed from other instruments already developed and used by other researchers.

3.5.3 Reliability of the research instruments

Reliability aims at ascertaining consistency of the responses collected by the instruments. It has been defined by Serem, Boit & Wanyama (2013) in terms of whether a particular tool or instrument would yield the same results it if it is repeatedly used by one researcher or by different researchers at once. In this study, piloting of the instruments was done using split test method, based on Cronchbach's alpha at a level of 0.7%.

3.6 Data Collection Procedure

The researcher obtained written authority from University of Nairobi to proceed to the field. The researcher then made formal requests to the deans of schools and heads of target departments to allow data collection in the university. Bookings for interviews were made with the officers of the university. With the help of six research assistants, the researcher undertook

systematic observation of the physical infrastructure of the universities, including visits to halls of residence, lecture halls and staff offices while administering questionnaires and conducting interviews. The tested and refined questionnaires and interview schedules were then distributed physically by the researcher and the research assistants. Adequate instructions were given to aid the respondents to help them complete the questionnaires with ease. To enhance response rate, the questionnaires were distributed physically such that they were completed and returned immediately, where possible) to the administrators within the same locality.

3.7 Data Analysis

The collected data was edited for accuracy, uniformity, consistency and completeness then analyzed using descriptive and inferential statistics. Descriptive statistics will present the distributional properties of data and also explain the respondent's characteristics while inferential statistics will show the nature and direction of relationship between variables. The researcher basically used Microsoft Excel 2010 to analyze data and derive percentages as required.

3.8 Ethical Consideration

A research permit will be obtained from the relevant government department to legitimize the study. All respondents in the study will be made fully aware of the purpose and the significance of the study and only those who willingly consent will be involved in the study. Confidentiality issues will be handled with utmost care to fully protect the identity of the participants in the study.

3.9 Operational Definition of Variables

The table 3.3 shows the relationship between the various variables, indicators, measurements, data collection and analysis techniques

Table 3.3: Operational Definition of Variables

Objective	Variable	Indicators	Scale	Data collection technique	Data analysis
To assess the influence of student enrolment on adoption of SMIS online	**Independent variable** Student enrolment **Dependent variable** SMIS adoption	Student demographics Student enrolment Mean Annual Intake	ordinal/ nominal	Document Analysis Questionnaire	Descriptive statistics
To establish the influence of ICT resources on adoption of SMIS	**Independent variable** ICT resources **Dependent variable** SMIS adoption	Computers Networks Internet connectivity Web resources ICT Skills	ordinal/ nominal ordinal/ nominal	Document Analysis Questionnaire Interviews	Descriptive statistics
To examine the influence of diversified academic programs on adoption of SMIS	**Independent variable** Diversified academic programs **Dependent variable** SMIS adoption	Full/Part time programs ICT incorporation in teaching Adoption of Distance, e-learning and blended methodology	ordinal/ nominal ordinal/ nominal	Document Analysis Questionnaire Interviews	Descriptive statistics
To assess the influence of staffing levels on adoption of SMIS online	**Independent variable** University Staffing levels **Dependent variable** SMIS adoption	Staff demographics Staff Adequacy Staff accessibility Workload	ordinal/ nominal ordinal/ nominal ordinal/ nominal	Document Analysis Questionnaire Interviews	Descriptive statistics

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION, INTERPRETATION AND DISCUSSION

4.1 Introduction

This chapter presents and discusses results on the background information of the respondents, student enrolment, ICT resources, academic programs and staffing levels and their influence on adoption of web based Student Management Information System (SMIS).

4.2 Response rate

This study targeted Moi University students and staff and used a sample of 380 respondents as recommended by Krejcie and Morgan table (1970). A total of 375 questionnaires were distributed to the respondents and 304 were returned.

Table 4.1 Response Rate

Respondents	Dispatched	Returned	Percentage
Students	295	251	85.1
Staff	80	53	66.3
TOTAL	**375**	**304**	**81.1**

Table 4.1 shows that 85.1% (251) and 66.3% (53) of the questionnaires dispatched recorded a satisfactory 81.1% return rate. The study primarily targeted students hence they comprised the bigger percentage of respondents.

4.3 Background information of the respondents

4.3.1 Age of respondents

The study sought to establish the age of the respondents participating in the study. The students and staff were asked to indicate their age.

Table 4.2 Age of student respondents

Age	Frequency	Percentage
17-22 years	153	62.4
23-28 years	88	36.0
29-34 years	3	1.2
35-40 years	1	0.4
Total	**245**	**100.0**

Table 4.2 shows that 153 (62.4%) student respondents were aged between 17-22 years, 88 (36%) were aged between 23-28 years, 3 (1.2%) were between 29-34 years old while 1 (0.4%) was between 35-40 years. The findings show that majority of the student respondents were aged between 17-22 years.

Table 4.3 Age of staff respondents

Age	Frequency	Percentage
21-30 years	11	20.8
31-40 years	17	32.1
41-50 years	21	39.6
51-60 years	4	7.5
Total	**53**	**100.0**

Table 4.3 shows that 11(20.8%) staff were between 20-30 years, 17 (32.1%) between 31-40 years, 21 (39.6%) between 41-50 years while 4 (7.5%) belonged to age bracket 50-60 years. While majority of the staff were aged between 41-50 years, the findings show that the university had a rich mix of age for the personnel.

4.3.2 Gender of respondents

The study sought to establish the gender of the respondents. To that effect they were asked to indicate whether their gender. The results are shown in tables 4.4 and 4.5.

Table 4.4 Gender of student respondents

Gender	Frequency	Percentage
Male	157	62.5
Female	94	37.5
Total	**251**	**100.0**

Table 4.4 shows that 157 (62.5%) students were male while 94 (37.5%) were female. The discrepancy was due to three facts: first, the female students were generally hesitant to complete the questionnaires. Two, majority of the students found in the computer labs at any given time were males. Finally, most of the unreturned questionnaires had been issued to the female students.

Table 4.5 Gender of staff respondents

Indicator	Frequency	Percentage
Male	34	64.2
Female	19	35.8
Total	**53**	**100.0**

Table 4.5 shows that 34 staff (64.2%) were male while 19 (35.8%) were female. Majority of the staff respondents were male attributed to the fact that the ICT directorate and the technical sections were male dominated.

4.3.3 Residence of student respondents

The study sought to establish the residents of the student respondents

Table 4.6 Residence of student respondents

Residence	Frequency	Percentage
University hostel	174	69.9
Non resident	75	30.1
Total	**249**	**100.0**

Table 4.6 shows that 174 (69.9%) resided in university hostels while 30.1% (75) were non residents. More questionnaires had been issued to residents than non-residents and the questionnaire return rate was generally higher among residents.

The research questionnaires were dispatched to students in the schools indicated in table 4.5 and returned thus.

4.3.4 School of student respondents

Table 4.7 School of student respondents

School	Frequency	Percentage
Medicine	26	10.4
Information Sciences	27	10.8
Engineering	30	12.0
Business & Economics	44	17.5
Education	51	20.3
Law	35	13.9
Human Resource Development	38	15.1
Total	**251**	**100.0**

Table 4.7 shows that 26 (10.4%) students were from the school of Medicine, 27 (10.8%) Information Sciences, 30 (12%) Engineering, 44 (17.5%) Business and Economics, 51 (20.3%)

Education, 35 (13.9) Law and 38 (15.1%) from Human Resource Development. The samples derived from the schools reflected the enrolments thereof.

4.3.5 Job status

Table 4.8 Job status

Job status	Frequency	Percentage
Temporary	9	17.0
Permanent	44	83.0
Total	**53**	**100.0**

Table 4.8 shows that 9 (17%) respondents were temporary staff while 44 (83%) were permanent staff. The findings show that most of the respondents were permanent staff while a few were either on contract, temporary deployment or industrial attachment.

4.3.6 Staff duration of service

Table 4.9 Staff duration of service

Duration of service	Frequency	Percentage
0-5 years	11	20.7
5-10 years	16	30.2
10-15 years	21	41.5
15-20 years	3	5.7
Over 20 years	1	1.9
Total	**53**	**100.0**

Table 4.9 shows that majority of the staff 21 (41.5%) had worked in the university for between 10-15 years followed by 16 (30.2%) who had served for 5-10 years. The findings show that the university had a high personnel retention rate while it also ensured new talents were brought on board.

4.4 Student Enrolment and adoption of web based SMIS

The study sought to establish the total number of undergraduate students enrolled for degree, diploma and certificates in the various schools. The following responses were received.

Table 4.10 Undergraduate Student Enrolment

School	Undergraduate Enrollment	Percentage
Information Sciences	1245	3.5
Education	15450	43.3
Human Resource Development	3265	9.2
Engineering	1465	4.1
Business and Economics	11682	32.7
Medicine	748	2.1
Law	1819	5.1
Total	**35674**	**100.0**

Table 4.10 shows that School of Education had the highest enrolment of 15,450 (43.3%) followed by School of Business and Economics 11,682 (32.7%). School of Medicine had the least enrolment of 748 students. The findings show that majority of the students (43.3% and 32.7%) in Moi University were pursuing Education and Business courses. Enrollment in all the other schools collectively comprised only 24%.

The study then sought to establish the enrollments of Bachelors degree students in the 7 schools

Table 4.11 Bachelors Student Enrolment

School	No. of Bachelors Students	Percentage
Information Sciences	847	2.7
Education	13680	43.0
Human Resource Development	3085	9.7
Engineering	1379	4.3
Business and Economics	10381	32.7
Medicine	617	1.9
Law	1799	5.7
Total	**31788**	**100.0**

Table 4.11 shows that Majority of the undergraduate students 13,680 (43.0%) were from the School of Education followed by 10,381 (32.7%) from School of Business and Economics. Again, the School of Medicine had the least number of undergraduates. The study established the undergraduate student enrolment over three academic years. In academic year 2012/13 the university admitted 7,321 students, 7,535 in 2013/2014 then 5217 in 2014/15 academic year. Computation of the figure also revealed that the Mean Annual Intake for undergraduates stood at 6,690 students. The enrollment details are featured in Appendix IX. The study found out that the university was admitting more students annually than her capacity to accommodate and serve effectively. The findings supported Oketch (2004) and Gudo et al (2011).

As an indicator of the high student enrolment, the respondents were asked whether they experienced or witnessed overcrowding in the university and they responded as below.

Table 4.12: Experience of overcrowding

Response	Frequency	%
Sometimes	150	49.3
Always	108	35.5
Not at all	46	15.2
Total	**304**	**100.0**

Table 4.12 shows that 150 (49.2%) respondents admitted that there was sometimes overcrowding, 108 (35.5%) indicated there was always overcrowding. The overcrowding was experienced in computer labs, around WiFi hotspots, and around power outlets besides hostels, lecture rooms and library in general. The findings support (Bianchi, 2014) who concluded that

educational expansion through increased enrolment severely crowded resources per student and called for more rationalized intake.

Specifically, the students were asked whether they scrambled for ICT resources with the following responses.

Table 4.13: Scramble for ICT resources

Response	Frequency	%
Yes	164	65.3
No	87	34.7
Total	**251**	**100.0**

From Table 4.13, 164 (65.3%) students indicated they scrambled for ICT resources while 87 (34.7%) denied. The ICT resources as well as vantage positions were available on first come first served basis and could only be used in shifts. The findings confirmed that increased student population put pressure on all university resources (Mwiria, 2007), including lecture halls, library resources, hostels, computer labs and personnel. The situation forced students to scramble for the available ICT resources as well as seats, sitting positions and other resources like sockets and proximity to hotspots

The respondents were asked whether the available ICT facilities were commensurate with the existing student population in their campuses.

Table 4.14: Student enrolment versus the existing ICT facilities

Response	Frequency	Percentage
Yes	68	23.1
No	227	76.9
Total	**295**	**100.0**

Table 4.14 shows that majority of the respondents 227 (23.1%) felt the student population was not commensurate with the existing ICT facilities. Particularly, the School had of Law had 96 working computers for 1,819 students; a ratio of 1:19. School of Medicine had 24 working computers against 748, a ration of 1:31 and much higher since the computers were shared with students in other schools like nursing, public and environmental health. The findings are in agreement with those of Altbach et al (2009), and Gartner (2011) who raised concerns about the

capacity of public universities to effectively offer quality services to the existing student body and recommended careful investment in physical facilities including ICT resources.

The staff respondents were asked whether increased student enrolment necessitated SMIS adoption.

Table 4.15: Increased student enrolment necessitates adoption of web based information systems

Response	Frequency	Percentage
Strongly Disagree	14	26.4
Disagree	7	13.2
Neutral	3	5.7
Agree	10	18.9
Strongly Agree	19	35.8
Total	**53**	**100.0**

Table 4.15 shows that while majority of the respondents 19 (35.8%) strongly agreed that increased student enrollment necessitates adoption of SMIS, 10 (18.9%) agreed. With increasing enrolment computerized web based information systems become handy in service the huge student numbers confirming the findings of Frank & Meyer (2007) and Yokaboski & Nolan (2011). That 7 (13.2%) and 14 (26.4%) respondents disagreed and strongly disagreed with the statement clearly indicates that increased student enrolment is not enough to lead to adoption of SMIS. In deed the researcher confirmed that the school of Education which had the highest enrollment also had the lowest SMIS adoption. SMIS adoption was attributed to other factors like competition, government policy intervention and the quality of ICT staff and technicians.

4.5 ICT resources and adoption of web based SMIS

The study assessed the availability of computers, data networks (Local Area Networks and University wide networks), internet connectivity, data and power backup arrangements. The ICT staff were asked about the availability of ICT resources in the university and they gave the following responses.

Table 4.16: Availability computer and network resources

Parameter	Frequency (Yes)	%	Frequency (No)	%
Functional computers are available	20	100.0	0	0.0
Departments have LANs	20	100.0	0	0.0
Departments are fully interlinked	11	55.0	9	45.0
Cable networks are available	20	100.0	0	0.0
There are active servers	20	100.0	0	0.0
Data and power backup exist	20	100.0	0	0.0
There is wireless connectivity (WiFi)	20	100.0	0	0.0
The ICT resources are generally sufficient	3	15.0	17	85.0

Table 4.16 shows that 20 (100%) accepted that the university had functional computers, Local Area Networks in departments, cable and wireless connectivity, active servers, data and power backups. 13 (55%) respondents thought the departments were fully interlinked while 9 (45%) disagreed. Only 4 (15%) felt that the ICT resources were generally sufficient while 17 (85%) thought the ICT resources were insufficient.

The study established that Moi University had made great efforts to invest in computers, data networks based on fibre optic back bone, servers, intelligent switches, wireless internet (WiFi) and end user training. In particular, the university servers were strategically and safely located to effectively host mail and internet services, information systems and perform user authentication. There was extensive use of Virtual LANs for labs, N-Computing, virtual servers and intelligent switches. Data backup arrangements were also elaborate with dedicated back up servers and external hard drives. Data backup were accomplished incrementally every 5 minutes and every 30 minutes. The university used standby generators, and green power for power stability, surge protection to ensure service availability during blackouts.

All the respondents were then asked whether they had access to university computer with internet connection. The following responses were received.

Table 4.17: Access to university computer with internet connection

Response	Frequency	Percentage
Yes	203	72.0
No	79	28.0
Total	**262**	**100.0**

Table 4.17 indicates that 203 (72%) respondents had access to university computer with internet connection while 79 (28%) did not have access. The findings show that majority of the respondents had access to university computer(s) with internet connection.

The respondents were asked where the computers were located, and they gave the following responses.

Table 4.18: Location of computers

Location of computers	Frequency	Percentage
Departmental labs	63	27.0
Library	100	42.7
Both department and library	71	30.3
Total	**234**	**100.0**

From Table 4.18, 63 (27%) respondents indicated that the computers were located in the computer labs within their departments. 100 (42.7%) indicated the library while 71 (30.3%) indicated that the computers with available both in their departments and the library. On the part of staff, 29 (54.7%) had access to computers in their offices. Through physically visiting the schools, departments and libraries, the researcher confirmed the availability of the computers.

The researcher sought to establish the adequacy of the computers to serve the existing student population. 224 (92.7%) respondents indicated that the computers were inadequate while only 12 (7.3%) thought otherwise.

Table 4.19: Adequacy of computers

Response	Frequency	Percentage
Adequate	21	7.3
Inadequate	268	92.7
Total	**289**	**100.0**

Overwhelmingly, 92.7% consistently indicated that the computers were inadequate to serve the high student population. The findings were in agreement with those of Oketch (2004), and Gudo et al (2011) who raised concerns about the capacity of Kenyan public universities to effectively offer quality services to the existing student body and recommended careful investment in physical facilities and ICT resources.

The study sought to find out what alternatives were being used by students to access internet. 133 (55.2%) students used their phones to connect to the internet, 30.7% used their laptops while 14.1% visited commercial cyber cafés.

Table 4.20: Alternatives for internet access

Alternative	Frequency	Percentage
Phones	133	55.2
Laptops	74	30.7
Cyber café	34	14.1
Total	**241**	**100.0**

Table 4.20 shows that majority of the respondents used their phones to access internet while a significant number owned laptops. Some schools like Law and Medicine had forged partnerships with USAID and AMPATH respectively to equip their students with tablets while the School of Engineering had made ownership of a laptop a mandatory requirement for admission for new students.

All the respondents were asked whether there was wireless internet connectivity (WiFi) in their campus. 251 (84.2%) indicated that WiFi was available in the university while 47 (15.8%) indicated there was no WiFi.

Table 4.21: Availability of WiFi in the university

Response	Frequency	Percentage
Yes	251	84.2
No	47	15.8
Total	**298**	**100.0**

Table 4.21 shows that majority of the respondents were aware of WiFi availability. In the main campus alone, 12,499 students had registered for WiFi confirming the massive positive response on availability of the service. Most of those who indicated there was no WiFi were part time (evening) students.

The study then asked the respondents to rate the WiFi connectivity. 26 (8.7%) respondents thought the WiFi connectivity was very good, 59 (19.8) thought WiFi was good, 129 (43%) rated the service as fair while 72 (24.2%) rated the service as poor

Table 4.22: WiFi Rating

Response	Frequency	Percentage
Very Good	26	8.7
Good	59	19.8
Fair	141	47.3
Poor	72	24.2
Total	**298**	**100.0**

Table 4.22 shows that majority of the respondents rated the WiFi connectivity as fair. The study established that the signal strength fluctuated between very good and very poor depending on the time of the day. Early morning and late evening users enjoyed very good signals due to low traffic. Thus, the responses reflected the timing of use of WiFi connectivity. The findings agreed with those of Bii and Gichoya (2006) who decried the slow internet speeds, limited internet access points and bandwidth.

All the respondents were asked whether they had university email accounts and 149 (53%) respondents responded positively while 132 (47%) were yet to open such accounts.

Table 4.23: Ownership of university email accounts

Response	Frequency	Percentage
Yes	149	53.0
No	132	47.0
Total	**281**	**100.0**

Table 4.23 shows that more than half the student population had university e-mail accounts.

It was in the interest of the study to establish which services were available to the students through the university website from among the options. 93 (37.1%) students had requested admission through the website, 174 (69.3%) booked rooms online, 75 (29.9%) filled non-resident forms, 56 (22.3%) accessed course content, 16 (6.4%) submitted their assignments, 27 (10.8%) accessed examination results, 9 (3.6%) used university e-mail service, 156 (62.2%) checked notices and announcements, 44 (17.5%) accessed HELB query system while 127 (50.6%) accessed e-resources.

Table 4.24: Student web services

Web services	Frequency	Percentage
Request for admission	93	37.1
Hostel room booking	174	69.3
Filling of non-resident forms	75	29.9
Access to course content	56	22.3
Submit assignments	16	6.4
Exam results	27	10.8
University e-mail service	9	3.6
Notices and announcements	156	62.2
HELB query system	44	17.5
E-Resources	127	50.6

Table 4.24 shows that Hostel Room Booking was the most popular service. The study established that it was mandatory for students to use the hostel management system for booking rooms and filling non-resident forms and a fine of Kshs. 1,500 was levied upon non compliance and failure to adhere to set deadlines.

The teaching staff were asked to indicate which web services they used in rendering their services. 3 (18.8%) of the respondents indicated that they uploaded course content for online access by the students, 2 (12.5%) availed CAT marks online, and 9 (56.3%) used university e-mail service.

Table 4.25 Teaching staff web services

Service	Frequency	Percentage
Upload course content	3	18.8
Access students assignments	2	12.5
Enter CAT marks	2	12.5
Access to E-resources	16	100.0
University e-mail services	9	56.3
General information and news	16	100.0

The findings show that lecturers mostly accessed the web to access e-resources and general information and university news. Most of the respondents visited the web to access e-resources and check notices. Use of university e-mail service was much higher among staff than students.

The researcher sought to know whether the online services were available to the users away from the university premises.

Table 4.26: Web Service availability away from the university

Response	Frequency	Percentage
Yes	168	70.3
No	71	29.7
Total	**239**	100.0

Table 4.26 shows that 168 (70.3%) respondents indicated that the services were available away from the university, while 71 (29.7%) said the services were not available. The findings indicate that the services were truly online, accessible from anywhere so long as one had internet connection. Only e-resources were restricted to specified radius around the university library.

All the respondents were asked about their frequency of use of Moi University web services. 32 (11.7%) respondents used the services very often, 87 (31.9%) only occasionally and 154 (56.4%) rarely.

Table 4.27: Frequency of use of MU web services

Response	Frequency	Percentage
Very often	32	11.7
Occasionally	87	31.9
Rarely	154	56.4
Total	**263**	**100.0**

Table 4.27 shows that majority of the respondents rarely used MU web services. Some respondents cited the limited number of existing online services and expressed the need for more. Again, some services like room booking, admissions and exam results were needed only once in a while.

The study assessed the level of ICT skills awareness and experience among students and staff. Table 4.29 shows that 98 (33.8%) respondents had very good computer skills, 121 (41.7%) good, 49 (16.9%) fair while 22 (7.6%) had poor computer skills.

Table 4.28 ICT Skills and experience

Response	Frequency	Percentage
Very good	98	33.8
Good	121	41.7
Fair	49	16.9
Poor	22	7.6
Total	**270**	**100**

The findings show impressive level of ICT skills in the university attributed to the fact that some students had prior computer experience before joining the university while there were also computer literacy courses in most programs. For the staff, the ICT directorate organized regular trainings for all categories of staff while IODL facilitated seminars for lecturers. The findings confirmed that college students are increasingly getting familiar and confident with ICTs (Retig, 2006).

4.6 Academic programs and adoption of web based SMIS

The student respondents were asked whether they were full time or part time students. 204 (81.3%) were full time students attending classes between 8am and 5pm while 18.7% were part time students

Table 4.29: Category of Student

Response	Frequency	Percentage
Full time	204	81.3
Part time	47	18.7
Total	**251**	**100.0**

Table 4.29 shows that majority of the respondents were full time students though the figures do not necessarily represent the actual enrolment of students as per the categories. No discrepancy was noted in utilization of the existing web based systems.

The study also attempted to establish the extent of ICT incorporation in teaching. To that effect the student and lecturers were asked the extent to which ICT had been incorporated in teaching. 20 (8.1%) respondents thought that there was extensive ICT incorporation in teaching, 103 (41.7%) indicated partial, 79 (32%) indicated minimal while 45 (18.2%) indicated no incorporation of ICT in teaching.

Table 4.30: Incorporation of ICT in teaching

Response	Frequency	Percentage
Extensively	20	8.1
Partially	103	41.7
Minimally	79	32.0
Not at all	45	18.2
Total	**247**	**100.0**

Table 4.30 shows that majority of the respondents cited partial ICT incorporation in teaching which included use of LCD projectors, powerpoint slides, exchange of teaching notes in softcopy and through e-mail.

The study sought to establish the adoption of various modes of delivery of the academic programs. As such the students were asked whether their courses were available on distance

learning, e-learning or blended mode. 2 (0.8%) of respondents accepted, 144 (61.3%) said there was no adoption of distance learning while 89 (37.9%) were not sure.

Table 4.31: Adoption of Distance Learning

Response	Frequency	Percentage
Yes	2	0.8
No	144	61.3
Not Sure	89	37.9
Total	**235**	**100.0**

Table 4.31 shows that majority of the respondents indicated there was no adoption of distance learning. In the same context, the lecturers were asked whether they had developed content distance learning and they returned the responses in table 4.33.

Table 4.32: Content for Distance Learning

Response	Frequency	Percentage
Yes	0	0.0
No	16	100.0
Total	**16**	**100.0**

Table 4.32 shows that majority of the lecturers had not developed content for distance learning. The findings resonated with the response in table 4.31 hence the researcher concluded that distance learning adoption was only marginal.

On adoption of e-learning, the students were asked whether their programs were available on e-learning platform.

Table 4.33: Adoption of e-Learning

Response	Frequency	Percentage
Yes	0	0.0
No	117	51.1
Not Sure	112	48.9
Total	**229**	**100.0**

Table 4.33 shows that 117 (61.3%) students indicated that their programs were not offered on e-learning basis while 112 (37.9%) were not sure. The findings show no adoption of

e-learning. Again, the lecturers were asked whether they had developed content for e-learning and they responded as shown in table 4.27 below.

Table 4.34: Content for E-Learning

Response	Frequency	Percentage
Yes	0	0.0
No	16	100.0
Total	**16**	**100.0**

Table 4.34 shows that none of the lecturers had developed content for e-learning. All the respondents 16 (100%) had not developed content for e-leaning. The findings confirm those of Tarus, Gichoya and Muumbo (2010) who observed that adoption of diversified programs was still low in Kenya.

On adoption of blended mode of teaching, the students were asked whether some of their programs were available on blended mode.

Table 4.35: Adoption of blended mode of teaching

Response	Frequency	Percentage
Yes	56	23.6
No	88	37.1
Not Sure	93	39.2
Total	**237**	**100.0**

Table 4.35 shows that 56 (23.6%) agreed that there was some adoption of blended methodology of teaching, 88 (37.1%) denied while 93 (39.2%) were not sure. Majority of the respondents confirmed were not sure about adoption of blended learning. This was attributed to lack of awareness about the methodology that was actually in use.

Asked whether they had developed content for blended teaching, the lecturers responded as shown in table 4.36 below.

Table 4.36: Content for Blended Mode of Teaching

Response	Frequency	Percentage
Yes	5	31.2
No	11	68.8
Total	**16**	**100.0**

Table 4.36 shows that 5 (31.2%) lecturers had developed content for blended methodology of teaching while 11 (68.8%) had not. The findings confirmed that blended mode of teaching was fairly adopted supported by 23.6% of the students and lectures.

The study sought to establish the availability of e-resources including electronic journals, for teaching, learning and research. 197 (68.9%) respondents indicated that they had access to e-resources while 89 (31.1%) indicated they had no access to e-resources.

Table 4.37: Access to e-resources

Response	Frequency	Percentage
Yes	197	68.9
No	89	31.1
Total	**286**	**100.0**

Table 4.37 shows that majority of the respondents had access to e-resources. The resources were however available in specific libraries only.

Finally, the study sought to know how students mostly submitted their assignments and projects. The question was directed to the students and lecturers. 58 (20.2%) respondents indicated that assignments were submitted in soft copy while 229 (79.8%) submitted hard copies.

Table 4.38: Submission of assignments and projects

Response	Frequency	Percentage
Soft copy via e-mail or student portal	58	20.2
Hardcopy to department	229	79.8
Total	**287**	**100.0**

Table 4.38 shows that majority of the assignments were submitted in hard copy of printouts despite the existence of systems to facilitate upload of soft copies.

4.7 Staffing levels

The study sought views of the respondents regarding university ICT staffing levels. 133 (46%) strongly disagreed, 78 (27.3%) disagreed while 43 (14.9%) and 25 (8.7%) agreed and strongly disagreed respectively, 9 (3.1%) were not sure.

Table: 4.39: The University has adequate ICT staff

Responses	Frequency	Percentage
Strongly Disagree	133	46.0
Disagree	78	27.3
Neutral	9	3.1
Agree	43	14.9
Strongly Agree	25	8.7
Total	**289**	**100.0**

The findings show that majority of the respondents thought the ICT staff were largely inadequate. This was confirmed by the ICT director who indicated the directorate had only 41 ICT staff serving the entire university and could do with many more. The findings confirmed conclusions by Aguele (2004) hat developing ICT human resource was still a major challenge especially in African Universities. Again, Bianchi (2014) also observed that university human resources were more or less fixed and didn't fully adjust to enrolment changes.

Asked whether they were comfortable with their work load, the ICT staff responded as shown in Table 4.40. 17 (85%) were not comfortable with the workload.

Table 4.40: ICT staff workload

Responses	Frequency	Percentage
Yes	3	15.0
No	17	85.0
Total	**20**	**100.0**

The findings indicate that majority of the ICT staff were not comfortable with their work load. The explanations given implied that there was so much to do by the few staff. They were often overworked and forced to work longer hours. Again, whereas they staff were specialized in specific areas like computer hardware, web design, network administration, database

administration and graphic design, they had to handle multiple tasks cutting across all areas and campuses.

On whether the ICT personnel were readily accessible, the study elicited the responses in Table 4. 41. 33 (8.3%) respondents strongly disagreed, 39 (14.1%) disagreed, 22 (7.9%) were neutral while 106 (38.3%) and 87 (31.4%) agreed and strongly agreed respectively.

Table: 4.41: The ICT staff are easily accessible for consultation

Responses	Frequency	Percentage
Strongly Disagree	33	8.3
Disagree	39	14.1
Neutral	22	7.9
Agree	106	38.3
Strongly Agree	87	31.4
Total	**277**	**100.0**

The findings indicate that majority of the respondents agreed that ICT staff were easily accessible for consultation. The study established that every school, and some departments, had at least an ICT staff attached to it. Some schools had also hired their independent technicians to supplement the ICT staffing thus increasing the accessibility of the otherwise inadequate personnel.

All students and staff other than ICT staff were asked the extent to which they agreed that ICT staff demonstrated competence in their work. 12 (4.3%) strongly disagreed, 39 (5.0) disagreed, 71 (25.3) were neutral while 121 (43.1%) and 63 (22.4%) agreed and strongly agreed respectively.

Table: 4.42: The ICT staff demonstrate competence in their work

Responses	Frequency	Percentage
Strongly Disagree	12	4.3
Disagree	39	5.0
Neutral	71	25.3
Agree	121	43.1
Strongly Agree	63	22.4
Total	**281**	**100.0**

The findings confirmed that the ICT staff were mostly competent as supported by majority of the respondents who agreed. Those who were neutral also indicated they did not have access to university computer and were not aware of the availability of WiFi hence the study assumed they had never sought the assistance of ICT staff. The study also consistently confirmed that SMIS adoption depended on the capability of ICT staff to develop and roll out specific applications especially within the schools they were attached to.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter provides a summary of findings as deducted by the study and presents conclusions and recommendations. Areas for further study have also been proposed.

5.2 Summary of findings

5.2.1 Demographic characteristics of respondents

Most of the respondents were students who comprised 251 (82.6%) against 53 (17.4%) staff. This was consistent with the dispatched questionnaires (295 for students and 80 for staff). In terms of gender, the male respondents comprised 191 (62.8%) while the females were 37.2% (113). Again, the ratio reflected the general gender composition among students and staff. Regarding age, majority of the student s 153 (62.5%) were aged between 17-22 years, followed by 88 (36%) aged between 23-28 years. Concerning residence, 174 (69.9%) students who took part in the study resided in the university hostels while 75 (30.1%) were non residents. Majority of the students 52 (20.7%) were from School of Education, followed by School of Business 45 (17.9%), Human Resource Development 38 (15.1%), Law 35 (13.1%), Engineering 30 (12%), Information Sciences 27 (10.8%) and Medicine 26 (10.4%).

Majority of the staff, 21 (39.6%) were aged between 41-50 years, followed by 17 (32.1%) aged 31-40 years, 11 (20.8%) aged 21-30 and 4 (7.5%) aged 51-60 years. ICT staff comprised 20 (37.7%), followed by administrators, 17 (32.1%) then lecturers, 16 (30.2%). 44 (83%) of the staff were on permanent basis while 9 (17%) were temporary. Concerning duration of service, majority of the staff 21(39.6%) had served for between 10-15 years followed by 16 (30.2%) 5-10 years, 11 (20.2%) 0-5 years, 3 (5.7%) 15-20 years then 1 (1.9%) who had served for over twenty years.

5.2.2 Student enrolment and SMIS adoption

The study established that Moi University had enrolled 7,231(26%) degree students in 2012/13 academic year, 7,353 (37.5%) in 2013/14 and 5,217 (26%) in 2014/15. The Mean Annual Intake for the three years was 6,690 (33.3%) students as shown in appendix IX. The high enrolment caused overcrowding in the university as confirmed by 211 (84.1%) respondents

who indicated they experienced or witnessed overcrowding in university facilities including hostels, lecture halls and libraries with 150 (49.3%). The high student population also forced students to scramble for the limited resources with 164 (65.3%) admitting that they scrambled for vantage sitting positions and vantage seating around hot spots and power outlets. Eventually, 227 (76.9%) respondents concluded that the university ICT facilities were not commensurate with the student population, thus insufficient to accommodate and effectively support the existing students.

5.2.3 ICT resources and SMIS adoption

The study established the availability, accessibility and utilization of ICT resources including policy documents (university strategic plan (2005/2015), ICT policy, IODL policy), computers, data networks, internet connectivity, information systems and requisite skills. On whether the respondents had access to university computers with internet connection, 203 (72%) respondents agreed while 79 (28%) disagreed. The study established that the computers were available in the libraries as confirmed by 100 (42.7%) respondents, departments as confirmed by 63 (27%) and both departmental labs and library as confirmed by 71 (30.3%) respondents.

The study established the availability of functional data networks, servers, power and data backup facilities. This was confirmed by 20 (100%) ICT staff who agreed that there were functional Local Area Networks in the departments interlinked to the university backbone, Virtual LANs , active servers, intelligent switches, backup generators and green power for the server rooms. Asked whether WiFi connectivity was available in the university, 251 (84.2%) respondents agreed, even though in terms of WiFi rating majority of the respondents 141 (47.3%) felt the service was only fair and 72 (24.2%) indicated the WiFi connectivity was poor.

On the adequacy of computers and internet resources, 268 (92.7%) respondents indicated that the resources were inadequate in comparison to the number of users. As such they turned to supplementary alternatives like phones, laptops and commercial cyber cafés. 133 (55.2%) indicated they used their phones to access internet, 74 (30.7%) used laptops while 34 (14.1%) visited cyber cafés. While making efforts to increase the number of computers and enhance internet service, the university had some partnering arrangements USAID and AMPATH to equip the students with tablets. The School of Law and School of Medicine already began the piloting. However, the school of Engineering had made it mandatory for first years to report with laptops. Such moves are likely to increase access to computers.

On the availability and use of web resources and services, the study established that there students and staff were turning to the university website for a number of services including admission processing as confirmed by 93 (37.1%), hostel room booking 174 (69.3%), filling of non resident forms 75 (29.9%), access to course content 56 (22.3%), submission of assignments 16 (6.4%), exam results 27 (10.8%), e-mail service 9 (3.6%), notices and announcements 156 (62.2%), HELB query system 44 (175%) and e-resources 127 (56.6%). These findings were confirmed by the lecturers who indicated they uploaded course content 3(18.8%), accessed student assignments 2 (12.5%), issued CAT marks 2 (12.5%), e-mail service 9 (56.3%), e-resources 16 (100%) and general information 16 (100%). All the services except access to e-resources were available to the users even while they were away from the university as confirmed by 168 (70.3%) respondents. The respondents however indicated they need more services online. On the frequency of use of the web services, majority of the respondents, 154 (56.4%) indicated they rarely used the web services, followed by 87 (31.9%) who did so occasionally while 32 (11.7%) were very frequent users of the web services.

Regarding availability ICT Skills and experience for effective navigation of the digital landscape, majority of the respondents 141 (47.3%) rated their skills as fair, followed by 72 (24.2%) poor, 59 (19.8%) good and 26 (8.7%) very good computer skills. The study established that some students arrived in the university with prior knowledge in computers. However, the departments had programs for introductory courses to computers. Again, the ICT directorate and IODL organized trainings for users regularly.

5.2.4 Diversified academic programs and SMIS adoption

Students who studied on full time basis accounted for 204 (81.3%) of those who took part in the study. Incorporation of ICT in teaching was rated as partial by 103 (41.7%) respondents, minimal 79 (41.7%), extensive by 20 (8.1%) respondents. However, 45 (18.2%) denied ICT had been incorporated into teaching. Regarding adoption of distance learning, majority of the students 144 (61.3%) denied, 89 (37.9%) were not sure while only 2 (0.8%) agreed. No lecturer had developed content for distance education. On adoption of e-learning 117 (51.1%) students denied while 112 (48.9%) were not sure. Again, no lecturer had developed content for e-learning. On adoption of blended learning, 93 (39.2%) were not sure, 88 (37.1%) denied while 56 (23.6%) agreed. 7 (43.8%) lecturers admitted to having developed content for blended learning.

There were systems to support the diversified academic programs as supported by 29 (54.7%) staff respondents but more activity and utilization of the systems were yet to be realized. On e-resources, 73% (187) of the respondents confirmed they had access. Finally, majority of the students 229 (79.8%) submitted their assignments in hard copy.

5.2.5 Staffing levels and SMIS adoption

The study found that ICT staffing levels were inadequate with only 41 ICT staff and 11 IODL technicians serving the entire university. 133 (46%) respondents strongly disagreed with the statement that the university had adequate ICT staff while 78 (27.3%) disagreed. The inadequacy of ICT staffing was further confirmed by 17 (85%) of the ICT staff who indicated they were not comfortable with their work load. However, despite the fact that the ICT staff were limited in number they were easily accessible as confirmed by 106 (38.3%) respondents who agreed with the statement 'ICT staff are easily accessible for consultation' and 87 (31.4%) who strongly agreed. The ICT staff were generally found to be competent in their work as confirmed by 121 (43.1%) respondents who agreed with the statement 'the ICT staff demonstrate competence in their work' and 63 (22.4%) who strongly agreed.

5.3 Conclusion

The study investigated the influence of public university expansion on adoption of web based SMIS. The study established that Moi University was currently developing an integrated SMIS bringing together all services for students self service through a single interface: student portal. However, there existed a number of stand alone information systems (sub systems of SMIS) that were already in use with evidenced discrepancy among the schools.

Concerning student enrolment and adoption of web based SMIS, the study established that the high enrolment and student population was a major driving factor in the expansion of public universities. With a Mean Annual Intake of 6690 (33.3%) for undergraduate degree students in just 7/15 schools, the study concluded that the university admitted more students than its capacity. This was confirmed by the experience and witness of overcrowding always or sometimes as confirmed by 258 (74.8%) respondents, scrambling for resources as indicated by 164 (65.3%) respondents and 227 (76.9%) who indicated the university ICT facilities were not commensurate with student population. There was evidence that efforts were made to enable students process admission requests and obtain admission letters online, book hostel rooms using Moi University Hostel Management System, access e-resources for study and research, and access examination results. The study concluded that high student population necessitates adoption of SMIS while at the same time puts pressure on the same systems who enhancements are never at par with student enrolment.

Concerning the influence of ICT resources and SMIS adoption, the study established the availability and use of computers, network resources, internet connectivity (bounded and wireless) and requisite end user skills and support. Majority of the respondents 203 (72%) indicated that they had access to computers and internet connection and they supplemented the limited resources with smart phones and laptops taking advantage of the available WiFi connectivity confirmed by 251 (84.2%) respondents. There was urgent need to increase internet access points and enhance internet bandwidth for better services. The respondents indicated they used web resources for a number of needs even though majority 154 (56.4%) indicated they used the web services rarely despite the available end user skills and experience confirmed as good by 121 (41.7%) respondents. There were plans to increase the number of computers, internet coverage and the number of online services for better quality, equitable and efficient service.

Regarding the influence of diversified academic programs on SMIS adoption, the study established that the university offered programs on full and part time basis. 204 (81.3%) respondents were full time students while 47 (18.7%) were part time. The part time programs including evening and weekend classes as well as institution based programs. The offering of certificate, diploma, degree and postgraduate programs provided opportunities for study for may. But the establishment of the institute of Open and Distance Learning and even the rolling out of MUSOMI, did not seem to have much impact on university expansion due to little or low uptake of distance and e-learning. There was minimal but progressive uptake of blended mode of teaching as confirmed by 56 (23.6%) respondents and 5 (31.2%) lecturers who had developed digital content for blended teaching. The study concluded that end user awareness was crucial in adoption of information systems that support diversified programs and that availability of a system does not always guarantee use.

Concerning staffing levels, the study concluded that there was inadequate ICT staffing in the university as confirmed by 133 (46%) respondents who disagreed that the ICT staffing was adequate and 17 (85%) ICT staff who were not comfortable with their work load. However, the ICT staff were readily accessible since they had been distributed in all schools. This was confirmed by 106 (38.3%) respondents. Majority of the respondents also indicated that the ICT staff demonstrated competence in their work.

5.4 Recommendations

On the basis of the findings and conclusions above, the study recommends the following:

1. Moi University needs to put up more structures on its 3626 acres of land at Main campus to provide more space for students.
2. There is need for the university to increase WiFi access points and the bandwidth for better connectivity and wider internet coverage
3. More web based services need to be availed for students and staff to enhance efficiency and web traffic for better web ranking
4. There need for more end user training to enhance technology awareness and acceptance
5. The university needs to ensure unified approach to systems development and adoption so that all schools are at the same level of technology adoption

5.5 Contributions to body of knowledge

Objectives	Contribution to body of knowledge
To assess the influence of student enrolment on adoption of web based SMIS	The study found out that increased student enrolment put pressure on the seemingly constant university facilities and human resource forcing adoption of web based information systems to better manage and serve the high student population. On the other hand uncontrolled student enrolment makes the existing systems inadequate and ineffective.
To establish the influence of university ICT resources on adoption of web based SMIS	The study established the availability of functional ICT resources encouraged their use by both students and staff but sometimes deliberate efforts are necessary to force users to adopt new technology. The study noted the need for universities to invest more in quality of service rather than equipment.
To examine the influence of diversified academic programs on adoption of web based SMIS	The study found out that diversification of academic programs was crucial in attracting new cohorts of learners but the presence of a system to support open and distance learning does not necessarily guarantee use.
To establish the influence of university staffing levels on adoption of web based SMIS	The study found out that availability of qualified and highly competent staff is necessary in ensuring proper workload, digital content development and support of information systems. On the other hand staff insufficiency forces adoption of information systems so as to achieve more with less staff.

5.6 Areas for further study

1. A similar study that focuses on post graduate students
2. A similar study that focuses on part time and institution based students
3. A similar study that focuses on students from the other 8 schools of the university i.e School of Science, Tourism Hospitality and Events Management, Nursing, Public Health, Dental Studies, Aerospace Sciences, Arts and Social Studies.
4. A comparative study involving two or more universities

REFERENCES

Abagi, O., Nzomo, J. & Otieno, W. (1995) *New Trends in education: Private Higher Education*. Paris: International Institute for Educational Planning

Aguele, L. I. (2004) Information and Communication Technology in Universities in Nigeria: Challenges for Teaching and Learning. *Journal of Education Systems, Research and development*, 1(2), 75 – 85.

Akinyokun, O. C., Angaye, C. O. & Ubaru, M. O. (2011) Factor analysis o the performance indices of information and communication technology projects in the public sector of the Nigerian economy. Journal of Technology Research,Vol. 1, pp1-15

Bach, C., Belardo, S., Bajwa, H., Kantharaju, P. & Prasanth, O. (2011). Factor Analysis in Measuring Information systems effectiveness. Proceedings of the 2011 ASEE North East Section Annual Conference, University of Hartford

Bii, H & Gichoya, D. M. (2006) *Challenges of establishing and managing IRM centre in a Kenyan public university: A critical review of papers by Moi University's IRM Centre Staff*. Electronic Journal of Information Systems in Developing countries. ejisdc.org

Babatunde I. G., Kayode A. B., Aderonke, T., Bethy, F. (2012) Statistical evaluation of the Impact of ICT on Nigerian Universities. International Journal of Education and Development Using ICT, Issue 1.

Bharamagoudar, S. R., Geeta, R. B. & Totad, S. G (2013) *Web Based Student Information Management System*. International Journal of Advanced Research in Computer and Communication Engineering. Vol. 2, Issue 6, June 2013

British Council (2014) Can Higher Education Solve Africa's Job Crisis? Understanding Graduate Employability in Sub-Saharan Africa

Butcher (2008) in Albtach P. G, Einsberg, L. & Rumbley, L. E (2009). Trends in Global Higher Education: Tracking an Academic Revolution: A report prepared for UNESCO 2009 World Conference on Higer Education

Cambridge University (2015). Cambridge University Student Information System-CAMSIS. www.cam.ac.uk/camsis.cam.ac.uk

Capital FM (2008). *HELB Extends Loans to Parallel Students*. Retrieved from: www.capitalfm.co.ke/news/2008/helb_extends_loans_to_parallel_students. Accessed on December 30, 2014

Commission for University Education (2013) *Status of Kenya Universities Report* http://en.wikipedia.org/wiki/List_of _oldest_universities_in_continuous_operation

Commission for University Education (2014) Universities Standards and Guidelines, 2014 Retrieved from: www.cue.or.ke on 29/2/2015 at 6.30pm

The CPS International Educational Index (2012). Top 100 East African Universities: rankings by ICT adoption. www.cps-research.com

Dhliwayo, K. (2014) *The Internal Customers Perceptions Of A Multi-Campus University System In Zimbabwe. A Case Of Great Zimbabwe University*. International Journal of Scientific & Technology Research Volume 3, Issue 2, February 2014

Ezarik, M. (2009). Multicampus planning: Behind the scenes. How four institutions solved their branch campus scheduling and transportation challenges. *University Business.* Norwalk, Connecticut: Professional Media Group LLC. Retrieved: January 24, 2015; http://universitybusiness.com/viewarticle.aspx?articleid=1381

Frank, D. J. & Meyer, J. W (2007) University Expansion and the Knowledge Society. Springer Science + Business Media B.V. 2007

Hughes, R. & Mwiria, K. (1990). An essay on the implications of university expansion in Kenya. *Higher Education,* Vol. 19 No. 2 pp. 215–237.

Gartner (2011) Review of Student Information Systems: Report for BC Ministry of Education

Gudo, C. O., Olel, M. A., & Oanda, I. O. (2011). *University Expansion in Kenya and Issues of Quality Education: Challenges and Opportunities.*International Journal of Business and Social Science Vol. 2 No. 20; November 2011

Greenberg M. R., Gotsch, A., Rhoads, G., & Schneider D. (2008). *Building and Sustaining a Multi-University and Multi-Campus Program or School of Public Health*. American Journal of Public Health, Vol. 98(9)

Harman, G., & Harman, K. (2003). *Institutional Mergers in Higher Education: Lessons From International Experience. Tertiary Education and Management*, Vol 9, Issue 1.

Holland, N. B. & Sullivan, L (2005). Enterprise-wide System Implementations at Multicampus Institutions : Research Bulletin. Center for Applied Research, Feb 15, 2005: www.educause.edu.ecar

Hughes, R., & Mwiria, K. (1990). An essay on the implications of university expansion in Kenya. *Higher Education, Vol 19* (2), 215–237

International Association of Universities (IAU) (2006 October 3rd) List of World Universities, 25th Edition. Palgrave Macmillan. Accessed from: http://www.amazon.com/World-List-Universities-25th-Edition/dp/1403992525

ICEF (2013) *Increasing mobility and growing demand for Higher Education in Kenya.* Accessed from: www.monitor.icef.com/2013/01/ *Increasing_mobility_and_growing_ demand_for Higher_Education_in_Kenya*

ISIMS evaluation Report (2006). Idaho Student Information Management System (ISIMS): Lessons for Future Technology Projects.

Jamah, A. (2013) *Moi University to Host Most joint Admissions Board Students* (The Standard, August 9, 2013). Nairobi: The Standard Media Group

Joint Admissions Board (2013). University Admissions 2012/2013. www.uonbi/jab/admissions_2013_2014

Johnson, R. W (2013). African's Universities and the Future: Quantity Vs Quality. Good Governance Africa. Retrieved from gga.org/editions/quanity_versus_quantity

Khawaja, A. S. & Abdinnour, S. (2011) *Understanding post-adoption IS usage stages: an empirical assessment of self-service information systems*. Information Systems Journal, Volume 23, Issue 3, May 2013: Wiley Publishing Ltd

Komives, S. R & Voodard, D. B (2013) Student Services: *A Handbook for the Professional*. Wiley Publishers

Kothari, C. R. (2004) Research Methodology: Methods and Techniques. New Age International

Krejcie, K. V. & Morgan, D. W. (1970) Determining Sample for Research Activities. Educational and Psychological Measurement. Vol. 30 , pp. 607-610

Kroenke, D. (2011) Using MIS, 3rd ed. New Jersey: Pearson Education, Inc.

Lynch, C. (2002).Serials in the networked environment. Serials Librarian, vol. 28 (2)

Manyasi, B (2010). OL & DE as a Means of Increasing Access to Higher Learning in Kenya. A Journal of the KIM School of Management Vol 1 pp 123 – 130.

MacGregor, K. (2012) *Plan for 1.5 Million Students by 2030* in University World News, 15 January 2012 Issue No: 88

McLeod, R. & Schell, G. (2007) Management Information Systems, 10th ed. New Jersey: Pearson Education, Inc.

Mohamedbhai, G. (2008) The Effects of Massification of Higher Education In Africa. Private Linkages, Public Trust. UNESCO/Universite Laval/Economica. Paris.

Moi University (2013) *Moi University in Brief*. Eldoret: Moi Univerity Press

Mwangi, E. G. & Shikhuyu, J. (2012). *Challenges of E-learning Implementation in Kenyan University Education*: Case study of Kimathi University in Nyeri County, Kenya

Mwiria, K & Nyukuri, M.S (1994). *The Management of Double Intakes: A case of Kenyatta University.* Paris. U N E S C O: International Institute for Educational Planning.

Nassiuma, D. (2000). *Survey Sampling: Theory and Methods*. Nairobi University Press.

Nganga, G. (2013) *Academic Shortage Deepens as Student Numbers Soar* in News: The Global Window on Higher Education. Retrieved: www.univerityworldnews.com/

Nganga, G. (2013) *Improve Terms or Lose Academics: Vice Chancellor Warns* in University World News: www.univerityworldnews.com/

Njeru, E. H. N & Odundo, P. (2003) *The Role of Higher Education Loans Board in Pro-poor Management Approaches to enhancing access to University Education in Kenya*. Kenya Universities Bill (2012). Republic of Kenya. Government Printers: Nairobi

Onyancha, O.B. & Ocholla, D.N. (2007). The Performance of South African and Kenyan universities on the World Wide Web: A web link analysis. International Journal of Scientoemtrics Informetrics and Bibliometrics, Vol. 11, no. 1. Retrieved from: http://www.cindoc.csic.es/cybermetrics/articles/v11i1p2.html.

Otieno, S. (2004) Student Loans in Kenya: Past Experiences, Current Hurdles, and Opportunities for the Future. JHEA/RESA Vol. 2, No. 2, 2004, pp.75–99

Otieno, J. J., Kiamba, C., & Some, D. K. (2008). Kenya. In D. Teferra & J. Knight (Eds.), *Higher education in Africa: The international dimension*, (pp. 238-241). Boston, MA: Center for International Higher Education.

Oxford University. Student Management System- SITS Vision System. www.ox.ac.uk

Rettig, J. (2003). Technology, cluelessness, anthropology, and the memex: the future of academic reference service, Reference Services Review, 31 (1), 17-21.

Sakaja, Y. M. (2011). Influence of Public Universities Regional Expansion Strategy on Service Delivery: A Case of University of Nairobi Extra Mural Department, Kenya. University of Nairobi

Tarus, J. K., Gichoya, D & Muumbo, A. (2010) *Challenges of implementing e-learning in Kenya: A case of Kenyan public universities*. The international review of research in open and distributed learning Vol. 16 No. 1, 2015. Retrieved from: www.irrodl.og

Tettey, W. J. (2010). Challenges of Developing and Retaining the Next Generation of Academics: Deficits in Academic Staff Capacity at African Universities. Partners for Higher Education in Africa

Trow, M. (2000). *From Mass Higher Education to Universal Access*: *The American Advantage.* Research and Occasional Paper Series, Center for Studies in Higher Education. UC Berkeley.

Shibanda, G. G. (2002). *Development Strategy of a Technological University Library Management Information System (MIS)*: A Case Of Moi University, Kenya.: The Journal of Technology on Campus, volume 19 number 2.

Webometrics (2012) *Number of Universities and HEIs: Ranking web of universities*. July 2012 Edition

Wainaina, M. (2011) Gendered Challenges and Opportunities in Module II Programs in Kenyan Public Universities: A Critical Appraisal. *International Journal of Humanities and Social Science Vol. 1 No. 20; December 2011*

Waschuer, D (2010) New Reports on Technology in US schools and colleges: The changing divide.

Wescort, C., Pizarro, M.,& Schiavo-Campo, S. (2007) the role of information and communication technology in improving public administration. Accessed from: http://www.adb.org/documents (23/2/2015)

Wikipedia (2014) List_of _oldest_universities_in_continuous_operation. Retrieved from http://en.wikipedia.org/wiki; 18/12/2014

World Bank (2010) *In Africa's universities, Quantity threatens quality* in *the Guardian*: Retrieved from www.guardian.com

Wu, B., Chen, A., Ji, H (2009) *The Isomorphism of Chinese Universities: An Analysis of Higher Education Expansion and Consequences*. University of Nortigham: China Policy Institute

Yokaboski, T. & Nolan, K. (2011) *The Kenyan School Systems' Impact on Public Higher Education Access: Examination of Growth, Access, and Challenges*. Journal of International Education and Leadership.Vol. 1 (1) Fall 2011. Retrieved: http://www.jielusa.org/home/

APPENDICES

APPENDIX I: LETTER OF INTRODUCTION

Japheth S. O. Ocholla
P. O. Box 5674-30100
Eldoret

Dear respondent,

My name is Japheth Ocholla, a Master of Arts Student at the University of Nairobi. I am currently conducting a research on the *Effects of Rapid University Expansion on the Adoption of Web-Based Student Management Information System*. For this research to be successful, I kindly request you to respond to the attached questionnaire as objectively and honestly as you can. Your responses will be handled with absolute confidentiality and used only for the purposes of this study.

Thanking you in advance,

Japheth S. O. Ocholla
L50/75055/14

APPENDIX II: QUESTIONNAIRE FOR STUDENTS

The purpose of this questionnaire is to establish the influence of public university expansion on adoption of web based Student Management Information System (SMIS). Your sincere contribution to the research by giving accurate and honest responses is solicited as confidentiality of volunteered information is guaranteed.

Section A: Background Information

1. **Age:** 17-22 [ ] 23-28 [ ] 29-34 [ ] 35-40 [ ] 41-46 [ ] over 46 [ ]
2. **Gender:** Male [ ] Female [ ]
3. **Residence:** University hostel [ ] Non resident [ ]
4. **School**: Education [ ] Information Sciences [ ] Engineering [ ] Business & Economics [ ] Human Resource [ ] Law [ ] Medicine [ ]

Section B: Student Enrolment

5. Do you experience overcrowding in your computer labs lecture halls and library?
   Sometime { } Always { } Not at all
6. Is there scrambling for ICT resorces? Yes { } No { }
   Explain_____
7. Do you think the student population in the campus is commensurate with the available ICT facilities? Yes { } No { } Not sure { }
   b) Briefly explain your answer
   _____
   _____

Sections C: ICT resources

8. Do you have access to university computer(s) with internet connection? Yes { } No { }
9. Where are the computers located? Departmental lab { } Library { } Both Department and Library { }
10. a) Are the available computers adequate for the student population?
    Yes { } No { }

    b) Explain your answer in (a) above

    _____
    _____

11. What alternatives do you often use for internet access?

My phone { } Laptop { } Cyber café { }

12. a) Is there wireless internet connectivity (WIFI) in your campus? Yes { } No { }

b) If yes, how would you rate the wireless service?

Very good { } Good { } Fair { } Poor { }

13. Do you have university e-mail address (i.e student@mu.ac.ke) Yes { } No { }

14. Which of the following online services are available to you through Moi university website?

Admission request	[ ]	Hostel room booking	[ ]
Course registration	[ ]	Filling Non resident forms	[ ]
Personal details entry and update	[ ]	Access to fee statements	[ ]
Exam results and transcripts	[ ]	Discussion fora	[ ]
View notices and announcements	[ ]	Access external services (i.e HELB)	[ ]
University email service	[ ]	E-resources for study and research	[ ]
Access to course content	[ ]	observation and complains register	[ ]

Any other (specify)_____

15. a) Are the services in 14 above available to you while you are away from campus?

Yes { } No { }

b) Explain your answer_____

_____

16. How often do you use Moi University web services?

Very often { } Ocassionally { } Rarely { }

17. Comment about your ICT skills and experience for navigating the digital landscape:

Very good { } Good { } Fair { } Poor { }

Section D: Academic programs

18. What is your mode of study? Full time { } Part time { }

19. How have your lecturers incorporated ICT in teaching?

Extensively { } Partially { } Minimally { } Not at all { }

20. Is your program offered through Distance Learning? Yes { } No { } Not sure { }

21. Is your program available on e-learning platform? Yes { } No { } Not sure { }

22. Are there units of your programme that are available on the blended mode of study?

Yes { } No { } Not sure { }

23. Do you have access to e-resources (i.e e-books, e-journals) through the university website? `

Yes { } No { }

24. How do you mostly submit your assignments?

Send soft copy electronically { } deposit hardcopy in the department { }

Section E: Staffing levels

25. Please indicate the extent to which you agree with the following statements as applicable in your school using the scale:
SD= Strongly Disagree D= Disagree, A= Agree and SA=Strongly Agree

Parameter	**SD**	**D**	**N**	**A**	**SA**
The ICT personnel are adequate					
ICT staff are readily accessible					
The university staff demonstrate competence					

Explain your answers above

_____
_____
_____

Thanks for taking time to complete the questionnaire

APPENDIX III: QUESTIONNAIRE FOR ADMINISTRATIVE STAFF

The purpose of this questionnaire is to establish the influence of public university expansion on adoption of web based Student Management Information System (SMIS). Your sincere contribution to the research by giving accurate and honest responses is solicited as confidentiality of volunteered information is guaranteed.

Section A: Background Information

1. Age

2. Gender: Male [ ] Female [ ]

3. Employment status: Temporary { } Permanent { }

4. Duration of service in the university (in years) :
0-5 { } 5-10 { } 10-15 { } 15-20 { } Over 20 { }

Section B: Student enrolment

5. a) What is the total number of undergraduate students in your school?

b) How many of the students are registered for Bachelors Degree?

6. Do you witness overcrowding of students in lecture halls, hostels and library?

Sometime { } Always { } Not at all

7. Do you think the student enrolment is commensurate with the available ICT facilities?

Yes { } No { }

b) Briefly explain your answer

_____

Section C: ICT resources

8. a) Do you have access to university computer with internet connection? Yes { } No { }

b) If Yes, where are the computers use by students located?

Departmental lab { } Library { }

c) What the one use? Departmental lab { } Library { } My office { }

d) Are the computers adequate are to serve the existing student population?

Yes { } No { }

b) Explain your answer_____

_____

9. a) Is there wireless internet connectivity (WIFI) in the university? Yes { } No { }

b) If Yes, How would you rate the wireless internet service?
Very good { } Good { } Fair { } Poor { }

10. Are MU web services accessible to users away from the university premises?

b) Explain your answer_____

_____

11. How often do you use Moi University web services?

Very often { } Ocassionally { } Rarely { }

12. Comment about your ICT skills and experience for navigating the digital landscape:

Very good { } Good { } Fair { } Poor { }

13. Do you have access to e-resources for study and research? Yes { } No { }

Section D: Academic programs

14. Does the school offer programs on distance learning? Yes { } No { } Not sure { }

15. Does the school offer programs on e-learning? Yes { } No { } Not sure { }

16. Have you developed content for blended teaching? Yes { } No { } Not sure { }

Section E: Staffing levels

17. Please indicate the extent to which you agree with the following statements as applicable in your school using the scale:

SD= Strongly Disagree D= Disagree, A= Agree and SA=Strongly Agree

Parameter	**SD**	**D**	**N**	**A**	**SA**
The ICT personnel are adequate					
ICT staff are readily accessible					
The university ICT staff demonstrate competence					

Explain your answer:

_____

_____

_____

APPENDIX IV: QUESTIONNAIRE FOR TEACHING STAFF

Section A: Background Information

18. Age

19. Gender: Male [ ] Female [ ]

20. Employment status: Temporary { } Permanent { }

21. Duration of service in the university (in years) :
0-6 { } 5-10 { } 10-15 { } 15-20 { } Over 20 { }

Section B: Student enrolment

22. Comment about the enrolment trends in the school for the last three academic years:

Increasing { } Stable { } Declining { }

23. Do you witness overcrowding of students in lecture halls, hostels and library?

Sometime { } Always { } Not at all

24. Do you think the student enrolment is commensurate with the available ICT facilities?

Yes { } No { }

b) Briefly explain your answer

_____

Section C: ICT resources

25. a) Do you have access to university computer with internet connection? Yes { } No { }

e) If Yes, where are the computers use by students located?

Departmental lab { } Library { }

f) What the one use? Departmental lab { } Library { } My office { }

g) Are the computers adequate are to serve the existing student population?

Yes { } No { }

b) Explain your answer_____

_____

26. a) Is there wireless internet connectivity (WIFI) in the university? Yes { } No { }

c) If Yes, How would you rate the wireless internet service?
Very good { } Good { } Fair { } Poor { }

27. Are MU web services accessible while you are away from the university?

b) Explain your answer_____

_____

28. How often do you use Moi University web services?
Very often { } Ocassionally { } Rarely { }

29. Comment about your ICT skills and experience for navigating the digital landscape:

Very good { } Good { } Fair { } Poor { }

30. Do you have access to e-resources for study and research? Yes { } No { }

Section D: Academic Programs

31. To what extent have you incorporated ICT in your teaching?

Extensively { } Partially { } Minimally { } Not at all

32. Have you developed content for Distance learning? Yes { } No { }

33. Have you developed content for e-learning? Yes { } No { }

34. Have you developed content for blended teaching? Yes { } No { }

35. How do your students submit their assignments for marking?

Soft copy via email or MUSOMI { } Hardcopy { }

SECTION E: Staffing Levels

36. Please indicate the extent to which you agree with the following statements as applicable in your school using the scale:

SD= Strongly Disagree D= Disagree, A= Agree and SA=Strongly Agree

Parameter	**SD**	**D**	**N**	**A**	**SA**
The ICT personnel are adequate					
ICT staff are readily accessible					
The ICT staff demonstrate competence					

Explain your answers above

_____

_____

_____

APPENDIX V: QUESTIONNAIRE FOR ICT STAFF

Section A: Background Information

1. Age
2. Gender: Male [ ] Female [ ]
3. Employment status: Temporary { } Permanent { }
4. Duration of service in the university (in years) :
   0-7 { } 5-10 { } 10-15 { } 15-20 { } Over 20 { }

Section B: Student enrolment

5. Comment about the enrolment trends in the school for the last three academic years:

   Increasing { } Stable { } Declining { }

6. Do you witness overcrowding of students in lecture halls, hostels and library?

   Sometime { } Always { } Not at all

7. Do you think the student enrolment is commensurate with the available ICT facilities?

   Yes { } No { }

   b) Briefly explain your answer

   _____

Section C: ICT resources

8. a) Do you have access to university computer with internet connection? Yes { } No { }

   h) If Yes, where are the computers use by students located?

   Departmental lab { } Library { }

   i) What the one use? Departmental lab { } Library { } My office { }

   j) Are the computers adequate are to serve the existing student population?

   Yes { } No { }

   b) Explain your answer_____

   _____

9. a) Is there wireless internet connectivity (WIFI) in the university? Yes { } No { }

   d) If Yes, How would you rate the wireless internet service?

   Very good { } Good { } Fair { } Poor { }

10. Are MU web services accessible while you are away from the university?

    b) Explain your answer_____

    _____

11. How often do you use Moi University web services?

Very often { } Ocassionally { } Rarely { }

12. Comment about your ICT skills and experience for navigating the digital landscape:
Very good { } Good { } Fair { } Poor { }

13. Do you have access to e-resources for study and research? Yes { } No { }

Section B: ICT resources

3

Does the university have?	**Yes**	**No**
1. Functional computers are available		
2. Departments have LANs		
3. Departments are fully interlinked		
4. Cable networks are available		
5. There are active servers		
6. Data and power backup exist		
7. There is wireless connectivity (WiFi)		
8. The ICT resources are generally sufficient		

14. a) Do you have access to university computer with internet connection? Yes { } No { }

k) If Yes, where are the computers use by students located?

Departmental lab { } Library { }

l) What the one use? Departmental lab { } Library { } My office { }

m) Are the computers adequate are to serve the existing student population?

Yes { } No { }

b) Explain your answer_____

_____

15. a) Is there wireless internet connectivity (WIFI) in the university? Yes { } No { }

e) If Yes, How would you rate the wireless internet service?
Very good { } Good { } Fair { } Poor { }

16. Are MU web services accessible while you are away from the university?

b) Explain your answer_____

_____

17. How often do you use Moi University web services?
Very often { } Ocassionally { } Rarely { }

18. Comment about your ICT skills and experience for navigating the digital landscape:
Very good { } Good { } Fair { } Poor { }

19. Do you have access to e-resources for study and research? Yes { } No { }

Section E: Staffing levels

20. Please indicate the extent to which you agree with the following statements as applicable in your school using the scale:
SD= Strongly Disagree D= Disagree, A= Agree and SA=Strongly Agree

Parameter	**SD**	**D**	**N**	**A**	**SA**
The ICT department is adequately staffed					
I am comfortable with my work load					
I am deliver my services competently					

Explain your answers above

_____
_____
_____

APPENDIX VI: INTERVIEW SCHEDULE FOR ICT DIRECTOR

1. Does the university have an ICT policy?
2. What is the state of ICT infrastructure in the university (adequacy, currency, coverage)?
3. Comment on computer/staff and computer/student ratios in the university?
4. How interlinked are the university campuses?
5. How adequate is the internet coverage in the university?
6. What level of bandwidth is available to the university? Adequacy of the bandwidth?
7. What is the capacity of the university's server(s)
8. How adequate are the power and data backup systems in place?
9. Does the university have a central computerized database for all the students?
10. Is there a functional student management information system
11. Which of the following SMIS functions can a student currently accomplish online:

Admission request	[ ]	Course registration	[ ]
Personal details entry and update	[ ]	Hostel room booking	[ ]
Viewing and printing of fee statement	[ ]	Exam results and transcripts	[ ]
Clearance process initiation	[ ]	View notices and announcements	[ ]
Access external services (i.e HELB)	[ ]	Student-student communication	[ ]
Student-staff communication	[ ]	Access to course content	[ ]
University students e-mail service	[ ]	Any other (specify)	[ ]

12. Which of the functions are most popular and why?
13. How effective is the students portal?
14. How adequate is the ICT staffing level to serve the entire university?
15. How is the work ICT force distributed in the campuses of the university?

APPENDIX IX a): MEAN ANNUAL INTAKE BETWEEN 2012/13 AND 2014/15

SCHOOL	2014/15	2013/14	2012/13	Total	MAI*
Information Sciences	81	98	107	**286**	94
Education	2485	3403	3054	**8942**	2981
Human Resource Development	733	714	727	**2174**	725
Engineering	214	180	193	**587**	196
Business & Economics	1140	2641	2704	**6485**	2161
Medicine	117	54	79	**250**	83
Law	447	445	457	**1349**	450
Total	**5217**	**7535**	**7321**	20073	**6690**
Percentage	**26.0**	**37.5**	**36.5**	**100.0**	**33.3**

1. **APPENDIX VII: WORK PLAN**

ACTIVITY / PERIOD	Feb	Mar	Apr	May	June	July	Aug
Submission & approval of research topic							
Proposal writing and submission							
Research instruments piloting							
Data collection							
Data analysis							
Report writing and submission							

APPENDIX VIII: RESEARCH BUDGET

Item	Quantity	Unit price	Cost (KShs)
Foolscaps	10 reams	400	4,000
Photocopy	400 pgs	2	800
Laserjet Toner cartridge 80A	1 pc	9000	9,000
Binding			2,000
Field notebooks	1 dozen	600	600
Travel			25,000
Subsistence			20,000
E-mail services			5,000
Stipend for research assistants	4 people	3000	12,000
TOTAL			**78,400**

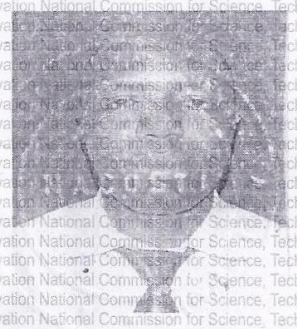
THIS IS TO CERTIFY THAT:
MR. JAPHETH SETH OCHOLA
of UNIVERSITY OF NAIROBI, 564-30100 eldoret,has been permitted to conduct research in *Uasin-Gishu County*

on the topic: *INFLUENCE OF PUBLIC UNIVERSITY EXPANSION ON ADOPTION OF WEB BASED STUDENT MANAGEMENT INFORMATION SYSTEM: A CASE OF MOI UNIVERSITY, KENYA*

for the period ending:
4th December,2015

.....
Applicant's Signature

Permit No : NACOSTI/P/15/2953/6451
Date Of Issue : 31st July,2015
Fee Recieved :Ksh 1,000



.....
Director General
National Commission for Science, Technology & Innovation