ACCESS TO AND UTILIZATION OF ACADEMIC
INFORMATION BY STUDENTS AND STAFF AT KABARAK
UNIVERSITY

By

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A Thesis submitted in partial fulfillment of the requirements for
the degree of Master of Philosophy in Information Sciences
(Library and Information Studies)

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March, 2011
DECLARATION

DECLARATION BY CANDIDATE:

This thesis is my original work and has not been presented for a degree in any other university. No part of this thesis may be reproduced without the permission of the author and/or Moi University.

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This thesis has been submitted for examination with our approval as University Supervisors.

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DEDICATION

To my children, Kiptoo and Mwende, who exercised a lot of patience and understanding while I was away from their lives for a moment to undertake this study.
ACKNOWLEDGEMENTS

I am grateful to God for giving me life and the chance and energy to carry out this study.

Special thanks to my dedicated supervisors and mentors, Prof. Cephas Odini and Dr. Damaris Odero, who provided the required support throughout the study. They provided helpful insights that shaped the direction of the research and facilitated an enabling environment for independent thinking.

I offer my sincere thanks to Kabarak University for allowing me to undertake research within its locality and for granting me a one-year study leave to pursue the Masters programme. I owe much credit to the university’s students and staff who participated in the survey and made the activity fruitful. Thanks to the university library for allowing me to use its resources and facilities to carry out literature research. The University Librarian, Mrs. Janegrace Kinyanjui along with the other library staff gave me the encouragement I needed in the course of the research.

Finally, very special thanks go to my family for their encouragement and forbearance. Thank you all.
ABSTRACT

Information is critical in the accomplishment of the educational role of a university, and access to it is a key to transformation. There was an indication of difficulty in finding the required information and low information literacy levels at Kabarak University, which impeded effective utilization. The aim of this study was to examine the accessibility and utilization of information among students and staff at Kabarak University and design an appropriate model. The specific objectives were to identify the information needs of students and staff, existing information sources, evaluate the access channels, find out the skills required to effectively access information and the challenges experienced by students and staff with a view to recommending effective improvement strategies. The study was guided by Leckie’s model of information seeking by professionals and Tsakonas’ model of user interaction with the digital environment. A mixed method approach was used in the collection of data, whereby both qualitative and quantitative data were obtained. A 15% sample was selected out of a total population of 771 students and 170 members of staff. Questionnaires for students and interviews for the staff were used to collect data respectively. Key informants consulted included the library staff and ICT personnel. Response from a total of 97 students and 30 staff was received. The data collected was summarized, coded and categorized for ease of presentation of results. The study revealed that students and staff had diverse information needs, but concentrated on the learning and work activities respectively. Both students (93%) and staff (88%) mostly turned to the Internet for their information needs, mainly because the Internet offered a variety of activities and information sources. However, both students and staff mostly referred to print resources for academic purposes. The library was identified as a significant source of information, while the use of ICT was identified as an immediate solution to access problems. The major limitations were identified as poor Internet connectivity; inadequate ICT resources and low information literacy levels. The study recommends improvements in ICT resources, network infrastructure; scheduled and diversified literacy programs; marketing of information services; professional repositioning, organization and digitization of local content.
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<td>AISI</td>
<td>African Information Society Initiative</td>
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<tr>
<td>AGORA</td>
<td>Access to Global Online Research in Agriculture</td>
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<tr>
<td>CCK</td>
<td>Communications Commission of Kenya</td>
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<tr>
<td>CCTV</td>
<td>Closed-circuit television</td>
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<td>CHE</td>
<td>Commission for Higher Education</td>
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<td>EASSy</td>
<td>East African Submarine Cable System</td>
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<tr>
<td>eIFL.net</td>
<td>Electronic Information for Libraries.net</td>
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<td>GII</td>
<td>Global Information Infrastructure</td>
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<tr>
<td>HINARI</td>
<td>Health InterNetwork Access to Research Initiative</td>
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<tr>
<td>HTML</td>
<td>HyperText Markup Language</td>
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<td>ICT</td>
<td>Information and Communications Technology</td>
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<td>INASP</td>
<td>International Network for the Availability of Scientific Publications</td>
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<td>KENET</td>
<td>Kenya Education Network</td>
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<td>KLISC</td>
<td>Kenya Librarians and Information Services Consortium</td>
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<tr>
<td>LAN</td>
<td>Local Area Network</td>
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<td>OPAC</td>
<td>Online Public Access Catalogue</td>
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<tr>
<td>PERI</td>
<td>Programme for the Enhancement of Research Information</td>
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<td>RFID</td>
<td>Radio Frequency Identification</td>
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<td>RFID</td>
<td>Radio Frequency Identification</td>
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<tr>
<td>RSS</td>
<td>Really Simple Syndication</td>
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<td>SCONUL</td>
<td>Society of College, National and University Libraries</td>
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<td>SEACOM</td>
<td>South East Asia Communication Centre</td>
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<tr>
<td>TEAMS</td>
<td>The East African Marine System</td>
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<tr>
<td>UNESCO</td>
<td>United Nations Educational, Scientific and Cultural Organization</td>
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<td>W3C</td>
<td>World Wide Web Consortium</td>
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CHAPTER ONE

1.0 INTRODUCTION

1.1 Background to the study

Access to information is critical for the development of an individual, and on a wider perspective, for the development of a country. Quoting Stueart (1999), Emojorho (2005) notes that the most vital difference between developed and developing, rich and poor nations is the knowledge gap – the capacity to generate, acquire, disseminate and use scientific and technical knowledge. It can be no accident that there is today no wealthy developed country that is information-poor, and conversely, no information-rich country that is poor and under developed. Access is imperative in a society seeking knowledge. The success or path taken by an individual in various aspects can be traced to the person’s encounter with specific information. The power of information is evident, and access to it is a key to transformation.

Improving access to information has been addressed in various fields and areas such as health, agriculture, business, government and education. These efforts have been made in view of the fact that improved access to information results in improved output in the respective areas. Success on access strategies can be seen in three dimensions: the situation and role of the user; availability of required content and the appropriateness of the access channels.

Information is required in a university setting for a number of reasons, the most common being research and learning. The key characteristics of a university involve the consumption of information which translates into knowledge generation.
Knowledge is changing at an ever-increasing rate; it is being produced, and it becomes redundant, at an ever-increasing tempo. Globalization is rapidly changing university education. The higher education sector’s primary tasks are the production and the reproduction of knowledge and preparing students to enter the world of work which is itself undergoing changes (Nassimbeni, 2000). Part of these changes are manifested in the shift from traditional methods of teaching and learning towards more student-centred modes and an emphasis on preparation for lifelong learning. Facilitating ease of access to knowledge is a proven way of providing quality education.

1.2 Kabarak University

Kabarak University is a Christian-based university situated 20 kilometres from Nakuru Town along the Nakuru-Eldama-Ravine Road. The university was launched on 16th October, 2000, when it was granted a letter of Interim Authority by the Government of Kenya, thus allowing it to formally operate as a degree awarding institution. It stands on a 600-acre land. The establishment of the university was as a result of the forward vision of the Sponsor and Chancellor, His Excellency Daniel T. Arap Moi (the second President of the Republic of Kenya) who decided to set up a reputable Christian university offering courses in business, theology, education, science and technology. Thus the vision of the university is to become a centre of academic excellence as a Christian liberal arts, science and technology institution. Its mission is to provide a holistic quality education to the youth as well as other age groups, equipping them with knowledge, practical skills and Christian moral values necessary for the service of God and humanity. The university endeavors to serve the local communities, the nation and the world through the creation, preservation and dissemination of knowledge within the context of biblical perspective.
The university opened its doors to the first batch of students on 23rd August, 2002. It has since had 4 graduation ceremonies in which over 200 graduands have graduated.

The university got another boost when it was awarded charter on 16th May, 2008 by the Government of Kenya. The population stands at about 850 students and 170 staff respectively. About 90 of the students undertake their studies in a constituent campus, which was established in the year 2005 in Nakuru Town. The campus received its first students in September 2006. It is situated at Giddo Plaza along the Nakuru-Kisumu highway in Nakuru’s Central Business District. Both full-time and part-time programmes are offered in the campus.

The programmes offered by the university include:

- Bachelor of Science in Computer Science
- Bachelor of Science in Environmental Technology
- Bachelor of Science in Telecommunications
- Bachelor of Commerce
- Bachelor of Science in Economics
- Bachelor of Science in Economics and Mathematics
- Bachelor of Business Management and Information Technology
- Bachelor of Theology
- Bachelor of Education (Science)
- Bachelor of Education (Arts)
- Bachelor of Laws (first intake in January, 2010)
- Pre-University
• Bridging Courses in mathematics and English

Other programmes offered by the university, but is yet to admit students are:

• Bachelor of Science in Information Technology
• Diploma in Computer Applications
• Diploma in Computer Science
• Certificate in Networking and Systems Administration
• Certificate in Web Design and Administration
• Certificate in Computer Programming

Plans are underway to offer diploma and degree programmes in nursing, pharmacy and clinical medicine. To support the programme, the university plans to build a teaching and referral hospital in the main campus in the near future.

The Academic programmes in the university are categorized under the following three Schools:

i) The School of Science Engineering & Technology, which has three departments namely Computer Science, Mathematics and Environmental and Life Sciences.

ii) The School Of Business Studies, which has two departments: Department of commerce, Department of Business Management and Technology. The school has collaboration with York St. Johns University in the UK where students are eligible to continue with their studies by transferring credits.

iii) The School Of Theology Education & Arts (STEA)
Each school also offers support programmes that are required across various departments. The mode of learning includes full-time, school-based and evening classes.

The first batch of 37 postgraduate students was received in September 2009. They included 13 students pursuing Masters in Business Administration (MBA) and 24 in PhD programmes (by research only) in various disciplines.

The university has collaborations with other universities, in the areas of student and staff exchanges and career development. Internationally, they are Joensuu University of Finland, York St. John’s (UK), University of Wolverhampton (UK), Liberty University (USA) and Kangnam University (Korea). Some courses are also offered in collaboration with local colleges, namely Alphax College in Eldoret and Eland College in Kericho. This began with the offering of bridging courses, and gradually expanded to degree programmes.

Kabarak University works at developing holistic individuals. The university’s goal is to promote a society that is enlightened in various aspects of life. The two main emphases are academic and spiritual dimensions. This is reflected in the institutional motto - ‘education in a biblical perspective’. The moral code derived from the Holy Bible (I Peter 3:15) states that “As members of Kabarak University Family, we purpose at all times and in all places, to set apart in one’s heart, Jesus as Lord.” To achieve this goal, a number of information resources, services and activities such as formal learning, spiritual services, social interactions, library services, short workshops, seminars and presentations form part of the institution’s ethos. It is
imperative that the development of an individual is dependent on a context that allows them to access, analyze and use information.

1.2.1 University library

The university library began as a relatively young library on 20th August, 2002, with three members of staff. Acquisition of information resources and furniture began during this period. Library services were offered in two ordinary classrooms, one room serving only as study space. In the year 2003, the library was moved to a more spacious room, which was previously housing the Moi High School – Kabarak Library. Internet services were introduced in due course, though the capacity was limited to only 10 computers for the patrons.

In the meantime, a more spacious library building with a seating capacity of 1,000 users was under construction. In September, 2006, the library moved to the new spacious building. Patrons however continued to access Internet services from the old library building. In September 2007, a hybrid network was set up in the new building, giving a boost to the Internet services. A branch library was set up in the year 2005 in Nakuru Town Campus to support the programmes being offered there.

The mission of the library is to provide quality information services to support teaching, learning and research activities of the university community. The following are some of the services and facilities the library offers to the users:

- Reference and information services. A reference desk is available to assist in answering their reference queries and assisting them access information.
- **Current Awareness Services (CAS).** There are various channels for creating awareness on new or relevant resources, such as notice boards, email, website, brochures, telephone calls, item displays and personal visits among others.

- **Selective Dissemination of Information (SDI).** The information provided is mostly in digital format and the main channel for dissemination is mainly through email. User profiles assist the reference librarian to determine the information needs.

- **Inter-library loans services.** The leading partners in loaning of books are Alphax College, Eland College, Moi High School – Kabarak and Egerton University.

- **Archival services.** Archival resources are still limited in volumes, since many of the records generated from the start of the university are still active.

- **Audio-visual services.** They include documented events of Kabarak community and a video library on a variety of themes in the form of tapes, DVD, CD and VHS.

- **Online/Internet services.** There are a few computers set aside for accessing online databases and the OPAC.

- **Room facilities.** There are discussion rooms, study carrels for individual users, conference and seminar rooms.

- **Junior readers’ services.** The University Library has a small section that serves junior readers between the age of 5 and 16 or thereabouts. Its purpose is to promote the formulation of lifelong information seeking habits from an early age.
• **Photocopying and printing services.** Library materials can be photocopied for educational purposes within the limits of copyright laws.

• **Bindery.** The services offered are binding and repair of books and lamination of documents.

The library stock expanded with time, and included both print and non-print resources. The library had a collection of about 15,000 volumes of books by 2009. Out of these, about 1,000 volumes were located in the Nakuru Town Campus library. In addition to the print resources, the library subscribes to a number of online databases jointly with a number of other private and public university libraries in Kenya. This is made possible through the Programme for the Enhancement of Research Information (PERI), which is sponsored by the International Network for the Availability of Scientific Publications. The databases that were accessible in 2009 included:

• American Physical Society
• American Society of Civil Engineers
• Beech Tree Publications
• CABI’s Global Health
• Cambridge Journals Online
• Edinburgh University Press
• Emerald Publishing
• Ebscohost
• Gale Thomson
• Health Internetwork Access to Research Initiative (HINARI)
• Informaworld
In an effort to improve on the efficiency of service delivery, the library embarked on an automation programme in the year 2007. Mandarin Library Automation software was selected and acquired for use. By mid 2008, the library had successfully automated cataloguing and circulation activities. A web version of the online catalogue was acquired. The library anticipates automating acquisitions and other routine tasks. Plans are also underway to install an RFID security system and utilize closed-circuit television (CCTV) surveillance to minimize loss of materials.
1.3 Statement of the problem

The availability of the desired information, knowledge on the existence of information resources and skills on effective use of access channels are essential for the meaningful utilization of information. The difficulty in finding the required information, low level of awareness of information resources and on ways of optimizing access to them has impeded effective information use at Kabarak University. The design of the existing information systems and services and acquisition of resources has not adequately catered for the users’ needs and information seeking patterns. A study is required in order to gather helpful facts that will assist in the design of cost-effective information systems and services and to ensure that the information resources acquired are economical, relevant and in the right format. The diversity of options of the formats of information resources, which are intended to enhance access to information, have instead led to confusion on the part of users and increased dilemmas to information service providers.

Compounded to the problem is the lack of adequate information literacy skills required to identify, select, synthesize, retrieve and use information from diverse sources. Skills are required in the utilization of ICT resources, which are the essential tools in information management. Though the university has invested in ICT resources, they are under-utilized. In addition to the design aspects, users require the conceptual, semantic and technical knowledge required for the optimal usage of ICT. This problem is magnified by information overload that is experienced throughout the world, especially with the advent of the Internet. Many students and staff do not always get what they need, or waste a lot of time to satisfy an information need and in some cases end up in frustration.
The results of a study conducted in sister universities, namely Jomo Kenyatta University of Agriculture and Technology, Nairobi, Kenyatta, Strathmore, Daystar, Catholic, African Nazarene and Kenya College of Accountancy revealed a similar pattern noted among students and staff at Kabarak University. According to the study, students had a healthy appetite for Internet use, but were constrained by low expertise on how to find information online (*Daily Nation*, December 9, 2008). Owing to the poor development of information systems in nearly all primary and secondary schools in the country, most students do not have prior experience in information searching. Many members of staff have also trained in institutions which lay little emphasis on information resources, and do not exploit the resources that are potentially available to them to solve their day to day problems. Statistics from the vendors of the subscribed online resources for instance indicate extremely low usage by the university despite the frequent usage of the available computers.

1.4  **Aim of the study**

To examine the accessibility and utilization of academic information among students and staff of Kabarak University and design an appropriate model.

1.5  **Objectives of the study**

The objectives of the study were to:

i) identify the information needs of students and staff of Kabarak University

ii) identify the information sources available for students and staff.

iii) evaluate the channels used in accessing information.
iv) find out the nature of skills required by students and staff to effectively access information.

v) identify the challenges experienced by students and staff in accessing information

vi) recommend ways of improving access to information by the students and staff.

1.6 Research questions

i) What kind of information do the students and staff of Kabarak University require for their daily activities?

ii) What sources do they consult to satisfy their information needs?

iii) What are the channels available for accessing and processing the required information?

iv) Which skills do they require in order to effectively access and utilize information?

v) What impediments do they encounter in accessing and utilizing information?

vi) How can access and utilization of information by students and staff at Kabarak University be improved?

1.7 Assumptions

The study is based on the following assumptions:

i) that students and staff at Kabarak University do not adequately access and utilize information to satisfy their need due to challenges encountered.
ii) that it is possible to improve access to and utilization of information by staff and students if the information needs, resources and suitable access strategies are understood, documented and considered in the provision of information services.

iii) that it is possible to stimulate the use of information when users are exposed to quality resources and educated on how to use access channels, retrieve and evaluate the information.

1.8 **Significance of the study**

This study unravels practical issues surrounding access and utilization of information by students and staff of Kabarak University. The research findings recommends ways of improving the level of access to information and give direction on the best way to allocate financial, human and other relevant resources in information service provision. The key players in the implementation of research results are as follows:

i) Information service providers: It is hoped that the findings can be used by the library and other information providers in the university to customize their services to suit the user requirements and utilize scarce resources cost-effectively. The study gives direction on the most effective communication channels to be employed by the university.

ii) Designers of information systems: The study enables vendors of integrated library systems, databases and other products relevant to information service provision to design their products in line with the dynamic user needs.
iii) Students and staff of Kabarak University: The results provide an opportunity for the consumers to air their views on the existing information services and become part of the solution to challenges faced.

iv) Other institutions of higher learning: The results of the case study can provide insights to other universities and colleges who may also be facing related information use and access challenges. Collaborative efforts among universities result in the production of more informed graduates.

v) Policy makers in the ministry in charge of education: The study reveals the level of information literacy among students at university level. It is indicative of the impact of programmes being employed in the lower educational levels. Examples are information services, ICT usage and the role of the curriculum in imparting information skills for lifelong learning. This can therefore be used for performance measurement in order to improve on the existing programmes.

1.9 Scope and limitations of the study

The researcher anticipates that it is possible to apply some of the findings of this study to the settings in other institutions in the country. However, this study confines itself to one institution due to the wide geographical distribution of the institutions. The population studied is within easy proximity to the researcher, who is also involved in the library information provision services. The study also covers only the current students and staff in the university’s main campus.
1.10 Definitions of operational terms

**Academic information**
For the purpose of this study, the term applies to information that relates to or supports university education. It includes lecture notes, library resources, seminars, workshops, discussions and research reports.

**Access**
The ability for people to successfully locate, retrieve and use the information contained within various computer systems. It is a concept that incorporates a host of behavioral, philosophical, technical and policy issues. The term can be used to extend beyond the use of computers and incorporate all information systems and resources.

**Broadband**
A faster method of connecting to the Internet for smaller organizations and home users (Catherall, 1999).

**Channel**
A path along which information flows; any medium whereby information is transmitted or received. Examples are books, sound waves, cables, computers and television.

**Closed-circuit television (CCTV)**
A video system used internally in some large libraries for conferencing and to monitor traffic for security purposes (Reitz, 2004)

**Collection development**
The process of systematically building library collections to serve study, teaching, research, recreational, and other needs of library users. The process includes selection and de-selection of current and retrospective materials, the planning of strategies for
continuing acquisition, and evaluation of collections to determine how well they serve user needs. Overall, collection development encompasses many library operations ranging from the selection of individual titles for purchase to the withdrawal of expendable materials (Fordham, [nd]).

Digital village
A computer facility located in rural or peri-urban areas that provides access to ICTs in addition to accelerating the economic and social development of local communities (www.ictvillage.com).

Fibre optic cable
A very fine glass strand that allows rapid transmission of data using modulated light beams. It is usual to put many strands together in a single cable, each one capable of carrying one or more data signals. Fibre-optic cable provides interference-free secure data transmission and, unlike metal wires, is not subject to corrosion (The BCS glossary of ICT and computing terms, 2005).

Firewall
A computer application used in a network to prevent external users gaining unauthorized access to a computer system (The BCS glossary of ICT and computing terms, 2005).

Information and Communications Technology (ICT)
The term is used to describe the design and application of systems and equipment for exchanging data by electrical means between two or more stations (International encyclopedia of information and library science, 2003). It is a gamut of industries and service facilities, including Internet service provision, telecommunications services and equipment, information technology (IT) equipment and services, media and
broadcasting, libraries and documentation centers, commercial information centers, commercial information providers, network-based information services and other related information and communication activities (African Information Society Initiative).

**Information literacy**

Skills in finding the information one needs, including an understanding of how libraries are organized, familiarity with the resources they provide (including information formats and automated search tools), and knowledge of community used research techniques. The concept also includes the skills required to critically evaluate information content and employ it effectively, as well as an understanding of the technological infrastructure on which information transmission is based, including its social, political and cultural context and impact (Reitz, 2004)

**Information society**

A society characterized by rapid growth and use of information; widespread exploitation of varied information sources, society where people know and appreciate what information they need, where to get it, how to get the information, and in the end, how to use it (Mutula, 2004). It is one in which, quality of life and economic development depend largely on information and its exploitation; increasing use of computers; commoditization of information; convergence of computing and telecommunication; e-governance; e-commerce; online education; universal access to phone, Internet, use of technology for community development; and use of information technology in management of public utilities (Martin, 1995).

**Institutional repositories**

Digital collections of the outputs created within a university or research institution.
**Open access**

The free online availability of digital content, especially of peer-reviewed scientific and scholarly journal articles and grey literature such as reports, electronic theses and dissertations (Ghosh, 2009).

**Portal**

A website designed to be a first port of call for a user logging on to the Internet. It can be designed to carry links to pages the user is likely to want to access; it may even be customizable so that the user can specify which links he or she wants to see (*The BCS glossary of ICT and computing terms*, 2005).

**Radio Frequency Identification (RFID)**

The use of microchips to tag library materials and the library card, enabling patrons to check out items by walking through a self-service station equipped with an antenna that emits low frequency radio waves (Reitz, 2004). The technology can also be harnessed for other important functions such as inventory and security checks at the entrance.

**Third Generation (3G) Network**

3G describes a range of telephone protocols (UMTS, cdma2000 and more) that transmit and receive data at speeds over the threshold at which certain kinds of mobile Internet experiences become possible, such as audio, image and video downloads, streaming data and online gaming (Willson, 2006). Users are able to download video, watch television and surf the Internet on mobile hand-held devices. 3G networks offer faster data transfer rates than the earlier generations. The first generation of wireless (1G) was analog cellular. The second generation (2G) is digital cellular, featuring integrated voice and data communications.
CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Introduction

This chapter reviews a selection of major scholarly works and other primary and secondary information sources for the purpose of this study. The findings from the literature review were used to guide the development of the data collection instruments and support the interpretation of the results. This section discusses the general information needs in a university setting, various types of resources and different strategic measures undertaken worldwide and nationally in an effort to make information widely accessible. It ends with the theoretical framework applied to the study.

2.2 The concept of information

Information has been identified as one of the basic resources alongside land, labour, capital and entrepreneurship. It is a basic component of education. However, though information is being sought on a daily basis, it has varied definitions according to the format, and media used to package or transfer it, as well as the discipline that defines it. For the purpose of this study, information refers to data that has been processed into a meaningful form (International encyclopedia of information and library science, 2003).

Many authors, especially in the information sciences field agree that mere presence of information does not guarantee its effective access and use. Several earlier researches
conducted on diverse professional groups reveal that frequently, professionals are frustrated in their search for relevant and necessary information. Frustrations result because a large number of complex and interacting variables may influence information-seeking processes. As the information need arises, factors such as the corporate culture, individual habits, availability of information systems and sources, commitment to professional development, and so on converge to affect the outcome (Leckie, et al. 1996). Several strategies have been mapped out to seek ways of improving on access and utilization of the information resources. These strategies mainly focus on the consumers of information and the effectiveness of the avenues in which the users seek information. Some of these strategies and current trends in information access are discussed in this chapter. Alongside the strategies is a discussion on the various sources and formats of information resources, whose characteristics have also been dynamic and have an impact on their effective use. These include print, electronic and multimedia resources.

2.3 Information needs

As Kroeker (1999) puts it, various types of content (words, pictures, sounds, and other forms of information) never have been separable from the medium in which they are represented. Therefore, the technology that disseminates information is part of the information itself. The medium shapes information and controls how the user makes use of it.

Kroeker (1999) further views that in order to access and use the desired content properly, users need the carrier to be such that interacting and extracting the embodied content is possible within their setting. Setting here refers to the distinct information
use environment such as a given library and information system or a given organization. According to the law of least effort, people and organizations expend as little as possible of their available resources (time, money or effort) to secure information. This should be put in to consideration when facilitating access to information in an institution. For example, the physical distance of a resource and opening hours have been found to be one of the key factors in library use or lack of use.

Studies carried out on the information seeking behaviour of engineering and law students in Ireland showed that students seemed to have a preference for channels that require the least effort, such as the Internet. They viewed the Internet as a speedy, current information source which fed initial information needs quickly. In this case, they chose their initial sources to help them define their information need, rather than to provide detailed knowledge. However, some of the same students who considered the Internet as the best information source for their project also listed it as the worst source, because they felt uncertain about the reliability of the information found, they felt overloaded with information on the Internet, and they found it hard to find specific information using this resource. They considered traditional print resources such as books, technical handbooks and journals to validate the information they located on the Internet (Kerins, Madden & Fulton, 2004).

It is difficult to sum up information needs of various groups being studied. There is hardly any perfect separation for various uses of information, such as academic, leisure, general knowledge or work related purposes. But in general terms, students and workers seek information in prescribed sources such as textbooks, reference
books and journals, to enable them to advance in their jobs or educational courses and pass their exams. Mi & Nesta (2006) observe that there is also much passive information acquisition, as people acquire much, if not most, of their general information from television, radio, or the daily newspapers. Even in academia much information seeking is passive: classroom lectures, after class discussion, conferences, assigned readings, and pod casts. Mi and Nesta further note that students and staff have information needs beyond their academic fields, such as personal information and leisure. The list includes entertainment, news, item prices, sports news, employment, housing, hobbies, student association work, information on other universities, and contact with friends via e-mail and chat. Administrators seek information on various subjects to help them make informed decisions and formulate sound policies. Scientists and lecturers seek existing information in order to use it as a basis for research and for creating new knowledge.

A recent phenomenon in information seeking is the use of social networks, such as Facebook. New ideas have evolved on the opportunities of improving access to diverse information through such channels. Kabaji (2009) for instance suggests that though such channels may not do away with the need for books and other printed resources, they can be used for awareness purposes and exchanging views on books read by the members. These forms of communication will, in due course, re-define the operations of the book club. Kabaji also notes that in the United States, teachers are being encouraged to use Facebook in educational instruction. Librarians generally use this media to interact with users, answer questions, and provide information about library services. Aharony (2009) also observes that OCLC has created a WorldCat
application in Facebook where the user can search WorldCat databases without entering the OCLC site.

2.4 Information resources

There has been some confusion over the concept of information resources, mainly as a result of the inclusion of technological resources. However, most authors regard the resources to constitute data, records, text and information technology (International encyclopedia of information and library science, 2003). University libraries play a leading role in the provision of information resources. The Universities have the largest collection of learning resources in libraries. It is estimated that taken together, universities hold approximately 70% of all library resources in Kenya (KENET, 2009).

The need to have information resources in various formats remains irrespective of the rapid technological developments. Evans (1999) concedes that one cannot make the necessary judgments about these issues without knowing the local users, what information they want and need, how and where they use the information, what type of equipment they have, what network capabilities exist, and what monetary and equipment resources are available to the library or information centre. Print and electronic resources for instance are seen to be complementary and competitive. Print journals are acquired by libraries and individuals long after they are published. Therefore sometimes they do not match with their electronic counterparts in currency. Most electronic resources tend to focus on current information while print resources commonly fill the gaps for accessing historical information. De Jager (2007) opines that right now, and probably into the foreseeable future, the World Wide Web or even
Google is not going to put into the hands of the individual user everything that is available in libraries. Print collections are still growing apace, the publishing industry is alive and well and people are buying more books than ever before. All print material is by no means available digitally. In spite of its much advertised intention to digitize the content of some of the world’s largest libraries, Google hasn’t solved the issue of copyright either, and into the foreseeable future will not be able to provide much more than some kind of a catalogue like record for items that are protected by copyright.

De Jager (2007) further highlights some of the advantages of electronic resources such as e-books over print. They cannot be stolen or get lost, they don’t go out of print. They don’t take up any shelf space. They can be read by a number of users at the same time. They are available for 24 hours of every day and one doesn’t have to go to the library to get them. Fulltext searching is possible, which could be particularly valuable in the case of reference books, and images and text can be cut and pasted. An e-book may be a very real and cost-effective alternative in cases where print copies are in high demand or in short supply. With the increased use of portable e-book readers, publishing houses forecast that e-books could occupy half of the whole book market in 2020 (Qunqing, 2004).

Information resources can be traced beyond what is obtained from documentary sources. Activities in other departments within and outside the university result in the generation of undocumented information. It is however difficult to facilitate access and wide utilization of such information, since it is only limited to the individuals who interact within the departmental context.
Recent studies have shown a seemingly changing trend in the use of library resources. Melgoza et al. (2002) for instance found that, for the most part, undergraduates prefer to use the Internet for library research, while faculty and graduate students have a greater tendency to use print material. This may be reflective of an emerging generation that embraces Internet use as opposed to occupational requirements. Libraries can therefore be prepared for a possible new generation of faculty that embraces the use of digital resources more than the print counterparts. The Internet has also been widely viewed as the means to bridge the knowledge gap between the developed and developing world and to promote the equal distribution of information. Melgoza et al further note that there are scholars who view that the Internet use in libraries is overhyped. However, they conclude that though the Internet may marginalize the library in certain respects, it cannot completely replace it. They suggest that it is important for the Internet and Library to develop a complementary model in which they synergize and make libraries a preferred destination; not just an afterthought.

A number of large libraries throughout the world became involved in digital library initiatives in the early 1990s, with much pioneering work being undertaken in the United States. Some of the digital library components commonly used in a university setup include:

- library portals and digital library management systems
- electronic reserves
- digital repositories
- e-books
• e-journals
• reading list management systems
• e-print repositories

Quoting Dempsey (2003), Secker identifies some of the problems associated with digital resources, including:

• the variety of formats that makes them less ready to process and present to users than printed materials.
• the different license conditions that come with digital resources.
• the differing user interfaces associated with them
• the fact each resources may need individual, customized support.

Library portals have been identified as one response to these problems and provide intermediate layers between users and resources in an attempt to manage and provide access to diverse wealth of electronic resources available. However, Davies (2007) points out that the rapid development and deployment of specialized portals such as library portals alongside general-purpose institutional portals suggests that all needs may not be adequately met by a single enterprise solution.

2.5 Collection development

Collection Development is a topic that has gained in importance in the current information society. It is a difficult task in that each library has users with diverse needs. The original reasons for this term have remained, but they have become less clear lately (Vignau & Quesada, 2006). Adekanmbi and Boadi (2008) are of the view that a balanced collection is one that reflects proportionately the various programmes, instructions, and research conducted in an institution at a given time and is not
disproportionately skewed towards any one discipline. However, not all institutional libraries have been able to develop a balanced collection because of the challenges facing librarians in collection development. Vignau and Meneses (2005) mention some of the external and international factors that led to change in collection development in university libraries. These are:

- **The economic crisis on a world scale.** It is in this period that inflation began directly affecting the publishing world. This produced the rise in the cost of paper, printing and composition. Librarians were obliged to ration the use of money to develop their collections.

- **The increase in the number of publications.** Scientific research increased, and periodicals became the support for excellence to mould these studies.

- **The advances in community technology.** It is attributed to the explosion of new information technologies and communication that have penetrated into the large sectors of the social life including universities, firms and publishing houses.

- **The variety in the format of the presentation of information.** As a result of the new technologies, information does not only appear written on paper, but in electronic formats such as: CD-ROM, online databases, DVDs and for the universities constitutes a new challenge to establish such collections.

In the case of variety of available formats, Burnett and Seuring (2001) note that print equivalents of some electronic information may, and in some cases already have ceased. Likewise, books and reference materials that used to be on CD-ROM are now being replaced by Internet versions and thus not integrating Internet resources may actually lead to the provision of access to less information than before. Caution is
however given concerning the use of Internet resources in that they are difficult to sieve through and are unstable. They might be moved to a different location and that they might disappear from the Web altogether. This calls for the integration of Internet sources into the library services. This would mean a commitment to maintaining access to selected Internet resources and also ensure that students are guided towards quality resources and that the often questionable value of Internet resources would not affect the standard of student papers.

Policies governing library collections have been subjected to the dynamic nature of information resources. For example, providing connections to global information, services and networks has added a new dimension to the selection and purchasing of materials for a particular library. Many libraries see the prospect of digital collection building as a viable alternative to the constrictions of space and the crisis of library funding. Selection is closely tied to the institution’s mission and objectives. When libraries provide Internet access, they provide a means for people to use the wealth of information stored on computers throughout the world, whose ever-changing contents are created, maintained and made available beyond the library.

The crises in government funding in the 1980s and 1990s in some countries hit libraries particularly hard. More generally, librarians responded to the chilly economic climate by adopting wholesale the ‘access over acquisition’ paradigm. Many librarians around the world rationalized such cuts in collection building (Limb, 2004). Furthermore, a number of universities since the late 1980s have emphasized on setting up learning resource centres. These centres had different designs and objectives from traditional libraries. They placed greater emphasis on reader places, information
technology, computing services, media centres, information skills rooms, learning development services, teaching, accommodation, and other learning. More recently, new learning resource centres have provided space for informal learning, group work, and laptop use, often with catering facilities. Quoting Hellen (2007), Makori (2009) observes that the changing media landscape and ongoing technological innovation are influencing the physical library premises creating a communication-based library rather than a collection-based one.

The new trends in customized learning resource centres have also revisited the need to preserve and provide access for grey literature. While quoting Auger (1982), Kargbo (2005) defines grey literature as non-conventional literature, referring to materials not issued through the normal commercial publishing channels and in most cases difficult to access. It consists, amongst other things, of such publications as conference literature, academic publications, patents, standards, research and development bulletins, official publications, business documents, magazines, newspapers, exhibition publications, statistical reports, posters, leaflets, teaching materials, and press and radio reports. Apart from the need to organize grey literature in academic libraries, Kargbo suggests an immediate access solution for them. In this regard, academic librarians embark on cooperative ventures to facilitate availability. Library consortia activities such as interlibrary loans, the provision of a union catalogue and the compilation of subject bibliographies and databases of these materials could suffice.
2.6 Accessibility of information

The issues relating to access and utilization of information in everyday life has been in discussion for years. Universities in particular have invested in the provision of information with a view to improving teaching, learning and research.

Though information is widely recognized as a catalyst for both national and personal development, many people, especially in the developing countries, are still unaware of the need for information and fail to exploit it even when information materials are available for free as in libraries and information centres. This is because the availability of information does not necessarily mean its accessibility. The wealth of information available or in existence in the world today is tremendous and the sheer volume of it, in a myriad formats, makes it impossible for one to have complete access to it. Other notable problems in Developing countries include illiteracy and lack of awareness of the need for information; geographical distance between nations; poverty and underdevelopment. These constraints hardly exist in developed and industrialized countries where basic infrastructures and facilities exist and the majority of the populace is literate and educated and are able to exploit information resources systematically (Aguolu, 1997). The geographical distance is becoming a less serious problem owing to rapid developments in ICT.

Compounded with this problem has been the need to understand how users interact with information systems. According to Tenopir (2003), research on human factors in information access, retrieval and use has gained popularity over the last two and a half decades, in particular in the last decade. This is in contrast to the earliest days of information retrieval, when researchers focused on aspects of retrieval systems other than the human in their attempt to evaluate retrieval performance or improve online
systems. Digital resources in particular continuously require solutions to problems related to content organization, information access and user/system interaction.

Borgman (2003) identifies several elements in defining “access to information” in the context of information infrastructure. One is connectivity, which is a prerequisite for using a computer network and the resources and services it supports. A second element is content and services, for connectivity is meaningless without them. The third element for access is usability, which has three aspects. One is the usability of the computer network or the information infrastructure itself. To be considered accessible, the network must be usable by “very citizen”, rather than being designed primarily for technical specialists. The second aspect is the set of skills or literacies that users bring to the system. Access is limited by people’s ability to use the technology and the information available. A third aspect is usability of content. To be considered “accessed”, the information must be retrieved in some form in which it can be read, viewed or otherwise employed constructively.

A recent report by the International Telecommunications Union (2009) reveals that ICT services in Africa (especially broadband) are still too high compared to the developed world (The Standard, October 7, 2009). This is attributed to the use of satellite connectivity. It projects continued growth in the number of mobile phone subscribers globally to reach 4.6 billion users by the end of the year 2009 while the number of people using Internet on their cell phones will grow to 600 million.

### 2.7 Strategies employed by universities to improve access to information

Various methods and strategies have been employed by universities to make academic information accessible to their communities. They include the use of ICT, setting up of various kinds of information services and teaming up with other institutions to
negotiate for affordable subscriptions or permissions to content. Wainwright (2005) observes that the problems being addressed by universities cluster around the following:

- Providing effective learning experiences for students who spend relatively less time on campus, who require services remotely from the locations of both academic staff and skilled support staff such as librarians, and who are faced with acquiring more generic skills, using a greater range of technology and an increasing variety of information resources.
- Providing effective teaching and research support for academic staff, who are under increasing time pressures, are often themselves remote from skilled support staff, often lack technological and information management skills, and are often unaware of or ineffective in accessing the greater range of relevant research and teaching materials becoming available electronically.

The ICT marketplace is also coming up with new innovations that help to make information more accessible to researchers. This is a response to the vast amount of resources available on the Internet. These solutions do not work in isolation, but interrelate with each other in some way. Some of these are discussed below.

### 2.7.1 Support of the open access movement

The Open Access (OA) movement is working towards improved access to scholarly publishing. The movement emerged in 2003 from a conference on open access hosted in Berlin and has become a significant force for change in the scholarly publishing industry (Ghosh, 2009). It works towards the removal of restrictions such as copyright and licensing in an effort to improve access to the available literature. In essence it is a concept that allows the results of publicly-funded research to be made available
online without charge to the reader. It also advocates for the efficient dissemination of the content. Utulu and Bolarinwa (2009) observe that the serials crisis which began in the 1970s and reached its crescendo in the 1980s resulted to the evolution of the open access movement. The pricing of journals consistently increased annually at a rate well above the general inflation rate.

Developments include alternative models of journal production, such as the setting up of institutional repositories, and initiatives that aim to influence the structure of the market for scholarly journals with a view to driving prices down such as the Scholarly Publishing and Academic Resources Coalition (SPARC). SPARC was formed in the United States in 1998 by the Association of Research Libraries (ARL) as a movement to counteract this commercialization and stranglehold that publishers have on scholarly publishing (Secker, 2004). Before the call for open access initiatives, most African countries approached the challenges of the serials crisis with the adoption of the CD-ROM technology. It has always been acknowledged that journals still remain the primary vehicle for the dissemination of scientific information, yet their costs have been exorbitant.

Chan (2005) points out the two broad strategies for providing OA to scientific research. One is through OA archiving (OAA) of published research material and the other is through the development of OA journals (OAJ) in which the costs of publication are not met by the readers but by some other means, such as the authors’ institute or funding bodies. Chan views self archiving as far more immediate and beneficial route for developing countries. This refers to the process whereby individual authors submit their own published papers or preprints to a publicly accessible archive of their choice.
2.7.2 Use of institutional websites

Institutional websites have been in use for several years. The main websites usually contain information such as general information about the university’s objectives, faculties and academic departments, administrations, subject areas of study, degrees offered, number of credit hours needed to be completed and prerequisites (if any), tuition fees and costs of study, registration procedures, the library, location, facilities and services, correspondence and contacts. The development of library web sites started in the 1990s. As soon as Mosaic, the world's first web browser, was released in 1993 academic health science libraries began developing web sites.

Today, very few libraries are without a presence on the web. In many universities, the library website forms part of the main institution’s website. Many library websites contain search engine links, Internet subject resources, local resources, electronic databases, and links to reference assistance along with other basic library-related information contents. Overall, a library web site serves as a delivery mechanism for databases, electronic texts and journals, and often for the library catalogue. These websites have evolved over the years. These dynamic or interactive websites, which encourage user participation, have forced their way into replacing the early static library web sites (Harinarayana, 2010). Some of these interactive features are discussed as part of the Web 2.0 era later in this chapter.

2.7.3 Development of institutional repositories (IR)

Scholarly communications are being restructured for the digital environment. One of the key new concepts being discussed by universities is the institutional repository (IR). This is the collective intellectual output of an institution recorded in a form that
can be preserved and exploited (Yeates, 2003). A number of universities in developed countries have invested in the setting up of their institutional repositories. As indicated by the Registry of Open Access Repositories (ROAR), there were over 1700 repositories around the world by April 2010. Over the past three years, the number has been growing at an average rate of one per day (Swan, 2009). This development is relatively lagging behind in the developing world, and particularly African universities. As a result, most of the research output from the African institutions is not readily accessible to a wide audience. Utulu and Bolarinwa (2009) further observes that major Internet-based scholarly information databases are mostly run by western countries, which leaves Africa with less than 4 percent of Internet content. This pattern is confirmed by the distribution of repositories around the world, as shown in the following figure.
At the time of this study, some of the institutions in Kenya that had started developing their institutional repositories included Strathmore University, International Livestock Research Institute (ILRI), Kenya Medical Research Institute (KEMRI) and University of Nairobi. Among the resources that accessed through institutional repositories are:

- Theses and dissertations
- Reports
- Open access journals (especially preprints or previous journal articles)
- Past exam papers
- E-books
- Conference papers/proceedings (slides, text, video, audio)
• Inaugural lectures/speeches
• Open courseware
• Administrative records (for public consumption)

Various benefits of IR have been identified. Swan (n.d.) outlines that IR:

• Opens up the outputs of the institution to the world
• Maximizes the visibility and impact of these outputs as a result
• Showcases the institution to interested constituencies – prospective staff, students and other stakeholders
• Collects and curates the digital outputs of the institution
• Manages and measures research and teaching activities
• Provides a workspace for work-in-progress and for collaborative and large-scale projects.
• Enables and encourages interdisciplinary approaches to research
• Facilitates the development and sharing of digital teaching materials and aids
• Supports student endeavours, providing access to theses and dissertations and a location for the development of e-portfolios.

These benefits revolve around availability and accessibility of information to researchers, which in turn translate to utilization of these outputs.

The main drawbacks as outlined by Yeates (2003) are that:

• They need top-down and bottom-up support.
• They affect the balance of institutional power as some departments proceed faster than others.
• They rely on unproven methods for long term digital preservation.
• They may need quick wins to sustain institutional support.

• Initial costs may be high as contributors perceive high risks and duplicate effort to reduce them.

Google and other Web search engines come in handy in indexing the content of the repositories for easy retrieval. Various programs, many of which are open source are available in the market for the development of digital repositories. Some examples are given by Laxminarsaiah and Rajgoli (2007):

• **DSpace** - Massachusetts Institute of Technology (MIT) and Hewlett-Packard (HP) have created DSpace software as a digital repository to manage the intellectual output of multidisciplinary research and development organizations.

• **EPrints** - The largest and most widely-distributed, installed software, developed by the University of Southampton, with minimum technical expertise.

• **FEDORA** – Developed by Cornell University and the University of Virginia.

• **Archimede** - Software developed by Laval University Library, Canada was designed for electronic preprints and post prints of institution faculty and staff.

• **CERN Document server software (CDSware)** - This software was developed and maintained by The European Corporation for Nuclear Research (CERN) to support electronic preprint servers, online library catalogues and web-based document repository systems.
• *Greenstone* - New Zealand Digital Library Project at the University of Waikato has developed and distributed it in cooperation with UNESCO and the Human Info NGO

### 2.7.4 Use of Portals

The idea of setting up of portals emanate from the challenge of providing users with a single point of access to resources. Khurshid and Ahmed (2007) outline that owing to the enormous growth of Web documents, locating of Web files by conventional means was quite difficult. To solve this problem, search engines were created. But, they too were found to be not that efficient in retrieving the desired documents from the huge amount of Web resources. This led to the introduction of web portal for channeling or categorization of Web documents into preconfigured groups.

The use of portals is popular in areas such as libraries, museums, higher education and other research institutions, government and inter-governmental agencies. However, Khurshid and Ahmed trace the initial use of portals to the business sector in the early 1990s. The Web portal, considered as an earlier stage of a portal, was first adopted by libraries in 1998 at the North Carolina State University libraries. Library portals in essence are a transition of the library OPAC. It is anticipated by Khurshid and Ahmed (2007), and other authors that portals will continue to be improved with new features and capabilities.

The debate however is whether a library portal is needed in addition to an institutional portal. An institutional portal provides a single gateway for users, such as employees, customers and external partners, to log in and retrieve corporate information and other services and resources (Davies, 2007). According to Davies, the arguments are both
philosophical and practical. On the one hand, providing integrated access to all possible information resources, the so called “one stop shop” naturally calls for a single tool. On the other hand, the library portal is a deep, narrowly focused service quite different from the institutional portal. They are therefore seen as complementary, but should integrate with each other.

Portals in a nutshell offer the potential to solve many of the problems that have arisen for information providers following the proliferation of electronic resources. They act as cross-resource searching tool. It should be able to search any single Web based resource or a combination of resources, including library catalogues, databases and academic web sites, and return identical results to those returned by the native interface (Groenewegen and Huggard, 2003). This way, users do not get bewildered by the large number of interfaces used by electronic resource providers. It also saves the users the time otherwise spent to move from one resource to another. If customized, a portal would also allow for a single log in to various resources.

2.7.5 Use of e-learning tools and resources

The use of e-learning management tools has become popular, especially in universities in developed countries. Significant technological advances, in particular high bandwidth capabilities have led to the revolution of the educational sector. Dadzie (2009) observes that the level of e-learning adoption in developing countries cannot be matched with that of the developed countries because of lack of facilities such as infrastructure, technology, low connectivity and low levels of training. Nonetheless, developing countries need to bridge this ‘digital divide’ by pursuing vigorously any home-grown solution which maximizes the use of infrastructure and technology.
The rapid developments in e-learning can largely be attributed to several radical changes that have occurred in higher education over recent years. Catherall (2005) summarizes the scenario as follows:

- Growth in demand for technical, business-related and other vocational subjects.
- Growth of the part-time student base.
- Growth in the numbers of non-traditional students (including mature students) requiring support for development of core study skills.
- Increasing legal remit to support students possessing disabilities, including visual and other access requirements.

Studies have been conducted on how e-libraries integrate with e-learning. The studies show that although libraries have been in the forefront of adopting advanced information access technologies, it appears that producers of e-learning products have not planned interfaces with the library. A case study at the United Arab Emirates University (UAEU) for instance showed that the e-library could support e-learning courses with a bundle of networked e-information services such as development of course-related electronic collections, virtual reference help, current awareness, SDI and online document delivery (Dadzie, 2009).

There are various proprietary software packages that support e-learning, such as Blackboard, WebCT, FirstClass, CourseInfo and Moodle. But the practice of e-learning, as observed by Catherall (2005), covers a wide set of applications, such as Web-based learning environments, computer-based learning, satellite broadcast, interactive TV and CD-ROM among others. E-learning attempts to reconcile a rapidly changing educational climate with technological innovation.
2.7.6 Use of Online Public Access Catalogues (OPACs)

One of the information access tools is the OPAC, whose developments have been significant in the last few years. It is commonly the point of interaction of users with the library system. Most OPACs are delivered via a web browser and offering users facilities such as inter-library loan, self-service, renewals and, increasingly, integration with the digital library. Many major library management systems have developed modules that, in addition to managing standard library functions such as serials management, acquisitions and ordering, they also increasingly manage the digital resources (Secker, 2004). Electronic resources can be catalogued and links to full text provided. This way, the OPAC not only gives the bibliographic record, but also the full text article. It has to some extent been seen to function as a “portal” in a similar way as the library homepage. Wells (2007) adds that the OPAC also functions as a promotional artefact, advertising the presence of the library and the services it can provide, and at the same time making a statement of authority about the communicative links that are supported and facilitated.

2.7.7 Setting up of libraries and information centres

Libraries provide structured access to information. They are still being considered resourceful to information seekers in universities. Some of these relevant services as outlined by Shafique (2007) include circulation, reference services, OPAC, inter library loan, abstracts, extracts, indexes, bibliographies, reviews, state-of-the-art reports, document delivery services, article alert services, Selective Dissemination of Information (SDI), table of contents alerts and current awareness services. However, research has shown a changing trend in the use of university libraries. For instance, the Council of Australian University Librarians’ (CAUL's) statistics reveal a
significant decline in both loans per capita, and provision of general seating per capita, over the decade 1992-2002. This is strongly indicative of a general decline in within-library use. In the very few cases where this trend has stabilized or reversed, it has been through significant investment in library workstations for student general computer access or following the opening of a new building permitting improved services and access (Wainwright, 2005). The reason brought forth for this decline is that library use has moved from in-house use to online use from home, from work, and from computer access facilities located across campuses. Statistics from library server accesses indicated a sharp increase. This was noted despite no significant change in other physical facilities and operations such as stacks of print resources, study carrels, reference desks and routine processing of print volumes. The future of the academic library lies in how well it meshes with a whole range of related university services. Libraries do not exist separate from their universities. Some of these services and 'collaborative facilities', as outlined by Wainwright include information technology support, multimedia production, distance education, academic development and student learning support.

Libraries therefore are taking advantage of emerging technologies to serve their clientele. The falling prices of personal devices such as computers, mobile phones and palmtops have offered opportunities for more users to own them. It is also noted that some libraries in the world are already lending gadgets such as IPods, and delivering services via mobile phones or PDAs (Schmidt, 2007). These applications have been made possible through various developments in the mobile telephone technology such as GPRS, WAP, and the 3G standard. Technological developments gradually reduce the functional gap between smartphones and laptop computers. The famous IPods were transformed into IPhones, and then came the IPads, which have a closer
similarity to the laptops. The laptops too increasingly come in customized designs. Cheaper netbooks favour Internet users. Future innovations most probably will result in enhanced functionality while paving way for miniaturized gadgets.

Opportunities are opening up for the future. For instance, EBSCOhost, a database vendor is already going mobile. EBSCO has released EBSCOhost® Mobile™ allowing researchers to access their EBSCOhost® databases via smartphones and other handheld devices. In addition to providing access to smartphone users, EBSCOhost Mobile will also work on desktops helping libraries with low bandwidths since it uses only a fraction of the bytes compared to a traditional EBSCOhost search. This is an idea that can be helpful to other database vendors in ensuring that users who experience low bandwidth get improved access to the content. Reference services are also being delivered via mobile phones in some libraries. This is done through instant messaging (IM) and Short Message Service (SMS). Other possible services include:

- checking records of books borrowed;
- receiving text alerts to new resources on the library web site;
- getting alert on library event information;
- getting information from the library OPAC/database; and
- contacting librarian for help. (Abdul Karim et al., 2006)

### 2.7.8 Development of the semantic web

Semantic web developments, though still at their infancy, present the potential of enabling users find what they want. The semantic web is being developed by the W3C in collaboration with a large number of researchers and industrial partners. It is seen as the next generation web, enabling automated information access and use based on
machine-processable semantics of data. This overcomes the shortcoming of HTML which, according to Sure and Studer (2005), is well suited for human consumption but not for machine-processability. Some of the prominent semantic web technologies are Ontobroker (initially developed at the Institute AIFB/University of Karlsruhe, and now commercialized by the company Ontoprise) and SHOE (University of Maryland).

The semantic web converts web pages from being readable and displayable by computers to being understandable by computers. It does this by adding extra metadata to web pages and by sharing this metadata between multiple applications. It enables computers to understand a web page in the way a human does, so that computers can find, share and integrate information on the web. It depends on two pillars: metadata and ontologies. Metadata provide the ability to identify and exploit relationships between items. Ontologies enable equivalences to be created between items in different collections which have been described using different vocabularies (Burke, 2009). The semantic web transforms organization of information by using the resource description format (RDF) to describe data models, including objects and relationships between objects. It is seen by Burke and others as an important tool for personalizing digital libraries, and in improving the effectiveness of portals. It facilitates interoperability through access to similar classes of digital objects and services, distributed across heterogeneous repositories.

Davies, et al. (2005) outline some of the semantic web-based intelligent knowledge access tools that are emerging in the marketplace. The tools attempt to offer better access to knowledge than the current capabilities of search engines. These are:
- *Desktop search* – Google are moving to support desktop search. So Microsoft is moving into Google’s world and vice-versa.

- *Categorisation* – as ranking quality increases, it is likely that the relative differences between different search algorithms from different vendors will get smaller. Therefore a new differentiator has to be found and one possibility is organising the results of a search for the user by category (e.g. Verity, clusty.com).

- *Integrated search* – future searches may not be initiated by visiting a webpage separate from your application but rather by, for example, highlighting a chunk of text in a Word document and right-clicking. This is an area Microsoft would hope to dominate by embedding its search capability into Office applications.

- *Seamless search* – this involves firing off ‘‘implicit queries’’ based on user activity. This means less overhead is required to access information. Ideally, this will combine a search of the desktop and the web (and other areas to which the user has access, e.g. networked drives and public folders).

- *Personalised search* – ‘‘tweaking’’ the search based on a user’s prior searches or a personal profile of some kind.

- *Beyond search* – some vendors are aiming to add intelligent, sub-document analysis of results (e.g. Corpora’s Jump!), so as to not just give the user a long list of documents but also help with the next step – the analysis of the returned information.

- *Visualisation* – visualisation of search results generally means using 2D or 3D representations of the search results and/or topics that they have been
classified against. This allows the user to quickly grasp the results and the categories.

- **Device independence** – knowledge workers use an increasingly sophisticated and diverse range of devices and expect to be able to access information wherever and whenever they are. As well as PCs (desktop and laptops), mobile phones (including SMS messaging, WAP browsing and use of 3G multimedia capability) and various PDA device types are now commonly used.

All of the trends identified above can be further enabled or enhanced by the application of semantic technology. But the full benefits and exploitation of the semantic web is yet to be discovered. Joint (2007) compares it to the birth of HTML and its later role in the development of the Internet. He adds that at the everyday level of library practice, just now the “Semantic Web” looks like a great idea which is still awaiting its big opportunity for a wide-ranging relevant application.

### 2.8 The role of information professionals in facilitating access to information

Information professionals and particularly librarians in universities are expected to play a leading role in promoting and improving access to information. Schmidt (2007) observes that library users are still visiting libraries. In fact attendance in most libraries is increasing. However in many Western countries, inquiries made and loans are decreasing. This seemingly contrasts with the OCLC’s 2005 report on perception of libraries, which shows that library users prefer libraries only for borrowing books. The report further says that many current library users indicate that they will stop using the libraries soon. These opinions suggest that users tend to prefer libraries that adjust services to fit the users’ needs and information seeking behavior. It agrees with
Schmidt’s opinion that users want appropriate facilities when they come and complain about poor facilities. The social experience is extremely important. They also want access to computers as well as printers and accompanying services which add value. Research by Public Access Computing Project (PACP) supports this by reporting an increase in the use of libraries with Internet and other online services and suggests that including Internet services actually increases the usage levels of libraries.

Poyner (2005) notes that historically, librarians were responsible for the collection and preservation of books. Their role grew into that of professionals who acquired, organized and developed that print-based collection and then started to include stock in varying formats like audio, video, microfilm, multimedia or computer programs. They disseminate information to end-users and improve access to information often beyond the physical limits of their library. He recommends a hybrid approach to information services, especially at present when electronic resources are inclined to promoting desktop e-access as opposed to the use of library services. He notes that the Internet presents new information horizons to end-users. Librarians must be on hand to help their end users, many of whom are inexperienced Internet searchers, to exploit the potential of the Internet and retrieve relevant information. A key danger with e-journal desktop access for instance is that other journal sources not available through a given system can be ignored and overlooked by the end user.

In order to adequately assist users and remain relevant in the emerging information order, Omekwu (2006) recommends that librarians and information professionals, especially in the Developing countries must reposition themselves. The usual or traditional way of information handling, management and service orientations are
being radically challenged and in some cases bypassed. He further observes that in
developed countries the concept of “easy and simple access to a variety of
information independent of time and place and subject disciplines” is already a
practical reality, and that academic libraries service approaches have been
reconstructed on strong information technology foundation. This agrees with
Schmidt’s idea that libraries have much to learn from shops, restaurants, and Internet
cafes, which are customer-focused. The financial constraints commonly indicated as a
setback to development and provision of information services in the early 1980s is no
longer a leading barrier. Success in ICT projects are partially attributed to the
industriousness and efforts made by the personnel concerned. However, the problem
of lack of appreciation of the role played by libraries in the educational process by a
number of university administrators still persists.

The recently used concepts such as library 2.0, Web 2.0 and World 2.0 describe the
new trends in the information industry. Trainor (2009) points out that When the Web
2.0 concept first emerged in late 2005 and early 2006, librarians were quick to
envision “Library 2.0”, a vision of a next generation of library services and tools that
were as different from a traditional library as a “version 1.0” webpage was to its
modern counterpart. Web applications that facilitated active participation of both the
users and librarians became popular, especially in the area of creating and sharing
content. According to Harinarayana and Raju (2010), the progression of dynamic web
sites can be traced by the emergence of commercial web conglomerates like
amazon.com and ebay.com. These commercial web sites have initiated a trend that
made web users into content contributors as well. Examples of web applications,
according to Trainor, run from online word processors and spreadsheets to photo-
sharing sites to Internet radio and video and everything in between. Typically quoted technologies include:

- Blogs – a web page that contains posts – opinions, information, personal diary entries or links. These posts appear in chronological order of their being entered, with the most recent first.
- Podcasting and vidcasting - audio and video content respectively available on the Internet
- Really Simple Syndication (RSS) feeds – a format that allows users to find out about updates without actually visiting a website. Information from the Web is collected within a feed, and ‘piped’ to the user in through a process called syndication.
- Wikis – a web page that can be easily edited by anyone who is allowed access.
- Instant messaging – a live online synchronous communication channel which facilitates online interaction between two people. An example is Meebo.
- Social networks – video sharing sites (e.g. YouTube), community sites (e.g. MySpace, Facebook, Friendster), photo sharing sites (e.g. Flickr, photobucket)
- Mash-ups - songs or compositions created by blending two or more songs, usually by overlaying the vocal track of one song seamlessly over the music track of another.
- Social tagging – addition of keywords to original digital object in order to describe it, but not as a part of a formal classification system, e.g. del.icio.us, dig, LinkedIn, connotea, CiteUlike

In addition, library vendors have taken the first steps toward making their software social with the advent of personalization features in their products. These tools
however have not been utilized without challenges. Joint (2009) identifies the problem of lack of integration. Because there are many such applications, many libraries tend to dip their toes into the water and stick with one or two services from the web 2.0 menu, rather than add different technologies together to create a disparate portfolio of hard-to-support services. Information professionals must be up to date with these developments and be able to monitor their usage and opportunities in information service provision. The idea is to strategically apply these tools in an ever-changing technological and user environment and understand the setbacks associated with their application.

Klobas (1996) discussed the following opportunities for users and librarians in networked information resources environment:

- **As educators**, librarians can increase awareness among their clients of information networks, their contents and their potential use. They can help clients who are new to electronic networks, and those who have poor interpersonal networks, to locate sources of information on the network.

- **As information managers**, librarians need access to information resources of many types, in many disciplines. They have the skills to build navigation tools for networked information resources in the same way that they develop navigation tools for published information in library catalogues and national bibliographies.

- **As information management consultants**, librarians can help network users build and maintain personal information systems that provide access to the subset of networked information resources relevant to each user’s work.
• As custodians of information, librarians are facing an apparent challenge to their role, as physical sources migrate into electronic form and on-demand electronic delivery becomes more common. The ephemeral nature of much electronic material (such as news groups) does, however, create a need to identify and, where appropriate, archive authoritative versions of electronic information (Peasley, 1993). Librarians have the training and skills to provide such custodianship.

• As information providers or publishers, librarians can make available much more widely collections that can now only be used within a single physical library location. A wide range of publication and access formats can be accommodated, from remote login to catalogues and indexes, to provision of electronic copies of entire collections or works, in print or other formats.

• As change agents, library staff can lobby managers and government, as appropriate, for network access for themselves and their users.

• As custodians of public library facilities, librarians can provide workstations, network gateways, printers and software which may not be otherwise available to the public. Anderson (1993) came to a similar conclusion following his review of public Internet access in the USA.

Though these opportunities were discussed shortly after the advent of the Internet, they still remain relevant and are applicable at present. They are profound by improved access channels, changing user preferences and the increased need for collaboration with a variety of expertise.

Librarians have always advocated for free and open access to information. Libraries serve as the middleman between suppliers and users in the traditional publishing
model. The library's main functions are collecting, integrating and providing information. With the growth of open access, a library's functions of managing and disseminating knowledge and providing a good information environment become increasingly important (Fang, 2006). Therefore, when purchasing electronic information resources, ALA recommends that librarians should conduct contract negotiations with vendors/network providers/licensors to ensure the least restrictive access in current and future products. Libraries, themselves, along with any parent institution and consortia partners, should also communicate their intellectual freedom concerns and public responsibilities in the production of their own electronic information resources (ALA, 2000).

2.9 Information literacy

Information literacy plays a critical role in improving access and utilization of information in all sectors. Developing lifelong learners is central to the mission of higher education institutions, and information literacy is a key contributor. Such literacy is required into the students’ careers, as citizens and members of communities.

The term information literacy was first introduced in 1974 by Zurkowski, who was then the President of the US Information Industry Association. He described “information literate” individuals as “people trained in the application of information resources to their work.” Further attempts to define information literacy were made, transforming it into a staple of the educational enterprise (Owusu-Ansah, 2005).

According to the Council of Australian University Librarians (2001), an information literate person is able to:
• recognize a need for information;
• determine the extent of information needed;
• access the needed information efficiently;
• evaluate the information and its sources;
• incorporate selected information into their knowledge base;
• use information effectively to accomplish a purpose;
• understand economic, legal, social and cultural issues in the use of information;
• access and use information ethically and legally;
• classify, store, manipulate and redraft information collected or generated; and
• recognize information literacy as a prerequisite for lifelong learning.

Some of these aspects have been summarized in the following flower-like diagram.
The American Library Association (1989) defined information literacy as recognizing an information need and locating, evaluating, and using the needed information effectively. Many other definitions contain related concepts in varying detail and approach.

The library profession recognizes that the library cannot rightfully claim total ownership of information literacy. Terms such as library instruction and bibliographic instruction concern knowledge on how to use the library. However, information literacy has its roots in library user education. The focus shifted from the traditional library instruction and ICT skills to an independent learning approach. This shift is also shown by changes in the mode of delivery, which has evolved from library tours and orientation lectures to fully integrated and accredited units that cover information-
seeking practices (Andretta, 2005). Library instruction has been criticized for failing to teach users how to be information literate. The viewpoint is that of the library’s, not that of the library user. Underlying this practice is the idea of the stability of libraries.

Rockman (2003) opines that information literacy is no longer just a library issue. It is the critical issue for the twenty-first century, of keen importance to all educational stakeholders, including faculty, librarians, and administrators. The increasingly complex world in which we live contains an abundance of information choices and formats. Those individuals who are knowledgeable about finding, evaluation, analyzing, integrating, managing, and conveying information to others effectively and efficiently are held in high esteem. These are the students, workers, and citizens who are most successful at solving problems, providing solutions, and producing new ideas and directions for the future. They are the lifelong learners, and can stay globally connected in our multicultural world. Fitz-Patrick (2009) adds that information literacy is about preparation for lifelong learning, whether in a formal educational or more informal learning situation. It relates to critical and reflective thinking. It is about providing the skills and conceptual abilities which will enable the individual to steer their own course, often without a teacher, through the information maze and emerge having grown in wisdom and learning.

The ultimate goal of promoting information literacy is to develop an information society, which is claimed to exist in the developed countries. Bundy has identified a number of areas that require a new kind of literacy in information intensive societies:

- participative citizenship;
- social inclusion;
• the creation of new knowledge;
• personal empowerment; and
• learning for life (Bundy, 2004).

The African Information Society Initiative (AISI) envisages that by the year 2010, a sustainable information society in Africa could be realized, where among other things:

• information and decision support systems will be used to support decision making in all the major sectors of the economy in line with each country's national development priorities;
• every man and woman, school child, village, government office and business should be able to access information and knowledge resources through computers and telecommunications; and
• access would be available via international, regional and national information highways.

While quoting Bawden (2001), Correia and Teixeira (2003) enumerate a multiplicity of related terms that are often used synonymously while discussing information literacy. These include:

• information literacy;
• library literacy;
• media literacy;
• computer literacy (synonyms – IT/information technology/electronic/electronic information literacy);
• network literacy (synonyms – Internet literacy, hyper-literacy); and
• digital literacy (synonym – digital information literacy).
These, among others sum up areas that make up an information literate person. Bawden further argues that library literacy, media literacy and computer literacy are skills-based literacies that emerged to meet the needs of an evolving and increasingly complex landscape of information resources, with new technologies and a wider variety of media and services. In this context, library literacy refers to competencies in the use of libraries (collections and services), the ability to follow a systematic search strategy to locate and evaluate the most relevant information on a given topic. Media literacy refers to critical thinking in assessing information made available through television, radio, newspapers, magazines and increasingly the Internet.

Mutula (2004) observes that several studies have shown that lack of information literacy is partly the cause of underutilization of existing ICTs and information resources. Whereas in developed countries information literacy has largely been included in the curriculum, in Africa, many students at various levels of education are unfamiliar with variety of information sources and services within and outside the library. This is largely exacerbated by the lack of libraries at school level, reading materials and qualified staff. Mutula’s concept therefore applies to the general utilization of information beyond the mere use of ICT. This condition is further clarified by the findings of a report, Factors influencing ICT usage among male and female teachers in Kenya and Uganda, released by the Association of Professional Teachers. The report showed that nearly half of teachers in public schools are computer illiterate. While younger teachers use ICT than their old peers, few are in decision making positions to influence its adoption in learning processes (The Standard, July 26, 2010).
SCONUL’s paper (1999) on information skills identifies students’ over-reliance on the Internet as the main reason for the development of information literacy, and argues that the lack of credibility and reliability of Internet sources requires the development of critical analytical skills on the part of the user. It has been noted that students increasingly rely on the Internet for their assignments and term papers. Many of them are comfortable using search engines such as Google. A 2002 research report, "OCLC White Paper on the Information Habits of College Students," reported that 42% of students rely on search engines for every assignment. Another 37% rely on search engines for most assignments. This trend probably might have increased as a result of increasing use of the Internet and financial difficulties experienced in university libraries in the acquisition of print resources.

The Pew Internet studies have also shown that students are moving faster along the curve of technology than faculty and librarians and many students are critical of faculty failures (Schmidt, 2007). A new paradigm shift has been noted whereby students want much more flexibility and learning options than just going to lectures, writing a paper, and taking a final exam. These are students mainly born after the early 1980s, and are commonly termed as the “net generation”, “generation Y”, “the point-and-clicks”, “digital natives” or “millenials.” As quoted by Makori (2009), authors such as Sweetney (2005), Konata (2006) and Walker (2006) view accelerated learning and increased learning productivity as the next millennial library frontiers. This kind of group is more team-oriented, focusing on ‘collaborative learning’. They tend to be visual learners and multitaskers, getting bored quickly with the more traditional “sage on the stage” lecture style. They are nomadic and communicate anywhere and at anytime and expect their technology to be mobile. Millennials are
looking for an ultimate portable device that integrates all of the functionality of laptops, telephones, cameras, video games, and TVs, and expect technologies to offer one-stop shopping for all their needs (Makori, 2009). Mi & Nesta (2006) observes that this generation of students turns to search engines as a starting point to do research, and has been raised with computers from infancy. They are non-linear thinkers and tend to begin tasks from a non-traditional starting point.

In recent years, much attention has also been paid to the creation of service areas known as “information commons”. The goal of the information commons is to link traditional library reference services with computer workstations well equipped with a range of software that includes, for example, Word, Excel, Access, Statistical Package for the Social Sciences (SPSS), PowerPoint and Photoshop, and also to offer access to scanning equipment. Knowledgeable personnel, whether technology or library staff, work with students in solving traditional library research problems and in providing computer technology support. Collaborative learning rooms are often located nearby. These rooms are in some cases equipped with interactive whiteboards, projectors and laptop drops. Libraries are also increasingly utilizing remote storage facilities to house their ever-growing physical collections and to clear space for information commons, group study and comfortable seating (Jones, 2006).

2.10 Access policies

Use policies are commonly part of institutions’ operational framework. Librarians have been known to enforce rules and regulations in their libraries, sometimes without regular revisions to cater for changing trends in information service provision. The standard by the Commission for Higher Education of Kenya (CHE) indicates that
library information resources shall be organized by internationally approved conventions and arranged for efficient access and retrieval (CHE, 2007). The American Library Association (ALA) advocates that reasonable restrictions placed on the time, place, and manner of library access should be used only when necessary to achieve substantial library managerial objectives and only in the least restrictive manner possible. Libraries should focus on developing policies that ensure broad access to information resources of all kinds. Policies should not limit the kinds of information accessed by which patrons and in what manner.

There is a general need to re-think access policies owing to the gradual adoption of technology in libraries as well as shifting needs of users. The shifting paradigm of ‘library’ introduces the practice of ‘anytime, anywhere’ delivery of library services. Thus access policies open up their geographical boundaries and cater for the diverse formats of information resources. They lean towards the promotion of ‘self-service’ approaches and increasingly blend the traditional library policies with ICT policies.

2.11 The Kenyan scenario

The improvement on access to information in Kenya has been an on-going activity. Universities form part of the central focus in the development of information access infrastructure. It is documented that teachers, students and technicians make greater use of information services provided in the country than other identified groups namely farmers and rural communities; policy makers, planners and administrators; and professionals in various fields. Information use by this group can be stimulated further through more rigorous and well-planned user education programmes in the academic institutions (Odini, 1995).
2.11.1 Online resources

Initiatives aimed at improved access to online resources exist. The Health InterNetwork Access to Research Initiative (HINARI) provides free or highly discounted subscription access to major journals in biomedical and related social sciences to non-profit institutions in developing countries. Other related initiatives include Access to Global Online Research in Agriculture (AGORA) and Electronic Information for Libraries.net (eIFL.net). A more comprehensive initiative in Kenya is the Programme for the Enhancement of Research Information (PERI), coordinated by the International Network for the Availability of Scientific Publications (INASP). Like eIFL.net, PERI also acts as a negotiator with commercial publishers and information aggregators on behalf of developing countries by securing deeply discounted prices for access to online journals and databases. In addition to playing a key role in reducing cost barriers, INASP has also been instrumental in designing programs that assist local journals with improving their editorial and scientific quality (Chan, 2005). Most private and public universities in Kenya are beneficiaries of the INASP programme.

The notable problems with database vendors are the relevance of the content and marketing strategies, which give the largest commercial publishers extraordinary power to control terms and conditions of the information market. So while the cost of production and distribution of electronic resources continues to decline, the cost of subscription continues to increase. And while library consortia are able to negotiate better prices than individual libraries, access costs to the one price and one size fits all bundles remain exceedingly high. It is also argued by authors such as Chan (2005) that one of the main problems with research access initiatives is the implicit assumption that research findings from the rich countries could be directly transferred
to the poor countries. This implies that the lack of organized indigenous knowledge contributes to information poverty. Much of the literature in developing countries such as Kenya is largely available in grey form.

There are however changing trends in the organization of local content among Kenyan institutions. Though still at the initial stages, Kenyan institutions such as the University of Nairobi, Kenya Medical Research Institute (KEMRI), Strathmore University and the International Livestock Research Institute (ILRI) have started organizing their institutional repositories. Sensitization workshops on open access have also been facilitated by organizations and bodies such as Bioline International, eIFL.net and Kenya Libraries and Information Services Consortium (KLISC). Open access is a viable solution to existing problems in scholarly communication as well as access to information currently available in grey form.

2.11.2 Network infrastructure

The AISI prediction may partially apply in the Kenyan situation. On-going initiatives in improving access to information using ICT may have positive implications on Kenyan universities. Several projects geared towards the installation of fibre optic cable across Africa are underway to enhance access and bridge the digital divide within the continent and between Africa and other continents. This will enable the country to shift from relying on satellite connections for Internet and telephone calls to the cheaper and more efficient fibre optic technology. Some of these projects are as follows:

- The SEACOM submarine cable being built by a consortium of private companies including Herakles, Blackstone, Aga Khan Fund, Venfin, Convergence Partners, Shanduka and the second national operator of South Africa Neotel.
The East African Marine System (TEAMS) owned by the Government of Kenya, the Kenyan private sector and UAE based mobile operator Etisalat.

The East African Submarine Cable System (EASSy) that is financed by public and private operators from east and southern African countries, the International Finance Corporation, the European Investment Bank, and the African Development Bank among others.

The West African sea board that is being served by the SAT3 cable is also expected to secure a cheaper fibre alternative when the 14,000Km West African Cable System (WACS) becomes operational in 2011. The consortium that is building WACS consists of an equal share split between Telkom, Neotel, MTN, Vodacom, and the South African government’s Broadband Infraco

(UbuntuNet Alliance for Research and Education Networking, 2009)

The TEAMS cable, which runs from Fujairah in the Kingdom of Oman to Mombasa, was completed in June, 2009. SEACOM is also operational, while the completion of EASSy projects is expected to follow. The following is a layout of the fibre optic projects in Kenya in relation to the rest of the world, as projected to be in place by 2011.
The laying of the fibre optic cable within Kenya has also been on-going. Operators like Access Kenya and Kenya Data Networks have been engaged in laying down the fibre within and between urban areas. The Kenyan government has allocated US$80 million to connect all districts using a fibre network. It has also secured a loan from the World Bank to enable the connectivity of academic and research institutions through the national research and education network, KENET (UbuntuNet Alliance for Research and Education Networking, 2009). It is the intention of KENET to see institutions of higher learning share resources via the Web, and lays emphasis on content development by the respective institutions. It is part of a Leland global information infrastructure (GII) initiative project started in 1996 with the aid of US Government. Kenya is one of the over 20 African countries that are included in the initiative.
The fibre projects in Kenya are shown below:

![Map of fibre projects in Kenya](image)

*Source: Communications Commission of Kenya*

**Figure 2-4. Projected fibre optic projects in Kenya by 2011**

The result of improved Internet access is significant in Kenyan universities, where there is a gradual shift to the use of electronic resources. The student appetite for the use of the Internet by students in Kenyan universities noted earlier reflects this shift *(Daily Nation, December 9, 2008)*. Bandwidth issues however still remain a major concern in most institutions, because Internet access is still slow and unreliable. In addition, the use of ICT is constrained by inadequate financial resources. This is largely because the institutions are tuition-dependent and are reluctant to transfer development costs to students in the form of increases in tuition fees. A study conducted in four private universities revealed that student access to computers, which is an indicator of their ability to tap into the information superhighway, is still...
very low. The average computer/student ratio in these universities namely Daystar, United States International University (USIU), University of Eastern Africa – Baraton (UEAB) and Catholic University of Eastern Africa (CUEA) was 1:24. Student interviews similarly indicated dissatisfaction with computer facilities (Mwiria, et al., 2007).

There are however other Internet access alternatives available to the public, though still relatively costly. The existing mobile phone service providers namely Telkom, Safaricom, Yu and Zain now offer Internet services using EDGE/GPRS, third generation technology (3G) along with other channels such as fibre optic. Yu is yet to roll out the 3G network, while Safaricom plans to start testing the Long-Term Evolution (4G) by the end of 2010 (The Standard, April 1, 2010). Internet access is facilitated through the use of hand-held devices and modems for laptops as well as cyber cafes for businesses. There are several initiatives aimed at promoting the acquisition of these resources by the populace. These include the zero-rating of taxes on the products by the government from time to time and hire purchase arrangements facilitated by network service providers in collaboration with financial institutions.

But failure to reduce Internet access charges even after connection to the undersea fibre optic cable has led to public dissatisfaction. Prices are still prohibitive. Investors cite the recouping of investments before lowering the rates, while there is a general outcry that the reasons given by the investors are not genuine. It has also been noted that industrial sabotage and bitter rivalry among telecommunication operators might scuttle prospects for cheaper high-speed Internet (Daily Nation, October 20, 2009). Cases of Internet outages are on the rise as a result of vandalism on the cables, mostly
by rival operators. Analysts say that the industry regulator, CCK must reign in the culprits and bring the situation to order. Telkom Kenya estimated an average of 15 cuts on each fibre optic cable operator every month, which causes an average of Sh. 1 million shillings losses per day and even more in terms of dissatisfied customers who switch service providers because of service unreliability. In October 2009 alone, Telkom recorded a total of 31 cuts, which average a cut each day. As a result, major Internet providers resorted to satellite communication for back-up.

Mere access to the Internet through the mobile phone service providers does not offered all the solutions for information access. Subscription to proprietary databases still limits the majority of Kenyans in accessing quality information. However, Internet access provides an opportunity to carry out a variety of activities that are aimed at improving the quality of life. The government is making concerted efforts to avail ICT services even in rural areas. This is one way of correcting the imbalance, whereby Internet services in most cases have been concentrated in the urban areas. It is a starting point towards ICT adoption by the citizenry. It aims to achieve this by facilitating the setting up of digital villages in every constituency in the first phase and location level in the second phase (www.ictvillage.com). The activities expected in these facilities include:

- **Cyber-cafe**: email, browsing, downloading, and uploading.
- **Bureau**: printing, scanning, copying, CD burning, digital photos, etc.
- **Training**: computers, business, and technical applications, etc.
- **Telephony**: air-time, scratch cards, ring tones, phones, etc.
- **Outsourcing**: data entry for Government and other clients.
- **Merchandising**: selling products and services to community.
• **Franchising**: operating businesses on behalf of other organizations (www.ictvillage.com).

It has however been noted that though the first digital villages were supposed to go live in June 2008, the project stalled due to delays in funding and politics. Donor bodies were being depended upon to support the projects (*The Standard*, June 28, 2010).

An additional development expected in the country is the switch from analog to digital radio and television transmission, which will offer better sound and picture clarity, more channels and multiple media feeds on the same platform. The deadline for complete switch has been set as the year 2012 by CCK. This is three years earlier than the 2015 global deadline set by the International Telecommunication Union (ITU). A significant educational strategy made by the government on the use of digital transmission is seen in the area of education. The Kenya Institute of Education for instance was granted an educational digital television channel in March 2010. This was aimed at providing educational programmes to students at primary and secondary level. In addition, 240 educational institutions countrywide were initially identified for computer-based online teaching in schools (*The Standard*, March 31, 2010). The project aims at availing the entire school curricula and teaching resources online.

### 2.11.3 Information literacy levels

The development of information literacy skills exist, though still on the lower side. Most universities in Kenya have developed basic communication skills course for new students. A Communication Skills Project established for Kenyan public
universities in 1988 focused on skills such as library skills, study skills, reading and note-taking skills, the interpretation of tables and graphs and writing skills. However, in most cases, libraries are not involved in either the design or the delivery of communication skills course. Kavulya (2003) points out that communication skills courses have been beset with problems ranging from lack of personnel to teach the courses, especially with background in librarianship, large groups which account for the prevalence of the lecture method, and a lack of evaluation of its effectiveness. The course is of limited value in the face of a lack of useful information resources especially in the public university libraries. The element of an examination makes students approach it from a purely theoretical point of view therefore failing to relate it to daily information use. It is offered only once in the university life of the students. Non-librarians who have limited knowledge of how libraries work teach the library skills aspect. Above all there is evidence of a lack of collaboration between the communication skills department and other departments in creating a course that fits well with all the subjects offered by the university.

Kavulya identifies the various forms of information literacy programmes provided in Kenyan universities. These include library orientation, library instruction courses, individual instruction or reference service, and use of library manuals and guides. He further observes that in the university setting, the learning is structured so as to create a student-centred learning environment where inquiry is the norm and the focus is on critical thinking and problem solving. Stress is placed on extensive and intensive reading as well as critical evaluation and the integration of information from various sources. This presents fresh students with a totally new challenge that they may never overcome unless sound instruction is provided to ensure that they master information skills. Lack of research skills and awareness of the services and resources available in
libraries as well as poorly developed user training programmes have been identified as key problems for new students by authors such as Mathu (1987), Mwige (1990) and Njuguna (1981). Their inability to access and use information in Kenya has led to a tendency to generally place reliance on their lecturer’s notes. This is reinforced by teaching methods that do not encourage independent learning based on the student’s critical analysis and synthesis of ideas from current information sources (Kavulya, 2003).

Concerted efforts are now being made to consolidate the programmes identified by Kavulya and have an examinable course on information literacy in universities. Efforts are being made by KLISC and INASP to develop an information literacy curriculum that can be adopted and customized by universities in Kenya. This has been done through workshops for information professionals with special focus on information literacy activities in learning institutions. Among the topics considered for inclusion at the initial stages are:

- Information resources – types and uses
- Information access and retrieval – organization, needs identification and search strategies.
- Evaluation of resources – relevancy, currency, authenticity, format, etc.
- Ethical and legal issues of information – copyright issues, mutilation of resources, etc.
- Communicating information - referencing styles
- Web 2.0 tools

(KLISC/INASP Workshop, November 2009)
Other workshops organized in the country focus on information communication technologies (ICT) and e-resource management training, delivering information, strengthening national research publications, open access, research and development, and monitoring and evaluation of e-resources usage. Workshops focusing specifically on information literacy have been facilitated by INASP and other sponsors such as UNESCO and KLISC. Financial support has been provided by the British, Danish, Norwegian and Swedish governments. The main target group has been librarians, who are expected to impart literacy skills to information seekers in their respective institutions.

The Commission for Higher Education of Kenya identifies the library as one of the facilitators of information literacy, and provides standards for the program. The guidelines for librarians include the following:

- Librarians shall assist primary users and others, in information retrieval methods, evaluation and documentation.
- The Librarians, in partnership with the faculty, shall provide information and instruction to all users through a well-structured information literacy competency programme.
- Planning for the Information Literacy Programme shall be conducted by Librarians and Faculty at the programme, curriculum and institutional levels.
- Staffing levels and needs shall be clearly defined by the University librarian.
- Budget information for the programme shall be done by the University librarian.
• The Information Literacy programme shall include a mission statement.

• The programme shall maintain an updated list of goals and objectives with clearly defined roles and responsibilities for each major goal. (CHE, 2007)

ICT literacy levels in Kenya are generally considered to be on the lower side. According to Makeni (2009), very few Kenyan households have an Internet connection and not many own a personal computer. There are just 3 million Internet users in the whole country, out of a total population of close to 40 million. However, a sharp increase in Internet usage is being realized, as shown by the following ITU estimates.

Table 2-1. Internet usage in Kenya

<table>
<thead>
<tr>
<th>YEAR</th>
<th>USERS</th>
<th>POPULATION</th>
<th>PERCENTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>200,000</td>
<td>30,339,770</td>
<td>0.7</td>
</tr>
<tr>
<td>2008</td>
<td>3,000,000</td>
<td>37,953,838</td>
<td>7.9</td>
</tr>
<tr>
<td>2009</td>
<td>3,359,600</td>
<td>39,002,772</td>
<td>8.6</td>
</tr>
</tbody>
</table>

Source: Internet World Statistics

Some analysts also say that the three competing fibre optic projects may actually create an over-supply of bandwidth in the East African market. The talk of opening up access to broadband, according to Makeni, could end up being one big white elephant. There has also been pressure from users on the Internet service providers to lower their access charges following the laying of the fibre optic cable. However, despite the debate, there has been growing interest from organizations to improve on information access by African citizens as a whole. Tim Bernes-Lee, the Web inventor and the founder of Web Foundations for instance visited several African countries
including Kenya late in 2009. The foundation’s visits to Africa focused on learning how the information technologies were being used, to understand the barriers and opportunities for Web usage, and to connect with people, projects and organizations active in the region. These include developers, entrepreneurs, mobile service providers, non-governmental organizations, users and potential partners. (Web Foundation, 2009).

The need to develop local content has equally emerged following the landing of the undersea cable. The Kenyan government has committed itself to support local content development in both the public and private sector by offering grants to groups or individuals who demonstrate innovation and invention in the provision of online services. These relate to areas such as agriculture, health care, water and sanitation, education and online government services. The need was considered following projections that a bigger number of Kenyans are expected to access the Internet in the near future. The ICT Board expects the 3 million figure to increase fourfold to 12 million by 2012 (Businesspost, 2009). Colleges and universities will have an opportunity to upload their local content as well and enhance e-learning.

Drastic increase in the use of mobile phones has been noted in the country, just as it is the case globally. Statistics indicate that though only 25% of the world’s population uses the Internet, over 70% use mobile phones. In Kenya, there were 15,000 mobile phone subscribers in 1999. The number of subscribers had increased to 3.4 million in 2004 and to 16 million in 2008. Mobile phone usage was further popularized by the money transfer service pioneered by Safaricom and later picked up by the other
mobile operators. It is further revealed that 60% of Kenyans watch TV and 90% are reached by radio (Sunday Nation, December 27, 2009).

A research conducted by TNS Research International in Nairobi, Mombasa and Kisumu in the year 2010 similarly showed prevalence in the use of mobile phones. According to the survey, 60% of Kenyans use their mobile phones to access the Internet; 29 use home PCs; 33% work PCs and 41% surf the Web on cyber cafes. The study also showed that although email accessing remains the top online activity in Kenya and the sub-Saharan region, usage of the Internet for social media, knowledge and education access is growing steadily (The People, December 3, 2010).

2.12 Theoretical framework

The study is based on two related models – Leckie’s model of professional groups’ information seeking and Tsakona’s model on the interaction of users with the digital environment. Users form the focus of an information system, and it is critical that systems are designed with their needs in mind. Due to the increasing use of ICT in information service provision, interaction with electronic information becomes an important component of user activities in academic institutions.

2.12.1 Leckie’s information seeking model

Leckie, et al. (1996) produced a model of professional groups' information seeking by examining the common characteristics of the behaviour of these groups. Several models attempted to focus on various professional groups. Though it was noted that there are certain variables that generally have been found to be critical (such as accessibility and ease with which retrieval can be accomplished), the ways in which these variables will converge is somewhat different from individual to individual,
lending a certain air of unpredictability to the information-seeking behavior. The model was therefore developed out of a careful consideration of the research literature on different groups of professionals, and is intended to be generalizable across the professions. Two empirical studies were done for instance about the information seeking behavior of students in Ireland, with one study focusing on engineering programmes and the other on law programmes. Although the studies explored information seeking patterns in different ways, the findings of both studies revealed similar patterns in the information seeking behaviour between students studying to become professionals and information seeking patterns of these groups identified in the model of Leckie et al. Students learned their information seeking strategies, including effective and less effective approaches, from educators. Mis-perceptions of the role and value of libraries and information professionals in their studies were common, and as a result, students often adopted information seeking strategies that excluded libraries and library staff. The studies suggest that engineering and law students in Ireland could benefit from greater information literacy training and awareness, enabling them to acquire the information skills they need to function effectively and efficiently in their future professional work lives. (Kerins, Madden & Fulton, 2004).

It is also noted that a professional frequently plays many distinct roles in a given day, including not only those having to do with the provision of scientific expertise and knowledge but also roles related to managing, counseling, supervising, planning and even research.
The model presupposes that the roles and related tasks undertaken by professionals in the course of daily practice prompt particular information needs which in turn give rise to an information seeking process. Five professional roles that are frequently mentioned are service provider, administrator/manager, researcher, educator and student. Embedded within these roles are specific tasks (such as assessment, counseling, supervising, report writing) which form the second component in the model.

Information needs arise out of situations pertaining to a specific task that is associated with one or more of the work roles. However, information needs can be influenced by
variables such as individual demographics (age, profession, specialization, career stage, geographical location), context, frequency (recurring need or new), predictability (anticipated need or unexpected), importance (degree of urgency), and complexity (easily resolved or difficult). The way in which information is sought is influenced by various factors such as sources of information, personal knowledge and experience and awareness of information sources (including accessibility, quality, timeliness, packaging, trustworthiness, familiarity and previous success).

Outcomes are the results of the information seeking process, such as providing a service or product, completing paperwork, realizing operational benefits and achieving professional development goals.

It is however possible that the outcome of the information seeking is that the need is not satisfied and further information seeking is required. In this case, the user may begin the information seeking process again or redefine the information need. A feedback loop, which highlights the benefit of the outcome of the information seeking process to the original information need or task, as well as other roles unexpectedly. Leckie, et al. imply that the feedback loop only loops back as far as the characteristics of the information need. However, it is conceivable that the looping could also go back to the task and work roles, at which point the information need, as well as the task or role, may be redefined and further rounds of information seeking may be undertaken, employing different combinations of sources and awareness factors (Kerins, 2004). The model however admits that components and factors are not static but interact with each other.
2.12.2 Tsakonas’ model of digital library interaction

A model that reflects a typical interaction between the users and the digital environment was proposed by Tsakonas, et al. (2008) of the Ionian University in Greece. The environment is considered a crucial factor in the digital library development and evaluation, and affects the information seeking process. Digital library interaction shares interaction from two distinct communities, the Human Computer Interaction (HCI) and the information science community. The HCI community is carrying the expertise on the improvement of user interaction with a new information management medium, while the information science community adds the scent of domain knowledge in the sense of information behaviour. This conjunction imposes the investigation of the iterative exchange of dialogue elements between the user and a digital library system, which are translated through an interface and aims to fulfill the user informational needs. Thus the model describes the interaction of the user with the digital library and also represents the interactions between the components of the digital library itself.
The main components of the interaction process are the user, the content and the system. Each of the components has a set of properties that are expressed during the interaction as needs, requests and responses.

**User**

The user has constantly changing information needs. It can be the end user of a digital library or the developer of the system (e.g. librarian or computer scientist). The roles of the user and the developer overlap, since the end user may participate in the development of a digital library collection. The context of the information need that
pushes the user to visit a digital library is a crucial attribute of the interaction, as it
recalls previous user experiences and applies cost/benefit analysis. User instruction
and support was found to be instrumental for the incremental development of a
reasonable digital library interaction.

Content
The content is the prime reason for interacting with the digital library. It addresses the
information needs of the user. The appropriateness and perceived usefulness of
content is the first selection criterion for the user. It affects the direction of the
information seeking process.

System
The system is governed by the rationale of the developer. It consists of subsystems
that perform different operations, such as the interface, the information retrieval
mechanism and the set of supplemental functionalities, such as peripheral devices.
The content manipulation requires different skills migrated from other contexts and
paradigms. For instance, the user may reproduce behaviours from the usage of printed
media and re-project them on his digital media usage models.

The model’s major limitation is that it focuses on the digital environment and does not
address information access in a hybrid setting. Many digital libraries tend to be
supported by physical organizations (libraries, archives, museums), forming hybrid
spaces which integrate the physical and the digital dimension. It also admits that the
predominant interaction process in complex information systems, like digital libraries,
is full of revisions, filtering and judgmental actions that cannot be represented in
idealistic “one-off”, linear interactions.

2.12.3 Application to the study

Because the outcomes of information seeking rely on the sources of information
available, as well as the awareness of those sources, it can be argued that students and
staff should be made fully aware of all information resources available to them and
how best to use such resources. It is likely that during the course of their education,
information seeking habits are constructed which may be carried with them
throughout their professional careers. Since Leckie’s model has arisen out of a careful
consideration of the research literature on different groups of professionals, it is
intended to be generalizable across the professions. It is also apparent that a
professional could have different roles at different times in a university environment.
Five roles that are commonly mentioned are service provider, administrator/manager,
researcher, educator and student. Embedded within these roles are specific tasks such
as assessment, counseling, supervising and report writing.

The interaction between the user, system and the content in Tsakonas’ digital library
scenario shows how the three components must be harmonized for effective access
and utilization of information. Effective interaction depends on both system usability
and information usefulness. Information is being packaged in digital format by
organizations for ease of access. It is therefore predictable that users will increasingly
seek and consume digital information in future. However, the rapid technological
developments, which are intended to simplify the user’s information seeking tasks,
may in fact drive the user away. This model therefore attempts to make the
information seeking environment right for meaningful utilization of content.
The two models focus on information seeking behavior and interaction with information systems in more encompassing terms. Several other models tend to give detailed emphasis on specific areas such as information behaviour, interactive approach and information system design applications. These include Dervin’s (1992) sense-making framework, Kuhlthau’s (1993) affective orientation to the information search process, Ingwersen’s (1996) cognitive model, Wilson’s (1999) information seeking model and Choo’s (1998) general model of information use. An interaction of most, if not all of these components is required in order to realize the desired outcomes. Therefore, a model is required to represent these concepts in the setting of a hybrid information service, noting that interaction with information is multi-faceted.

2.13 Summary

The literature reviewed was mostly obtained from the latest sources at the time of the study. Primary sources provided the most reliable statistics and information on emerging trends in information access and utilization. The rapid technological advances however make some of the facts obsolete. Furthermore, much of the literature reviewed highlights the prevailing trends and conditions in the developed countries. These sources are however relevant in suggesting some of the possible steps to be taken in alleviating information access problems in Kenyan universities, and are instrumental in avoiding the reinvention of the wheel. The key issues highlighted centered on the dynamic nature of user needs, changing information environments, changing trends in the delivery of educational programmes and technological advances that have influenced the way universities access information. No one single approach to improving access to information is singled out. The
literature therefore assists the researcher to conceptualize ways of converging various strategies and resources towards improved information access.
CHAPTER THREE

3.0 RESEARCH METHODOLOGY

3.1 Introduction

This study examines the accessibility and utilization of information among students and staff at Kabarak University with a view to identifying and recommending practical improvement measures.

This chapter discusses the procedures used in carrying out the study. It also specifies the selected population along with the sampling procedure used. The data collection instruments used in the survey and the reasons for their preference are briefly discussed.

3.2 Research design

A research design is a plan showing how the problem of investigation will be solved. Research design is a process of meticulous selection of methods to be used to answer the research question and solve the research problem (Ngechu, 2006).

A mixed methods approach was used in the study. This is a type of research design in which qualitative and quantitative approaches are used in type of questions, research methods, data collection and analysis procedures and/or inferences (Tashakkori & Teddlie, 2002). This research design method was preferred since it captures the diverse views on user interaction with information resources and communication channels, as well as studies the relationships existing among subjects. The views and suggestions of students and staff on accessibility and utilization of information at Kabarak University can be captured, as well as their behavioural patterns when
seeking information. The choice of Kabarak University was intended to focus on the
issues on information access in a typical university context.

3.3 Study population

The study was confined to the regular students and full time members of staff. The
initial category of the population composed of a total of 771 students in the
undergraduate and pre-university programs in the main campus. Students undertaking
bridging courses and those out on field attachment were left out because they were not
available at the intended time of study. The bridging courses also last for a period of
two months, which does not give the students enough time to interact with the
existing information resources and systems. The first batch of postgraduate students
was also excluded in the survey because they had spent a relatively short time at the
university. They also reported after the initial sampling and data collection had been
done, and the survey had reached an advanced stage. All the 170 members of the
teaching and non-teaching staff formed the second category of the study population.
However, the non-teaching staff category only covered the members of staff whose
work assignments required that they actively seek information. These included
technicians, secretaries, administrators, spiritual leaders, financial managers and other
resourceful informants including ICT managers, library staff and policy makers
among others. Part-time members of staff were not included since most of them did
not spend much time within the university, or their teaching period was too short for
any meaningful study.
3.4 Sample size and sampling procedure

Sampling involves the process of selecting a number of individuals for a study in such a way that the individuals selected represent the large group from which they were selected. (Mugenda & Mugenda, 2003). The goal of sampling is to obtain the results from part of the population that can be generalized to the entire population with as much accuracy as possible.

The researcher drew samples of a minimum of 15% of the entire population using stratified random sampling. This was considered a manageable sample within time constraints as well as the easy proximity of the target population. A 10% sample has been suggested as the minimum for descriptive studies by authors such as Kasomo (2006), while a number of researchers recommend as big a sample as possible for quantitative studies. In this case, at least 15% was considered sufficient in obtaining representative results. Therefore, a total of 116 students and 25 members of staff formed the sample. A total of 30 staff (6 teaching and 24 non-teaching) participated in the survey. A stratified sample was taken from the first to the fourth year students and from different subjects of study, as shown below.
Table 3-1: Sample size for the survey

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>NUMBER</th>
<th>RESPONSES</th>
<th>%</th>
</tr>
</thead>
<tbody>
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<td>Students (undergraduates)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1&lt;sup&gt;st&lt;/sup&gt; years</td>
<td>138</td>
<td>18</td>
<td>2.3</td>
</tr>
<tr>
<td>2&lt;sup&gt;nd&lt;/sup&gt; years</td>
<td>130</td>
<td>9</td>
<td>1.2</td>
</tr>
<tr>
<td>3&lt;sup&gt;rd&lt;/sup&gt; years</td>
<td>196</td>
<td>34</td>
<td>4.4</td>
</tr>
<tr>
<td>4&lt;sup&gt;th&lt;/sup&gt; years</td>
<td>186</td>
<td>30</td>
<td>3.9</td>
</tr>
<tr>
<td>School-based</td>
<td>81</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>731</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Students (pre-university)</td>
<td>40</td>
<td>6</td>
<td>0.8</td>
</tr>
<tr>
<td>Total</td>
<td>771</td>
<td>97</td>
<td>12.6</td>
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</tbody>
</table>

The course distribution for responses was as follows:

Table 3-2: Responses per course category

<table>
<thead>
<tr>
<th>COURSE</th>
<th>TOTAL NUMBER</th>
<th>RESPONSES</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computer Science</td>
<td>86</td>
<td>10</td>
<td>1.2</td>
</tr>
<tr>
<td>Commerce</td>
<td>551</td>
<td>58</td>
<td>7.5</td>
</tr>
<tr>
<td>Theology</td>
<td>6</td>
<td>5</td>
<td>0.6</td>
</tr>
<tr>
<td>Education (School-based and regular)</td>
<td>88</td>
<td>18</td>
<td>2.3</td>
</tr>
<tr>
<td>Pre-university</td>
<td>40</td>
<td>6</td>
<td>0.8</td>
</tr>
<tr>
<td>TOTAL</td>
<td>771</td>
<td>97</td>
<td>12.6</td>
</tr>
</tbody>
</table>

3.5 Data collection methods

Two methods were selected for gathering information from respondents, namely questionnaires and interviews.
### 3.5.1 Questionnaires

Questionnaires were used to collect data from the undergraduate and pre-university students sampled from the entire population. They were randomly distributed to students in different year of study. Student representatives in the first to the fourth year of study assisted in the distribution of some of the questionnaires. The use of questionnaires was considered appropriate for studying the respondents’ experiences, knowledge and opinions, especially from a large population. The respondents had enough time to think through their answers at their convenient time.

A semi-structured approach was employed for ease of coding and easy understanding of the questions by respondents while allowing the respondents to freely express their opinions. The types of questions included open expression by respondents, use of Likert scale and multiple choices. However, questionnaires have the weakness of low response rate. An effort to overcome this weakness was made by distributing the questionnaires to as many respondents as possible, far above the minimum target. Assistance from student representatives also helped to minimize the loss of control of questionnaires sent out.

### 3.5.2 Interviews

The study used semi-structured interviews with open-ended questions. The researcher personally conducted the interviews. This approach had the advantage of allowing the researcher to probe issues in detail and possibly obtain more information than earlier anticipated in the design of the data collection tools. The data collected from interviews provided more clarification for responses that may not have been adequately captured in questionnaires. It was also possible to gather helpful insights
from members of staff who were also involved in imparting knowledge to students or in the provision of information services. There was however a danger of gathering biased data and the researcher minimized the problem by clarifying the intentions of the study and focused on the set objectives.

The sampled members of staff were interviewed. The interview method was appropriate since the population of the respondents was relatively small. It was also easier to reach out to the respondents at their places of work unlike in the case of students whose availability could not be predicted.

3.5.3 Secondary data

Secondary data from books, journals and the Internet were also consulted. The data was of interest especially in establishing the extent of use of online resources.

3.6 Data analysis

The data obtained from the interviews and questionnaires were checked, classified, edited and coded. Quantitative data was analyzed with the help of SPSS software. Descriptive statistics were used and results presented in graphs and tables.

3.7 Ethical considerations

The informed consent of Kabarak University was sought before the commencement of the study. Informed consent of all respondents selected in the sample was also sought at the time they were approached to participate in the study. All data was treated in a way that protected the confidentiality and anonymity of the respondents involved in the study.
3.8 Dissemination of findings

Copies of this thesis have been made available to the School of Information Sciences and Margaret Thatcher Library (Moi University) and Kabarak University Library. A digital version has been submitted for posting at Kabarak University’s institutional repository. Publication as journal articles will also be considered for wide access through online databases such as Emerald and Sage.
CHAPTER FOUR

4.0 DATA PRESENTATION, ANALYSIS AND INTERPRETATION

4.1 Introduction

This chapter presents the findings of the survey and provides an analysis of the data collected in line with the objectives of the study.

A total of 97 students and 30 staff participated in the survey. These gave a response rate of 84% and 120% respectively. Two of the staff participants were informants to the study. They were purposively drawn from the library and ICT departments.

4.2 Information needs

The respondents were asked to indicate their information needs. This was necessary to ascertain accessibility of information in line with their specific needs. The following table summarizes the responses.

Table 4-1. Information needs of students and staff

<table>
<thead>
<tr>
<th>Types of resources</th>
<th>Students (N = 97)</th>
<th>Staff (N = 30)</th>
<th>Students and staff (N = 127)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>%</td>
<td>Number</td>
</tr>
<tr>
<td>Course materials</td>
<td>77</td>
<td>79</td>
<td>10</td>
</tr>
<tr>
<td>Lecture notes</td>
<td>78</td>
<td>80</td>
<td>3</td>
</tr>
<tr>
<td>Textbook resources</td>
<td>75</td>
<td>77</td>
<td>17</td>
</tr>
<tr>
<td>Research articles</td>
<td>54</td>
<td>56</td>
<td>10</td>
</tr>
<tr>
<td>News updates</td>
<td>47</td>
<td>49</td>
<td>17</td>
</tr>
<tr>
<td>Manuals/guides</td>
<td>46</td>
<td>47</td>
<td>18</td>
</tr>
<tr>
<td>Recreational</td>
<td>38</td>
<td>39</td>
<td>6</td>
</tr>
<tr>
<td>Statistics</td>
<td>28</td>
<td>29</td>
<td>3</td>
</tr>
</tbody>
</table>
These information needs are graphically presented by Figure 4-1 below:

![Information needs of students and staff](image)

**Figure 4-1. Information needs of students and staff**

The kinds of information required by respondents were diverse, but tended to concentrate around their daily activities. Students gave top priority to information that related to their studies, mainly lecture notes (80%), having relatively equal weight as course materials (79%) and textbook resources (77%) respectively. Though research articles formed an important ingredient to their coursework, only about half of the respondents made use of them. This is an indication that about half of the students went an extra mile to search for additional resources that supported their coursework. There was more reliance on secondary sources of information as opposed to primary sources. In general terms, information needs are diverse and it is not easy to satisfy all. Furthermore, information is multi-faceted. For example, news updates, statistics...
and research articles among others support course materials and facilitate the accomplishment of course assignments by students.

Staff sought for tools that were relevant to their work activities. The majority (64%) needed manuals, guides and other resources that provided solutions to their work-related problems. They required information that provided answers at the time of need. This was followed by a tie between textbook resources and news updates (61%). As in the case of students, staff also applied the least effort principle, whereby information that provided immediate solutions to their problems was sought. There was an overlap in their needs in that some of the staff also doubled as students in various institutions. Apart from carrying out the main tasks in their job descriptions, a number of staff also had additional responsibilities. For instance, some of the teaching staff were also involved in administrative work, while some of the non-teaching staff had part-time teaching contracts.

According to the reference librarian, students required articles to compile their assignments. Sources were of diverse formats, such as books, e-journals and newspapers. Many of the reference enquiries related to guidance on where to obtain particular information, such as stock market reports, reports on the education sector, newspaper articles and topical journal articles. Teaching staff required information resources that supported their teaching and research activities. However, since some of the members of the teaching staff were also postgraduate students, they commonly required journal articles and updates in their respective subject fields.

The needs were satisfied through the provision of access details in the case of online databases, referring them to sources of information or availing actual documents to
them. Access details such as usernames and passwords were provided through various means, such as university website, OPAC, bookmarks, notice boards, email broadcasts or as requested by users.

4.3 Information sources consulted

A variety of sources are consulted to satisfy information needs. The frequencies of use of these sources and the purpose for which they were utilized are summarized on Table 4-2 below.

Table 4-2. Information sources consulted by students

N = 97

<table>
<thead>
<tr>
<th>Information sources</th>
<th>Academic</th>
<th>General knowledge</th>
<th>Leisure</th>
<th>Correspondence</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Books</td>
<td>94</td>
<td>43</td>
<td>25</td>
<td>16</td>
<td>178</td>
</tr>
<tr>
<td>Journals</td>
<td>26</td>
<td>57</td>
<td>42</td>
<td>14</td>
<td>139</td>
</tr>
<tr>
<td>Electronic resources</td>
<td>76</td>
<td>72</td>
<td>69</td>
<td>39</td>
<td>256</td>
</tr>
<tr>
<td>Class notes</td>
<td>87</td>
<td>15</td>
<td>3</td>
<td>10</td>
<td>115</td>
</tr>
<tr>
<td>Verbal information</td>
<td>33</td>
<td>54</td>
<td>53</td>
<td>29</td>
<td>169</td>
</tr>
</tbody>
</table>

Electronic resources topped the sources consulted by students. They were used for a variety of reasons by the majority of the respondents in comparison to the other sources. However, since the other sources on Table 4-2 may also take electronic format, the format of the documents sought is clarified on Table 4-4. These were followed by books and verbal information respectively. Books were consulted mainly for academic purposes. General knowledge and leisure topped the use of journals respectively. This is a reflection of the kind of journals available in the library. There were mainly periodicals for general reading (magazines and newspapers). Scholarly journals were mainly available online, but their usage was relatively low. Most respondents possibly did not consider e-journals when giving their answers, since the
use of journals for academic purposes ranked low. Similarly, subscribed e-resources were not significantly accessed for general knowledge or leisure. It is worth considering social networking as an important source of academic information, though not as prominently as general knowledge and leisure. Verbal information mainly took the form of person to person consultation and group discussions. There were a variety of forums for such exchanges as clarified by the reference librarian, such as lecture sessions, residence, library’s discussion rooms, classrooms, symposiums, guest speakers on various topics and workshops.

The staff showed a similar pattern of use of resources, but with an addition of work related purpose. There was a narrow gap in the frequency of use of all these sources for work related tasks, suggesting that the staff utilized information from a variety of sources and formats.

Table 4-3. Information sources consulted by staff

<table>
<thead>
<tr>
<th>Information sources</th>
<th>Academic knowledge</th>
<th>Leisure</th>
<th>Correspondence</th>
<th>Work related</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Books</td>
<td>20</td>
<td>12</td>
<td>7</td>
<td>0</td>
<td>13</td>
</tr>
<tr>
<td>Journals</td>
<td>13</td>
<td>14</td>
<td>3</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td>Electronic resources</td>
<td>17</td>
<td>16</td>
<td>9</td>
<td>12</td>
<td>15</td>
</tr>
<tr>
<td>Verbal information</td>
<td>3</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>13</td>
</tr>
<tr>
<td>Office documents/manuals</td>
<td>6</td>
<td>2</td>
<td>0</td>
<td>10</td>
<td>16</td>
</tr>
</tbody>
</table>

Most students and staff preferred the print versions of books, journals and other documents availed to them by the university (Table 4-4). This contrasts with the popular overall use of electronic resources in Table 4-2. However, it is in harmony with the frequent use of books and class notes for academic purposes. Print resources
constituted the main source of academic information as well as resources used in offices. It also suggests that most of the resources provided by the university were in print form, irrespective of the preference of the respondents. There has also been a general perception that academic resources in most part constitute print media. Though the university library did not regularly subscribe to print academic journal titles, print journals were consulted more than electronic format. These print journals mainly constitute magazines and newspapers consulted for leisure and general knowledge. This inclination would probably be different if the university subscribed to digital versions of newspapers and magazines, or presented more resources in digital and other formats. It also confirmed the low usage of office/administrative documents on the local area network. The source that is easy to use and satisfies the community’s information needs would be frequently consulted.

*Table 4-4. Formats of resources consulted*

<table>
<thead>
<tr>
<th>Information sources</th>
<th>Print</th>
<th>Electronic</th>
<th>Multimedia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Books</td>
<td>102</td>
<td>40</td>
<td>21</td>
</tr>
<tr>
<td>Journals</td>
<td>76</td>
<td>55</td>
<td>21</td>
</tr>
<tr>
<td>Manuals/office documents</td>
<td>77</td>
<td>54</td>
<td>23</td>
</tr>
<tr>
<td>TOTAL</td>
<td>255</td>
<td>149</td>
<td>65</td>
</tr>
</tbody>
</table>

Electronic resources came ahead of journals in Table 4-2, indicating that students may have been accessing free Internet resources for their research more than they accessed online databases subscribed to by the university. There were also a variety of other activities carried out on the Internet apart from accessing information for class related tasks. This is supported by the activities that they carried out on the Internet (Figure 4-2).
The most outstanding activity on the Internet for both students and staff was the use of search engines. The popular use of search engines when searching the Internet is an indication of users voyaging into a sea of information with the expectation of retrieving relevant results. This is similar to the findings in other universities, whereby students in particular turned to the Internet as the first source of information for their assignments. They use the search engines (especially Google) to discover the unknown sources on the Web. The popular Web 2.0 services and tools that supported social networking had an impact as well, and were mentioned by respondents as part of the familiar sites. They were more popular among the students than the staff. These included wikis, blogs and podcasts. One respondent proposed that “the university
should encourage students by allowing access to sites that are interesting, for example Facebook which is interactive.”

Despite the fact that social sites did not contribute much in providing academic resources to users, they offered an opportunity for users to gain experience in the use of computers and Internet. Chatting also increased the chance of awareness of existing information sources to satisfy a need. The participation in the use of these social media opened a way for the library to offer some of the reference services to its users. The library was registered with Facebook and Twitter. However, these tools seemingly catered for a different type of user need rather than luring the traditional users into a new way of interacting with the library.

In the case of staff, correspondence closely came second – this may be related to their work activities, which involved communication within and outside the organization. Some of the respondents, especially students may not have considered the visiting of social sites such as Facebook, Bebo, MySpace and Twitter as part of correspondence.

Electronic resources were not available only on the Internet. However, a comparison of sources of electronic resources showed that the Internet still remained the most commonly consulted source (Figure 4-3). The use of CD-ROM resources was on the lower side. The acquisition and utilization of CD-ROM resources was not emphasized by the university. The library for instance did not make any budgetary provision for them. There has been a gradual decline in the use of CD-ROMs in libraries, unlike in the 1980s and 1990s. This contrasts with the improvements achieved in terms of storage capacity of this media. Researchers have laid increasingly less emphasis on their use in libraries, especially with the increasing popularity of networked resources.
Part of the reason for the low usage at the university however was the lack of awareness and the unavailability of a variety of CD-ROM resources for users.

![Information sources graph]

*Figure 4-3. Sources of electronic information*

While commenting on the appropriateness of the formats, respondents considered print and electronic resources equally appropriate. Print resources were easy to refer to while electronic resources were easy to manage and access. The choice of format did not appear to be a conscious decision, but rather the information required for a particular purpose. Most respondents did not comment on multimedia resources. The few responses pointed out their relevance for class presentations, such as models and Powerpoint presentations. The content from both formats were found to be useful, though caution on reliability was emphasized for Internet resources.
4.4 Channels used for accessing information

Various channels for accessing information were given (Table 4-5).

Table 4-5. Channels used for accessing information

<table>
<thead>
<tr>
<th>Source</th>
<th>Students (N = 97)</th>
<th>%</th>
<th>Staff (N = 30)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internet</td>
<td>91</td>
<td>94</td>
<td>24</td>
<td>86</td>
</tr>
<tr>
<td>Library</td>
<td>88</td>
<td>91</td>
<td>22</td>
<td>79</td>
</tr>
<tr>
<td>Lecturers</td>
<td>58</td>
<td>60</td>
<td>15</td>
<td>54</td>
</tr>
<tr>
<td>Colleagues</td>
<td>52</td>
<td>54</td>
<td>15</td>
<td>54</td>
</tr>
<tr>
<td>Offices</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The Internet topped the list of the most popularly used access channels for both students and staff, followed closely by the library. Lecturers and colleagues trail behind, while offices were rated the lowest by the staff.

4.4.1 Use of library

The library offered Internet services as well, partially explaining the reason for its significant use. All the respondents – both students and staff (100%) visited the library for various reasons, the leading of which was to consult various information resources. The second related activity was browsing the Internet using library computers. The majority of respondents (83%) considered the library to have quality resources that ranked higher than other sources of information they consulted within the university. The majority of the students (58%) rated themselves as ‘aware’ of the library and its services, but less than half (35%) had given suggestions on improvement of library services. A greater proportion of the staff perceived that they were ‘quite aware’ (47%). About half (50%) of the staff had forwarded their suggestions to the library. The majority of students (60%) and staff (64%) were aware of the online databases accessible to them. However, only 42% of the students and
40% of the staff respondents had accessed them. Various reasons were given for their low usage, as discussed under problems with the use of electronic resources.

Statistics provided by the library’s reference desk also indicated low usage of online resources subscribed through PERI. The following are the full text download statistics for the year 2008/2009, as provided by some of the database vendors.

**Table 4-6. Usage statistics for online databases**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Oxford Journals</td>
<td>9</td>
<td>13</td>
<td>14</td>
<td>13</td>
<td>7</td>
<td>16</td>
<td>44</td>
<td>1</td>
<td>12</td>
<td>10</td>
<td>11</td>
<td>5</td>
<td>155</td>
</tr>
<tr>
<td>ISTOR</td>
<td>86</td>
<td>168</td>
<td>168</td>
<td>126</td>
<td>48</td>
<td>157</td>
<td>337</td>
<td>122</td>
<td>101</td>
<td>85</td>
<td>78</td>
<td>39</td>
<td>1,515</td>
</tr>
<tr>
<td>Emerald</td>
<td>1,586</td>
<td>2,059</td>
<td>3,720</td>
<td>2,807</td>
<td>5,333</td>
<td>8,283</td>
<td>14,920</td>
<td>7,823</td>
<td>7,399</td>
<td>8,305</td>
<td>154</td>
<td>66</td>
<td>62,455</td>
</tr>
<tr>
<td>EBSCO</td>
<td>1,378</td>
<td>1,320</td>
<td>634</td>
<td>1,342</td>
<td>2,097</td>
<td>1,655</td>
<td>2,019</td>
<td>900</td>
<td>243</td>
<td>1,757</td>
<td>1,130</td>
<td>320</td>
<td>14,795</td>
</tr>
<tr>
<td>Liebert Online</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>Scitation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Project MUSE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Many of the databases did not provide ready usage statistics, while requests to some vendors to generate the statistics were not fruitful. Some of the databases were not available during certain periods of time, as it is the case with Scitation and Project MUSE. A common problem with many of the databases was access restrictions of
some of the articles, even though the database itself was part of the university subscriptions. Elsevier for instance offered a limited number of titles for full text access, though this has been subjected to yearly review. A few of the respondents indicated that some of these databases did not meet their information needs. Each database had specific subject strengths – some of which covered only one subject area. Online databases accessed by the university were part of consortium subscriptions through PERI. This made high quality resources available to Kenyan universities at affordable rates. However, the weak point was that these resources did not uniformly satisfy the subject needs of member institutions, and the entire bundle was not exploited to the maximum. The library renews registration with some of the vendors at the beginning of each year after paying the registration fees. The university has been paying for the yearly subscription of the resources since 2004, with the consortium subscription for the year 2010 being Sh. 470,000. This cost was considered far below the expected subscription of the databases in the absence of consortium arrangement.

From the library staff’s point of view, the library provided both print and electronic resources. CD-ROMs were not frequently consulted as compared to online resources. The available CDs were mainly those that accompanied books. The CDs at the Audio visual section were less than twenty. Apart from books, magazines and newspapers, other print resources in the library were not frequently consulted. Electronic resources were seen as effective. They could easily be manipulated compared to the print counterparts. However, students and staff commonly cited inadequate computers and lack of awareness as a handicap to the effective use of electronic resources. Users also got frustrated by the frequent power outages while accessing electronic resources. The
power generator at the university was not able to turn on as soon as the regular electricity failed. This lapse always led to the loss of unsaved work.

The OPAC was not popularly used, even for searching or personalized tasks, such as item reservation or renewals. More resources such as links to databases and other electronic resources were added to the OPAC to make it a kind of a library portal. With increased training and awareness on its usage, the library staff viewed that the use of the web OPAC could assist users find their way to diverse electronic resources without the need to remember various Web addresses (URLs) or switch between various sites when browsing diverse electronic resources.

4.4.2 Use of ICT

Various technologies in addition to the Internet facilitated access to information. Most of the students (96%) and staff (100%) used various ICTs in accessing information. Some of these are shown on Table 4-7 below, along with the purpose of their use.

Table 4-7. ICT and frequency of use by students and staff

<table>
<thead>
<tr>
<th>ICT resources</th>
<th>Academic</th>
<th>General knowledge</th>
<th>Leisure</th>
<th>Correspondence</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computers</td>
<td>103</td>
<td>82</td>
<td>71</td>
<td>43</td>
<td>299</td>
</tr>
<tr>
<td>PDAs</td>
<td>27</td>
<td>19</td>
<td>17</td>
<td>13</td>
<td>76</td>
</tr>
<tr>
<td>Cell phones</td>
<td>21</td>
<td>47</td>
<td>75</td>
<td>58</td>
<td>201</td>
</tr>
<tr>
<td>Digital cameras</td>
<td>14</td>
<td>19</td>
<td>72</td>
<td>17</td>
<td>122</td>
</tr>
<tr>
<td>CD/DVD players</td>
<td>32</td>
<td>42</td>
<td>82</td>
<td>12</td>
<td>168</td>
</tr>
<tr>
<td>Radio</td>
<td>18</td>
<td>83</td>
<td>89</td>
<td>16</td>
<td>206</td>
</tr>
<tr>
<td>Television</td>
<td>26</td>
<td>97</td>
<td>91</td>
<td>17</td>
<td>231</td>
</tr>
</tbody>
</table>

Students utilized computers far ahead of other technologies. They were mainly used for accessing academic information. The use of hands held devices such as PDAs for accessing information was the lowest. The main reason given was that most
respondents did not have them, as they were not affordable. Ordinary mobile phones were more common especially among students, and were mainly used for leisure activities. DVD players, radio and television were also mainly used for leisure. However, radio and television played a second role of providing general knowledge. The overall usage of these technologies is reflected in the chart below.

![Figure 4-4. Overall use of ICT](image)

The majority of students had basic training on the use of the technologies, but emphasis was laid on computers. Formal training through class work and computer application courses was the starting point for 64 of the respondents (66%). Only 7 respondents (7%) relied entirely on hands-on experience. The majority of the students received formal training at Kabarak University.
Most of the staff also had formal training, but also pointed out hands-on experience as an equal contributor to their ICT skills. The formal training for staff was not confined to Kabarak University, since there was no scheduled programme for training them at the institution. The hands on experience played a significant role in providing computer literacy to the staff since a number of them utilize the resources in accomplishing certain work roles.

According to the ICT staff, the commonly used technologies provided by the university for accessing information were computers, local area network (structured and wireless), the Internet, televisions and DVD players. Most of the other access channels, such as portable digital assistants were available to a few individual owners. Few students and staff owned laptop computers, though it was noted that the number was gradually increasing. In a number of cases, the laptop owners consulted library or ICT staff for assistance in network configurations. Some users generally shied away from utilizing ICTs, while others made requests for basic coaching in the library, such as browsing, wordprocessing, file management, removal of viruses, using the OPAC and accessing past exam papers. These requests were common especially among students in the school-based programme, who were in most cases more advanced in age than the regular students. Internet usage was meaningful only when the connection was relatively fast. There was frequent breakdown of Internet services. This was mainly attributed to vandalism of the fibre optic cable according to the updates from the ICT department. However, in addition to technical difficulties, there was a general problem in finding relevant information on the Web.
New students were made aware of ICT resources such as file sharing, email and the Internet through short orientations. Among the areas covered by the orientation were the library and ICT sections. There was a general computer course (introduction to computer applications) taught to all first year undergraduate students irrespective of the programmes they take.

The university has been working towards improving the network infrastructure with the help of KENET’s bandwidth expansion program. The bandwidth was upgraded from 128 kbps uplink/256 kbps downlink to 1 mbps for both uplink and downlink in July, 2009. Many of the computers in use, especially by students were however few and old. The pace for upgrading of old ICT resources was relatively slow. The computers for browsing in the library and computer labs for instance were acquired in 2003, and had relatively low memory. Most of them had 128MB RAM and 20GB hard disk storage. There were 10 computers available for students in the library (some of these broke down in the course of the survey), and 4 labs for classes. One of the labs was dedicated for projects, leaving three for regular practical sessions.

There was an ICT policy in place to guide on the usage of ICT resources, such as separation of proxy settings for staff and students. The bandwidth management issues however were yet to be incorporated, especially bandwidth allocation within the local area network.

An e-learning programme called Moodle was installed by the university. It had been used by a few lecturers to deliver course content to students. The library has also posted past university examinations on it. This was done in the course of the survey. It
was noted that a few lecturers used email to communicate to their students, while the majority still gave print handouts and used the conventional teaching methods. The university had an email facility called WorldClient for staff and students, with various user categories defined. The categorization of users facilitated discussion forums within the university in addition to its use for external communication. These categories include members of various departments, students and staff.

4.5 Impediments in accessing and utilizing information

4.5.1 Challenges to the use of ICT

Several challenges were mentioned in relation to the use of ICT, with special emphasis on computers. These are summarized on table 4-8 below.

Table 4-8. Challenges experienced in the use of ICT
N = 127

<table>
<thead>
<tr>
<th>S/N</th>
<th>Challenges identified</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Slow computers or Internet connectivity</td>
<td>54</td>
<td>42</td>
</tr>
<tr>
<td>2</td>
<td>Frequent interruption of power supply</td>
<td>25</td>
<td>20</td>
</tr>
<tr>
<td>3</td>
<td>Computers or network not working</td>
<td>22</td>
<td>17</td>
</tr>
<tr>
<td>4</td>
<td>Limited knowledge on use and maintenance of computers</td>
<td>16</td>
<td>12</td>
</tr>
<tr>
<td>5</td>
<td>Frequent hardware and software changes</td>
<td>13</td>
<td>10</td>
</tr>
<tr>
<td>6</td>
<td>Inadequate number of computers</td>
<td>10</td>
<td>7</td>
</tr>
<tr>
<td>7</td>
<td>Interference by computer viruses</td>
<td>10</td>
<td>7</td>
</tr>
<tr>
<td>8</td>
<td>Restricted access to certain sites by firewall</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>9</td>
<td>Health related problems when using ICT</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>10</td>
<td>Lack of funds to acquire personal ICT resources</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>11</td>
<td>Limited network coverage</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>12</td>
<td>Lack of technical assistance when required</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>
An overwhelming majority of respondents identified network limitations as the main hindrance to information access. These challenges related to the problem of limited bandwidth, old and slow equipment. These three issues were intertwined such that respondents possibly could not isolate or draw a line between them. It is possible that some of the deterrent factors experienced were technical in nature. Therefore some respondents were not able to specify the nature of problems experienced. This is reflected by the mention of the need for more knowledge on computers and the notably low response in this area.

4.5.2 Challenges experienced in using electronic resources

The challenges experienced in accessing and utilizing electronic resources were quite related to those mentioned in the general use of ICT. These are summarized as follows:

*Table 4-9. Challenges experienced in using electronic resources*

<table>
<thead>
<tr>
<th>S/N</th>
<th>Challenges identified</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Slow computers or Internet connectivity</td>
<td>48</td>
<td>38</td>
</tr>
<tr>
<td>2</td>
<td>Finding relevant information</td>
<td>18</td>
<td>14</td>
</tr>
<tr>
<td>3</td>
<td>Frequent interruption of power supply</td>
<td>17</td>
<td>13</td>
</tr>
<tr>
<td>4</td>
<td>Restricted access to certain sites by firewall</td>
<td>15</td>
<td>12</td>
</tr>
<tr>
<td>5</td>
<td>Computers or network not working</td>
<td>14</td>
<td>11</td>
</tr>
<tr>
<td>6</td>
<td>Restricted access to full-text articles</td>
<td>13</td>
<td>10</td>
</tr>
<tr>
<td>7</td>
<td>Inadequate number of computers</td>
<td>12</td>
<td>9</td>
</tr>
<tr>
<td>8</td>
<td>Interference by computer viruses</td>
<td>12</td>
<td>9</td>
</tr>
<tr>
<td>9</td>
<td>Hardware and software incompatibility</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>10</td>
<td>Limited knowledge or awareness</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>11</td>
<td>Disabled or unsuitable storage drives</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>
Network limitations still topped the challenges mentioned. But the difficulty in finding relevant information was mentioned prominently. When this combined with the technical access barriers mentioned, information needs were not satisfied or took too long to get satisfied. Restriction to full-text articles was probably not as a result of the firewall, but publisher restrictions. A sample student response captured several of these problems: “Our Internet is slow, restricted and the computers themselves do not work plus they are few”.

Downloading of documents was affected by the versions of the software in use. The most common of these were Microsoft Office, Web browsers, media players and Acrobat Reader. For instance, most computers had Office 2003 installed, and could not open documents saved in Office 2007. The library had opted to remove Microsoft Office from most of the computers to discourage users from typing their work at the expense of browsing. This measure was taken because of the limited number of computers available for library users. Some CD-ROM drives could not read documents created by more recent CD writers. The Internet and storage devices were instrumental in spreading computer viruses. As a control measure, some of the floppy drives and USB ports were disabled. However, this limited users from saving the documents they downloaded from the Internet.

4.5.3 Low awareness levels

The study revealed low awareness levels of potential resources available to students and staff. This was more profound in the use of electronic databases subscribed to by the university. Few respondents were able to point out the reasons for the low usage of the databases. The outstanding among both students and staff was lack of awareness. The staff also mentioned lack of time and simply failing to apply effort to
access the resources. But since the majority of the respondents had indicated that they were aware of their existence, marketing of these resources had the potential of increasing their usage. Responses show that though the majority of students (61%) were aware of the existence of the online databases, less than half (42%) had actually accessed them. There may have been no strong motivation to turn to them as a source of information, both from their class activities and personal learning experience. The practice of using Google to retrieve information resources was likely to have permeated into online journals as well. Subscription to online databases did not always guarantee access to them through the use of search engines. Some of the databases were best accessed through their prescribed login procedures. Users had to be accustomed to these procedures through the use of appropriate awareness campaigns, rather than depend only on search engine results. One student summed up the problem with the use of search engines: “They do not give all information in one search and it is hard to find what I have requested, therefore wasting my time”.

The participation by Kabarak and other Kenyan universities in facilitating access to online databases to users is a relatively new undertaking. Therefore many users were yet to appreciate their value in relation to their print counterparts. The high school experience did not give them an opportunity to use online databases, and therefore influenced the information seeking pattern at the university. Likewise, the mode of learning has not embraced the use of online resources to a great extent.

Awareness campaigns for information services, according to library staff, were done through the use of emails, verbal communication, website and the use of promotional materials such as bulletins, brochures, bookmarks, and posters. This was echoed by
respondents who used online databases. Each of the communication channels played a significant role in the existing awareness campaigns as shown on Table 4-10 below.

*Table 4-10. Awareness of electronic databases*

<table>
<thead>
<tr>
<th>Source of information</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Students (N = 97)</td>
</tr>
<tr>
<td>Library orientation</td>
<td>37</td>
</tr>
<tr>
<td>Colleagues</td>
<td>31</td>
</tr>
<tr>
<td>Posters</td>
<td>30</td>
</tr>
<tr>
<td>Lecturers</td>
<td>29</td>
</tr>
<tr>
<td>Library website</td>
<td>29</td>
</tr>
<tr>
<td>Seminars</td>
<td>-</td>
</tr>
</tbody>
</table>

Though library orientation was the most popular source of information for students, this was not so for the staff. Instead, colleagues (including lecturers) played a greater role – mostly by word of mouth. Seminars played the least role. This suggests that literacy programs were limited in scope. They were either not adequately tailored to the needs of the community or were rarely organized. Library orientation was the first step to recognizing the need for information. It may not be considered as an effective means of imparting information seeking skills to students, since they had the encounter at the time of reporting. During this period, the new students were not yet introduced to class work. They were still adjusting to the university environment.
4.5.4 Low information literacy levels

Though efforts were being made to improve on the levels of information literacy of students and staff, it was generally felt that the programmes in place did not adequately achieve this. A total of 76 (78%) of students had access to a library in high school, while 22 (78%) of staff had access either in high school, college or places of work. The breakdown of the kind of resources they used in the libraries however showed that books took the lead followed by journals (Figure 4-5 and 4-6). This contrasts with the most frequently used information source at the university, which was the Internet. The staff members had a higher access level to the Internet and computers, the most likely reason being that their former places of employment offered the training and facilities. They also had higher chances of using these tools having gone through college life.

Figure 4-5. Resources used by students while in high school
The few respondents who did not have access to libraries mentioned issuing of textbook resources by their respective schools as the major means of information provision. The activities in place to educate them on how to access and utilize information in their former schools were orientation (51%), classroom sessions (22%), guides - posters, leaflets, shelf labels, notices (16%) and seminars, clubs and symposiums (9%) respectively. In the case of staff, orientation was most frequently mentioned followed by seminars/workshops and general awareness which played equally important roles.

This suggests that high school libraries were not well developed and lacked a variety of resources and facilities, such as computers and the Internet. The use of electronic resources was minimal. Most student respondents got exposed to them either when they joined the university or through their own initiatives. This quick change of activity indicates the enormous flexibility of students in embracing new technology.
The staff on the other hand were most likely influenced by the situation of the institutions they worked with or studied in before. Unlike students, most of them acquired experience while discharging their duties, and/or underwent ICT training earlier. They therefore recommended refresher courses for their productivity. This was deemed necessary due to the frequent technological changes.

The reference librarian indicated that there were programmes designed to promote information literacy among students and staff. These included on-demand guidance for individuals, library orientation, seminars and the use of guides (such as on the use of OPAC). The one-on-one programmes were thought to be the most effective of these. Seminars were rarely conducted, and there had been only one for all staff on the area of electronic resources since the inception of the university. No seminars had been organized for students. It was suggested that scheduled training sessions should be put in place for both students and staff by the library. Orientation of new students and staff in the library and other areas was the most common way of providing literacy skills, but the time allocated to them was inadequate. Therefore their scope ended with the existing facilities and services with no exploration of information available in a variety of sources and formats. It was a way of introducing the new students to the existing services in the university. It promoted awareness of the available services and resources. But it did not expand the users’ horizons to the sea of information available globally and the required tools and skills in accessing and utilizing information.

The university offered common courses on the use of computers, communication skills and research methods to all undergraduate and pre-university students. The course outlines for communication skills in particular did not reflect a standardized
approach. Specific library skills for instance varied across curriculums, and were not taught by librarians, except in isolated cases when individual lecturers made arrangements with the library staff.

4.5.5 Challenges relating to library services

The library staff pointed out a few challenges that were specific to library services. They included the following:

i) Lack of effective guiding policy on the provision of information

ii) User attitudes in seeking information. Most users preferred the shortest way possible to obtaining information, and do not necessarily consider any help from the library staff.

iii) Failure to get the required resources in the library due to theft or misplacement of resources. Users could access bibliographic records of some items in the catalogue, but failed to find them on the respective shelves.

iv) Lack of adequate funds to acquire a variety of information resources and equipment.

4.6 Respondents’ perceived means of improving access to information

The suggestions for the improvement of access to information directly related to the access problems highlighted by the respondents. The following were the suggestions given:

4.6.1 Improvement of ICT resources

A greater proportion of student and staff respondents viewed improvement of Internet bandwidth as the leading priority in accessing information. This is followed by
increasing number of computers, upgrading of hardware/software, and improving awareness of resources, which are of relatively similar importance.

Table 4-11. Suggestions on use of ICT resource

<table>
<thead>
<tr>
<th>S/N</th>
<th>Suggested solutions to use of electronic resources</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Improve on the network bandwidth</td>
<td>31</td>
<td>24</td>
</tr>
<tr>
<td>2</td>
<td>Increase number of computers and support facilities</td>
<td>19</td>
<td>15</td>
</tr>
<tr>
<td>3</td>
<td>Upgrade software and hardware</td>
<td>14</td>
<td>11</td>
</tr>
<tr>
<td>4</td>
<td>Improve on awareness of resources</td>
<td>13</td>
<td>10</td>
</tr>
<tr>
<td>5</td>
<td>Avail resources on the LAN</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>6</td>
<td>Improve on variety of resources, e.g. audio-visuals, e-books</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>7</td>
<td>Minimize interference by firewall</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>8</td>
<td>Improve on accessibility of articles in databases</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>9</td>
<td>Develop friendly user guides and manuals</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>10</td>
<td>Promote e-learning</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>11</td>
<td>Expand computer network, especially wireless network</td>
<td>1</td>
<td>0.7</td>
</tr>
<tr>
<td>12</td>
<td>Have lecturers participate in sourcing of quality information</td>
<td>1</td>
<td>0.7</td>
</tr>
<tr>
<td>13</td>
<td>Enable the functioning of storage devices and drives</td>
<td>1</td>
<td>0.7</td>
</tr>
</tbody>
</table>

Access to and availability of computers had an influence on access to electronic resources. The more the computers were available, the more likely the problem of inaccessibility of electronic resources would be solved. This could translate into increased use of electronic resources in the university.

The ICT staff also proposed the need to have useful resources organized and shared on the local area network in addition to the e-learning to facilitate wider access. This may take the form of a digital repository. Additional proposed improvement measures were upgrading of hardware and software, network expansion.
4.6.2 Design of information literacy programs

The respondents perceived the following areas as being part of the existing information literacy activities in the university.

Table 4-12. Existing activities that promoted information literacy

<table>
<thead>
<tr>
<th>S/N</th>
<th>Activity/source</th>
<th>Frequency</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Students (N = 97)</td>
<td>Staff (N = 30)</td>
</tr>
<tr>
<td>1</td>
<td>Common courses (Communication skills and computer applications)</td>
<td>19</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>General awareness (notice boards, email, posters, displays, etc.)</td>
<td>17</td>
<td>5</td>
</tr>
<tr>
<td>3</td>
<td>Website and library online catalogue</td>
<td>17</td>
<td>-</td>
</tr>
<tr>
<td>4</td>
<td>Orientation</td>
<td>16</td>
<td>5</td>
</tr>
<tr>
<td>5</td>
<td>Social interaction (seminars, symposiums, open forums, group discussions, peer counseling)</td>
<td>16</td>
<td>4</td>
</tr>
<tr>
<td>6</td>
<td>Personal/hands-on experience</td>
<td>11</td>
<td>-</td>
</tr>
<tr>
<td>7</td>
<td>Library reference services</td>
<td>7</td>
<td>-</td>
</tr>
<tr>
<td>8</td>
<td>Guides, such as shelf labels</td>
<td>3</td>
<td>-</td>
</tr>
</tbody>
</table>

The activities contributed towards promoting general awareness of existing resources, provided skills for searching and utilizing the required information. The roles played by most of these activities were of fairly the same importance, since they were given nearly the same weight by the respondents. However, fewer respondents could identify the role played by the library reference services, despite its contribution in some of the other listed answers, such as sending emails and notices. The above activities relate to those that existed in the previous school, though orientation took the lead (51%), followed by classroom activities (22%), guides (16%) and social interactions (9%) respectively. These responses point to the importance of marketing in promoting the use of information.
In order to improve on use of ICT and facilitate the use of resources, the following areas were suggested by students for inclusion in literacy programs in the order of popularity.

Table 4-13. Suggested areas for literacy programs

N = 97

<table>
<thead>
<tr>
<th>S/N</th>
<th>Suggested areas/topics</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Computer basics and applications</td>
<td>26</td>
<td>27</td>
</tr>
<tr>
<td>2</td>
<td>Use of online/electronic databases</td>
<td>18</td>
<td>19</td>
</tr>
<tr>
<td>3</td>
<td>Searching and evaluation techniques</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>4</td>
<td>Network basics</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>5</td>
<td>Basic PC maintenance</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>6</td>
<td>Programming basics</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

Respondents viewed that the basic use of computers was the most required area for inclusion in information literacy programs. This took the lead despite the offering of basic computer training courses for all students during the first year of study. This suggests that the introductory course provided the skill to operate computers, but more guidance was necessary to enable users harness them for information access. Training needs expressed by the users reflected a kind of frustration in attempting to get the required information. The training did not provide the necessary skills to optimize the performance of the computers and the Internet.

4.6.3 Improvement of library services

Some proposals were given by the library staff concerning ways of improving information access through library services. These are summed up as follows:

i) Putting guiding policies in place to guide information service provision in line with the changing needs and technologies. These suggested the need to revise...
staff job descriptions and re-positioning to meet the increasing demand for electronic resources.

ii) Installation of a security system, preferably RFID system to minimize the loss of library resources.

iii) The use of mobile devices to pass information to users. An example is the establishment of a short message service (sms) for updates, such as fee payments, examination results and availability of information resources.

iv) Allocation of funding towards the acquisition of a variety of resources, such as multimedia information sources.

4.7 Proposed model for a hybrid information service

Based on the findings of the study, the researcher proposes a combination of the components presented by the two models by Leckie and Tsakonnas for use in a hybrid setting.
Figure 4-7. Proposed information access and use model

In this model, the outcomes of the information services form the central focus. Outcomes are indicators of the extent to which a user is able to access the required information and utilize it to perform tasks or solve problems at hand. In a university setting, these include quality research output, class assignments, professional improvement, improved service delivery and effective community outreach. These are influenced in an inter-related manner by factors such as information literacy levels, usability of the information system in place, content and user characteristics.
The user’s experience or expertise determines the success in retrieving and evaluating content. Information literacy imparts this skill and improves on the outcomes. However, the system should be designed in a manner that it outputs content in a manner that suits the user’s preferences. Feedback mechanism from the outcomes links with the influencing factors. Feedback for instance may suggest the need for improvement or re-designing of information system, literacy programmes or the type of content that is most appropriate to the end user. It can also act as an indicator on the level of awareness of the characteristics and needs of the users.
CHAPTER FIVE

5.0 SUMMARY OF MAJOR FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter highlights the findings of the study with a view to arrive at logical conclusions. The section presents a summary of the information needs of students and staff, available information resources, channels of accessing information, the nature of skills required to effectively access information and the challenges experienced by students and staff in accessing information. Based on the findings of the study, it further provides recommendations that can be helpful in improving access to and utilization of information by students and staff at Kabarak University.

5.2 Information needs

The nature of activities tended to reflect the nature of information required by students and staff, and gave little room for the seeking of a broad range of information. Students were more concerned with resources for the courses they undertook, while staff needed information that solved work-related problems. Users tended to have less time for information seeking activities. This concurs with the summary by Forsha (1992), as quoted by Wainwright (2005:9): “people want what they want when they want it. They don't want something else, they don't want less than they want, and they certainly don't want it at some other time.”

The findings of the study on the sources of information revealed a similarity with those conducted among sister institutions in Kenya, namely Jomo Kenyatta University
of Agriculture and Technology, Nairobi, Kenyatta, Strathmore, Daystar, Catholic, African Nazarene and Kenya College of Accountancy. The study had revealed an increased appetite among students for the use of the Internet, though the level of expertise on its use was found to be low. Students tended to turn to the Internet more than any other source, followed closely by the library. There was an overlap in these findings in that the library also provided Internet services. Though books and other print resources were a major source of academic resources, the Internet led in usage for a variety of reasons other than academic, such as correspondence, leisure and general knowledge. The popular usage of the Internet had less connection to academic or research activities, but related more to the current lifestyles and information seeking habits. The Internet offered a variety of exciting features and activities. In addition, students opted for easier methods of getting information for their coursework, such as through the use of search engines. These usage trends provided an opportunity for the provision of academic resources to the users in the level that matches with their seeking habits. This survey showed that though Internet usage was higher than that of print resources, users mostly used print resources in the library. While this was partly attributed to the few computer facilities available in the library, it pointed out the fact that users browsed the Internet in other places such as computer labs and offices. Print resources on the other hand did not lose relevance in satisfying academic needs. Hybrid services therefore stood out as a viable option. This approach advocates for the provision of information resources in print, electronic and any other appropriate format.
5.3 Information resources

Electronic resources topped the sources consulted by students and staff. However, though the majority acknowledged using electronic resources, about half of them accessed databases subscribed to by the university. Some of these databases may have been relevant to their needs, but the awareness of their existence and content limited their exploitation. Users therefore preferred using search engines and visiting familiar sites to retrieve free resources on the Internet.

Print resources were the most consulted for academic purposes, with books taking the lead. The usage of audio visual resources was on the lower side. However, the choice of the format did not appear to be a conscious decision, but more on the relevance of the information and the carrier that embodied the required information.

5.4 Information access channels

Accessibility was a key factor in the choice of access channels by respondents. The more immediate and cost-effective solution to information access in the university was viewed by respondents as the use of ICT. Computers were the most commonly used ICT resources, and the Internet was the most widely utilized resource for a variety of reasons, such as academic, correspondence, leisure and general knowledge. However, low bandwidth hampered effective access to the Internet. Alongside the need for broadband services, respondents proposed the need for addition of computer facilities and network expansion to enable students and staff with personal laptops to utilize Internet resources and utilize library services beyond the opening hours.

All the respondents visited the university library for a variety of reasons, the leading of which was to consult diverse information resources. The quality of library
resources was generally considered to be higher than other resources respondents consulted during their studies or work assignments.

5.5 **Skills required to effectively access information**

Several skill requirements were expressed by the respondents. These are summed up by the need to have enhanced information literacy programmes. The programmes at the university were not adequately designed, while the literacy level was low. This problem was as a result of the inadequacy of literacy programmes in secondary schools especially among the students. Most of the respondents had access to a library in high school or their previous place of employment. Most students however accessed books that supported the syllabus, magazines and newspapers, but few had access to electronic resources and the Internet. Several students had their first computer courses at the university. Thus the need for training beyond the general computer course, communication skills and research methods was expressed. The wish to have training in basic computer usage suggested that the general course offered by the university did not reach the level of imparting skills required to effectively utilize electronic resources. Only those who did computer and information technology courses were advantaged. One way of capturing the major information literacy aspects required by a student in the university is through the mainstreaming of information literacy in the main curriculum. This will incorporate aspects such as communication skills, computer literacy, library literacy and information searching skills to mention but a few. This is already the practice in many countries such as the United States, Australia, New Zealand, Scandinavia, Canada, United Kingdom and Netherlands. But as suggested by Dadzie (2007), information literacy programmes in developing countries like Kenya must be developed to suit specific needs and the local environment.
Literacy programmes should be accompanied by the provision of adequate ICT resources for wider access by students and staff. Hands-on opportunities enhance literacy levels and provide efficiency to the developers of literacy programs by way of blending theory with practice. There is a possibility of obtaining different results for ICT usage patterns if a variety of these resources are made available to users. This may result from increased ICT adoption by users to satisfy their information requirements. A wider variety of information resources might also be discovered and hence consulted. Though the increase in the use of personal laptops may be attributed to technological developments and falling prices, it was also a deliberate attempt by users to acquire tools for accessing information. Laptops enabled students to do assignments using word processing tools and access the Internet.

Both teaching and non-teaching staff in particular did not have any organized orientation schedule when they joined the university. They did not have a chance for guided tours. This negated their role in imparting information literacy skills and promoting awareness of information sources among students. Students did not adequately access the information they required due to insufficient mentoring from the teaching fraternity.

5.6 Major challenges experienced in accessing information
The major setbacks identified in access and utilization of information included the following:

i) Poor communication infrastructure. Low bandwidth and frequent network breakdown was the leading problem in the use of electronic resources.

ii) Inadequate ICT resources, especially computers.
iii) Inadequate support facilities. These include power back-up, printers, scanners and photocopiers.

iv) Low information literacy levels. The key problems related to computer literacy and use of online resources.

v) Low awareness levels for the available resources and services.

5.7 Summary

This study revealed that access and utilization of information at Kabarak University was hampered by several factors. The user community faced a transitional period when digitization of resources and an increase in the use of ICTs to access and utilize information was becoming a reality. However, poor communication infrastructure and limited facilities, the difficulty in locating the required information, limited information resources, low information literacy levels and dynamic user environment were the main challenges experienced. Several strategies to alleviate the problems were suggested, the leading being the improvement of network infrastructure and computer facilities. The study showed similar results as those conducted in some of the Kenyan universities, especially in the area of popular usage of Internet resources and the use of search engines for information searching. It also revealed that the institution was in a transitional period whereby the older generation of students and staff required more guidance in the use of ICT, while the ‘millennials’ were gradually forming the larger user population. Hybrid information services appeared to be the most preferred approach, whereby both print and electronic information resources complemented each other.
5.8 Recommendations

Based on the findings of the study, the researcher recommends the following:

5.8.1 Repositioning by information professionals

Information managers at Kabarak University are faced with the challenge of re-defining their role in information provision. Conventional skills acquired in training institutions alone do not provide solutions to the user requirements and improved information access. Development of conceptual, technical and other skills are necessary among information service staff – whether through formal training, hands-on experience or other personal informal learning initiatives. They can in turn assist users in using access channels such as ICT resources and facilitate on-demand provision of information. Some of the available opportunities for the staff include:

- Enrolling in relevant courses, such as education, learning technology, web technology and marketing.
- Keeping up to date through channels such as e-mail lists, discussion forums and blogs
- Establishing a close network with colleagues in the same profession and other professions that are relevant to information sciences
- Attending relevant conferences and seminars
- Consulting a wide variety of literature in information sciences.

Job descriptions and roles must be adjusted to meet the changes in tasks that are to be performed in the dynamic environment. Information professionals must also venture into user spheres to understand their possible role in offering assistance to them without necessarily interfering with the users’ privacy. Professional flexibility is
critical, especially in this era when the role of academic libraries is rapidly changing. Librarians must also embrace Web 2.0 tools and other necessary developments that are popular with the modern information seekers. Whereas traditionally the roles of academic libraries in information provision were unchallenged, today they have to take a business-like approach to take the lead in relevance. The mentality however should not be that of the survival of library profession, but provision of solutions to new challenges in the information science field.

The goodwill enjoyed by the library is a golden opportunity to keep up to date in information service provision. This is reflected by the overwhelming number of users who visit the facility, mostly to utilize its collection, photocopy documents or browse the Internet.

5.8.2 Acquisition of the required ICT resources

In order to reap maximum benefits from the information resources available internally and externally, the university needs to harness ICT in most areas of its operations. These include the following:

- *Installation of a library security system.* To minimize the loss of resources in the library, an efficient system is required. This enables users to find most of the resources that are indicated in the catalogue. The researcher recommends RFID system due to its high detection rate and other enhanced features such as stock taking. For enhanced security, this blends well with the use of CCTV system. Any convenient security check, such as the use of biometric system at the key entry points may suffice. However, the university should remain open to more efficient systems that may be developed in future.
• **Management and campus-wide dissemination of digital information resources.** This is covered by other recommendations given in this section.

• **Optimal use of integrated systems.** Library automation aims at enabling the library to offer its services with less human intervention, thus reducing manpower requirements while improving service quality and extending operating hours. The library system as much as possible should be integrated with any other system the university may install to facilitate the sharing of data and wide provision of services. The key areas include admissions, finance, human resource, e-learning, catering and accommodation. All features in the library software that are beneficial to the users should be harnessed and customized to satisfy the local needs.

• **Acquisition of additional computers.** Computers form part of information resources. Users require computers that offer capabilities for retrieving information at high speed, storing information, presenting the information in the desired formats, safeguarding retrieved information and widely sharing the information among other features. Computers should be seen as equally important as the conventional information resources such as books and journals. They are the medium for downloading the vast information resources available over the Internet as well as managing the information efficiently. The Internet as a tool for information retrieval may be a solution to some of the problems relating to access. The university has the potential of satisfying student and staff needs through the provision of Internet services. As such, yearly budgets should cater for their acquisition and improvement if high academic standards are to be maintained. The user interface with the computers should also be considered. The university has the option of moving
from the currently used Cathode Ray Tube (CRT) to a friendlier screen such as the Liquid Crystal Display (LCD). CRT displays glimmer and their high radiation cause the eyes of many users to feel tired easily, especially old users who have got used to paper. The LCD monitor has many advantages such as small bulk, low power costs, low radiation and no twinkle, and is easier for tired eyes (Qunqing, 2004). The small user population that mentioned health related problems when using ICT will then experience more comfort.

Adequate power supply and network terminals should also be availed at strategic places.

- **Acquisition of support resources.** Examples are scanners, cameras, photocopiers and printers. Cameras facilitate the capturing of important events such as presentations, seminars and spiritual programmes. These can be archived and made accessible in digital format via the university network. Printers enable users to utilize downloads at their own convenient time. They cater for the needs of users who prefer the printed version of documents.

- **Provision of support services.** Apart from having the required resources in place, the university should ensure that they are mobilized to provide the required services. Facilities that support inputs to and outputs from learning should be made accessible to users. These include writing materials, paper, CDs/DVDs, flash disks, photocopying and printing services. Their easy availability save the time and expenses users would have otherwise incurred looking for them and enable them to efficiently utilize the information contained in the respective media.

A good internal ICT policy guideline should be in place to ensure that students and all categories of staff have reasonable access to ICT resources. It also creates a culture of
utilizing ICT in handling a number of daily activities. Training requirements and procedures for students and staff should be included in the policy. The policy should be revised from time to time to cater for the rapid developments in the ICT sector.

5.8.3 Organization of local content

Many of the manual, repetitive tasks that initially consumed most of the library staff’s time have been streamlined through the use of integrated library systems. In fact, library automation aimed at improving efficiency in routine operations, such as circulation of items, report generation, stock taking and cataloguing. The staff in the library, in collaboration with the ICT department and content providers should then work towards organizing information that is not easily accessible through conventional publishing. This way, information services are customized to meet the local needs as well as share content with the rest of the world in the most economical manner. This is justified by the fact that substantive information sources in Developing countries are in grey form. Such sources include research outputs in form of theses and dissertations, reports, conference papers, inaugural speeches, administrative documents, past examination papers, open courseware and journal articles.

The already-established LAN infrastructure in the university provide adequate framework for content organization and dissemination. The infrastructure however is a channel for content delivery, and will not by itself satisfy the information needs of the users. The content must be selected and packaged prior to delivery. This requires intellectual input and wide consultation among all stakeholders. Support from the university’s management in areas such as development of governing policies, allocation of human, technical and financial resources is required. Scanners for
instance are critical in the digitization of documents. Policy issues in particular provide guidelines on the resources for internal use and those meant for general consumption.

5.8.4 Setting up of an institutional repository

Much of the information available in print format is now available in electronic format. The Internet has made it possible to manage and share digital resources worldwide, while these resources are increasingly being utilized in learning institutions. This advantage has prompted many institutions in the world to set up digital repositories. Once the university has well organized local content, its dissemination becomes of paramount importance. The available open source software for the development of repositories, can be considered, but must insist on those that support the latest Open Access Initiatives metadata harvesting protocols. All departments in the university can play a leading role in uploading all relevant content on the LAN, and appropriate information shared with other institutions. Efforts should also be made to regularly update and maintain the repository.

The library department should spearhead the development of the repository. This is because librarians already have the skills and experience in the organization, storage and dissemination of information. Their role in the university involves the provision of information services to support teaching, learning and research. Librarians are also in a position to consult widely on legal aspects of information. They should work with other departments that generate the relevant content or have the technical skills to set up and maintain the repository. These include information technology staff, administrators and academics. Storage does not present a major problem as a result of technological advancement and falling prices of mass storage devices such as hard
discs in the market. Focus on digital repositories is worth the consideration bearing in mind that many institutions in the world have institutional repositories in place, or are in the process of setting them up to enhance wide access to information. Considering the benefits of open access, Chang (2003) opines that libraries could provide direct access to scholarly publications via these repositories instead of via serials publishers and vendors. The serials crisis that has long impeded library operations of all sizes would be relieved to a great extent. Libraries would consequently spend less time dealing with subscription issues.

Since many users were familiar with the use of search engines, content developers cannot afford to ignore their role in information retrieval. Popular search engines can be harnessed to retrieve local content as well. It is not easy to radically change the users’ pattern of information seeking via the search engines. But it is beneficial to the users if content is brought to their attention through the search ‘hits’. Digital repositories present the additional advantage of availing full text of the documents to users. It is an improvement of the OPAC, which has largely been criticized mainly for providing bibliographic details. The OPAC has not been popular with the ‘Google’ generation that wants answers and easy navigation. They don’t want to have to go to the library to fetch things (de Jager, 2007).

Ultimately, the university will have the option of enabling access to this content through users’ handheld devices. On a wider scale, all universities in Kenya should pursue KENET’s objective of developing and organizing local content for the benefit of all learning institutions. This contributes in saving the time wasted by the ‘Google’ researchers in obtaining the required content. In the case of repositories for instance, outputs that were previously visible only to those who had access to academic
journals through subscriptions are exposed to Google and other Web search engines. Collaborative provision of research information in fact leads to improved research activities, which yield better results. It is foreseeable that in the long run, collaborative dissemination of information will be a reality across all sectors, including government departments, private organizations and educational institutions.

5.8.5 Utilization of e-learning resources

The role of ICT in education cannot be overlooked. E-learning plays a role in improving the quality of teaching and learning. The Moodle e-learning platform already in place is under-utilized. Efficient utilization of digital academic/course resources is possible if users are conversant with the use of the platform. Apart from the advantages of efficient and secure delivery of the content, e-learning cuts on the costs otherwise incurred on printed handouts. A wider variety of content can therefore be posted, including notes, manuals, digital versions of book chapters and journal articles. This can simplify and supplement the role of class reserves in the library. It minimizes the inconvenience caused by the limited access to resources on the library reserve shelves which are governed by the loaning times and library opening hours. It is also cost-effective. Users have the option to download the content to their laptops for use at a later time, rather than making photocopies of the print version.

The use of electronic reserves is not a new concept. In the US and UK for instance, electronic reserves services have been running for a number of years. Core readings are copyright cleared (where necessary), scanned and made available to users via a network (Secker, 2004). Access is limited to members of the university using an authentication system to prevent external users from gaining access to copyright controlled materials in the collection. There are various approaches to the
establishment of course reserves, and the choice will largely depend on ease of use and the most effective tools available for the task. Some of these include:

- Using features within the library management system.
- Using ready-made electronic reserves systems, such as ERes and DocuLib.
- A combination of approaches, such as creating links in Moodle to course materials.

A similar approach can also be used for the management of reading lists. The practice of e-learning does not end with the use of one kind of software, but the use of ICT as a vehicle for teaching and learning. The benefits of e-learning go beyond the university set up. Learners are equipped with the necessary experience to improve their careers later in life through e-learning programmes. The teaching fraternity therefore must lead the way in encouraging their students to utilize e-learning. They should avail content on the e-learning platform in collaboration with the ICT department. The ICT department has a role to play in educating all users on the benefits of e-learning and impart the required technical skills.

5.8.6 Development of an operational portal

Following increased use of digital resources, it is important to provide an easy way for users to access the resources. Users do not find it convenient to keep a record of the addresses (URLs) to various resources on their own. The presence of various access tools and services that are underutilized and uncoordinated create a confusing scenario for the end user. These include the e-learning platform, university website, reference services page, OPAC and the proposed institutional repository. A portal that facilitates the convergence of all these tools provides the user with a ‘one-stop shop’ for most of the immediate services while retaining the uniqueness of features of each
tool. Perhaps in future the library’s OPAC may take the full features of a portal. It is a more viable solution to the user frustration of relying entirely on familiar search engines such as Google, missing out on a lot of other relevant quality information resources. A team should also be made in charge of the portal and all other access tools. The team ensures that the portal is up to date and contains the required content. The main university website in particular is less dynamic and risks being neglected as an important source of dynamic information. This calls for the need to have a staff member in charge of updating the website.

5.8.7 Customization of access to online resources

There are various access models for online databases. The approach commonly taken for access to PERI resources is the country-wide license. It involves the registration of an institution’s IP addresses and provision of usernames/passwords for authentication. The IP address approach in most cases limits access to the institution’s local area network. The proxy server in this case acts as the gateway for access. In order to facilitate access to resources by non-resident students and staff, it is recommended that a combined approach be negotiated with the database vendors. In this case, IP authentication serves best for users who access the resource whilst on the university network. The username and password combination serves as the access mechanism for those users who wish to access the resource from outside the university. Another approach is the use of shared access tokens, as it is applied for databases such as JSTOR archive. A user follows an access token link and registers for an account. An additional option is the use of a remote logon script that can be used by the university for off campus users. These and other emerging options will enable users who access the Internet through other service providers (such as mobile phone service providers) to download articles from online databases. A similar access approach works well
with other e-resources that are restricted to the university community. These include e-learning content, selected repository resources and other LAN resources. Remote access to digital content become increasingly important to postgraduate students who spend less time within campus and perhaps juggle employment with studies. An access policy is required to guide on the categories of resources for internal use and those meant for use by the general public.

5.8.8 Setting up of a multimedia resource centre

Library services are rapidly evolving to cope with the pace of technological advancements. Most multimedia resources are taking the digital form. The convergence of these formats makes it necessary to have tools that facilitate their usability. A library multimedia resource centre comes in handy to assist users in accessing and utilizing online resources, CD-ROM and DVD-ROM resources, Multimedia support services such as CD writing, playing music or video, educational presentations and e-learning. The multimedia centre requires the installation of basic support software and hardware and a staff in charge. The resource centre enables the library to combine several services that were offered in its different sections before. Some of the reference services are easily offered digitally at the resource centre. It acts as a convenient venue for information literacy sessions. The audio-visual section provides its services at the centre. Users access online databases, digital library, e-learning and repository resources at the centre as well. The terminology used for this facility may vary, while its approach to service provision will be determined by the user requirements. The “information commons” as discussed by Jones (2006) for example require these multimedia facilities along with the necessary rooms.
5.8.9 Bandwidth management

Users require broadband services. But bandwidth is an expensive resource that should be utilized in the most economical way possible. The institution is faced with the problem of low bandwidth. The university should strive to improve on the network infrastructure in order to improve access to online resources. The prospects for improvement of bandwidth are positive in that the price of bandwidth is gradually falling. There are prospects of using cable connection in future as opposed to the more expensive satellite connections. Various reasons have been given as to why universities will need to increase their bandwidth from time to time:

- Student numbers tend to grow, and universities increase the number of computers they own.
- The volume of resources on the Internet keeps growing, and tends to become ever more bandwidth-hungry.
- New services on the Internet, such as streaming media, may present new opportunities for education, though it is also possible that streaming media will prove to be useful for entertainment only (INASP, nd).

In addition, attention should also be paid to the bandwidth allocation to users within the institution. Prioritization and network traffic considerations are key areas to effective utilization of the Internet by an institution of higher learning. Areas that heavily use the Internet, such as the library should be allocated more bandwidth, compared to offices. The ICT department should also carry out an assessment of areas where users conveniently use their personal devices to browse the Internet or use LAN resources. Owing to the increased use of laptop computers for instance, residential areas and classrooms are among the likely areas that require network
coverage. The reality of the provision of information services ‘anytime, anywhere’ will then become a reality.

Bandwidth management also involves discouraging access to less relevant sites that may unnecessarily congest the network. It also involves efforts to regulate access to sites considered useful by users, such as social networks. Alternative provisions could be made where possible. For example, it may minimize bandwidth wastage if the university’s email facility (WorldClient or any other chosen by the university) is optimized rather than having users visit sites such as Yahoo! or Microsoft Network (MSN). Bandwidth management reduces underutilization of the resource. For example, during the weekends, residential areas and other areas where Internet may be required could benefit from the low traffic through appropriate bandwidth allocation. Unused bandwidth is a waste of financial resources.

The university could consider using software to manage bandwidth, maximize network security as well as apply relevant usage policy. It is noted that bandwidth can also be consumed by activities on the network. These include applications and behaviours such as email spam, viruses, computer hackers and spiders. Appropriate measures such as server security, firewalls and virus protection are required. With advancements in network technologies, it is almost certain that in the near future, bandwidth limitations in general will be brought to the minimum.

5.8.10 Design and implementation of appropriate literacy programs at the university

Regular literacy programs should form part of the university ethos. Collaboration between the library, faculty, student affairs, human resource and other departments is necessary in identifying relevant literacy programs and scheduling them in the main
curriculum. As a minimum, a consistent staff member is required in information service points to assist users in accessing information whenever required. Members of the teaching staff in particular are critical stakeholders in literacy programs because they impart considerable skills and habits to students. They can utilize resources such as the e-learning module to deliver content and frequently communicate to students via email. Literacy programs become increasingly important as the university increasingly utilize digital resources. But as a starting point, the literacy programmes for the faculty must be planned and carefully implemented. They should be trained as trainers.

Though the existing literacy programs such as communications skills courses have been criticized for being exam-oriented, the impact can also be seen to be largely dependent on how well they are coordinated. An on-going strategy to introduce information literacy as a course in universities has the potential of positively influencing students. Arguably, all careers are hinged on training followed by examinations for students. Similarly, examinations for information literacy programs are capable of producing the desired results. The course however should be carefully developed and regularly reviewed by all stakeholders if it is to impact the lives of the students beyond the university life. It should not limit itself to one level of training, but cut across the entire learning programme in the university. The university offers regular courses in technology and has the necessary human and infrastructural resources to implement ICT literacy programs.

The “millenials” are partially here. Though this generation is gradually permeating into the university population, it is too early to categorize all the younger students as millenials. This is because a number of students were not able to interact with
computers and other ICTs from an early stage due to socio-economic setbacks. However, they quickly identify with the new generation when they interact and get exposed to ICT resources. A number of students in the new generation have personal laptops and other ICT resources. In order to cater for the needs of this generation, libraries should consider tailoring their literacy programs in line with their characteristics. As suggested by Makori (2009) and other authors, libraries will need more group study space and tolerance for a slightly higher noise levels. Libraries should design tutorials with a game-like feel to interest as well as educate this group. The bottomline is to have interesting and interactive sessions that leave long-lasting impressions on students and staff. This, however, does not take the place of the need for intensive research and effort required for high quality educational output as well as contribute towards innovation.

There were low ICT literacy levels despite the existence of formal training programmes in the university. The usage of certain resources such as PDAs was less popular among most users. ICT literacy goes hand in hand with hands-on experience. Therefore, the university should strive towards reducing the ratio of available ICT resources against the number of students and staff. The more users are exposed to ICT resources, the higher the likelihood that they will utilize them to solve their day to day problems. The older generation in particular, especially students in the school-based programmes require hands-on experience, since many secondary schools in Kenya do not have the required computer facilities. The millennials require an expansive and reliable network in places where they prefer browsing, such as the hostels, library or social areas. The model for digital library interaction suggested by Tsakonnas [et al.] highlights the framework for successful use of ICT in information access.
5.8.11 Imparting information literacy in schools

Information literacy is a lifelong learning experience. It is more effective if the process begins at an early stage in life. It is therefore recommended that the country’s primary and high school curricula incorporate basic computer courses, so that students are able to utilize them in university level without the need to undergo basic training again. This will go a long way in solving the ICT literacy problems experienced at university level. Current initiatives in promoting the use of ICT in schools should be encouraged and supported by the schools and the ministry in charge of education. These include the New Partnership for Africa’s Development (NEPAD), Kenya ICT Trust Fund, Computers for Schools Kenya (CFSK) and Rotary Club among others. They mainly provide computers to schools. The government of Kenya on the other hand through the ministry of education has a role to play in curriculum development and policy implementation. Likewise, parents should be encouraged to support their children in acquiring the tools literacy rather than wholly depend on college or university programmes. These include basic training on computer applications and hands on experience in the case where parents own technological resources such as computers.

5.8.12 Promotion and strengthening of Open Access (OA) initiatives

The rise of library and other consortia in the country is a major step towards championing the interests of information consumers and generators. The first notable achievement is the negotiation of subscription costs and access rights to databases with vendors. This was an effort to address the serials crisis, and can be seen as the first step in improving access to scholarly journal articles. The second step at present focuses on consortia efforts to promote free access to information by backing up the open access movement. Members of consortia such as KLISC have the opportunity to
agree on publishing their institutional research output on their institutional repositories and remove any access restrictions. Library consortia can speak collectively to policy makers in respective institutions to facilitate resource sharing. They then will stand a good chance of airing their OA concerns globally.

One way of supporting the OA ideals is by uploading locally available content such as e-prints on the institutional repository. In order to promote the exploitation of these resources, channels such as the Directory of Open Access Journals (DOAJ) are worth considering. This is a comprehensive list of Open Access journals in all subject areas and is maintained by the University of Lund. All efforts should be accompanied by appropriate education. Information professionals in particular should seize every opportunity to inform faculty members on open access movement, the trends of open access publishing, and increasing governmental and organizational support for institutional repositories. Copyright issues and the benefits of OA should also be made clear to all stakeholders.

5.8.13 Marketing of information services

Information literacy is enhanced through marketing of information services. Users should be made aware of potential resources that can satisfy their needs. The survey does not single out one ideal method of promoting awareness. Instead, activities of each category of users suggest the likelihood of receiving updates. The more diverse the channels, the more likely it is for the users to become aware. Information service providers should create as many pointers to information as possible. Non-traditional channels such as social networks and Web 2.0 tools in general offer one such option. For instance, the application of RSS feeds in libraries provides updates on new items or resources available for the patrons and enable them to have a single library page
that syndicates all library content that interests them (Aharony, 2009). The networks enable the library to reach the “millennials” where they are, rather than wait for them to come to the library. They also encourage feedback and acknowledge patrons as partners in the search for information. It is almost certain that these networks are here to stay. They will only be improved, and the nature of interaction will be dictated by technological innovations as well as users’ lifestyles. With improved bandwidth for example, user access restrictions to certain popular and useful websites by the firewall may need to be minimized. Other methods such as websites, brochures, posters, RSS summaries, newsgroup feeds, email alerts, orientation and personal contacts are equally important.

An overwhelming number of the respondents (100%) visited the library according to the study. This has a direct bearing on the nature and effectiveness of marketing of information services. The high frequency of library visits is an opportunity for reaching out to them. It is an indication that users still have reasons for visiting the facility, and as the survey shows, they value library resources. Great care should be made to retain the existing customers and ensure that services are customized to meet their needs. It should also be viewed that the library visits could indicate resource deficiency on the part of the users. Rather than accessing resources remotely, users have to physically visit the library. Others visit to make use of the network which is concentrated within the library building. Still others do not have personal devices such as computers and utilize library computers.

The dynamic nature of user needs and information seeking patterns make it necessary for information providers to carry out regular audit. Relevant surveys and consultation with staff and students assist information providers in designing customized services
that are in harmony with user activities. The library is strategic in these surveys due to its huge investment in information resources. For instance, this survey revealed that the majority of students and staff use mobile phones in their daily activities. These gadgets have the potential of being used as alternative vehicles for information dissemination to supplement the already-constrained computers. Unlike the popularly used radio and television channels whose content is controlled by the vendors, it is easier to locally deliver content via mobile phones. Examples are updates on fee payments, announcements, library reminders, current awareness and examination results to mention but a few. Many of the recent models of mobile phones have the feature for accessing the Internet. These can be used as vehicles of transmitting academic content to users – at least more practically in the near future. User studies may also take the form of simple feedback mechanisms such as suggestion boxes, response mail or personal visit. These facilitate the provision of short-term solutions to user needs.

5.8.14 Maintenance and updating of resources

After the initial investment on information resources, continuous effort is required in maintaining and updating them. These include hardware (computers, network), software (antivirus, application programs) and information resources (print resources, websites, portals, database access rights, e-learning content, repository). Annual budgets should cater for these requirements. Someone should be available to assist in basic troubleshooting tasks, such as updating software, configurations, virus scan, repairs and making follow-up on subscriptions. Such assistance gives the user the opportunity to access information without experiencing distractions from defective hardware, unavailable or inappropriate software or unfamiliar configurations. As suggested by the nature of problems experienced in using ICT, users do not have the
time, rights and sometimes the skills to fix these problems during their information seeking session. Staff negligence on this matter is also likely to create an uncomfortable environment for the information seekers who may shy away from using the resources. These are a form of ‘noise’ in the communication process, and concerted efforts should be made to minimize them.

5.8.15 Provision of power back-up facilities

Though it has been noted that reliable supply of electricity for the most part is beyond the control of the university, the institution has a role in minimizing inefficiency and the loss of information as a result of power failure. Power back-up systems are required for most, if not all the computer terminals. The university can also consider various options for power back-up, including having a reliable power generator. Reliable power supply is particularly critical for e-learning activities. Power interruption may lead to unnecessary re-scheduling of sessions or interference with the communication infrastructure. Frequent power failure wastes time for computer users who have to restart the machines and programs or sites they were using. Some of the ICT resources have also been damaged by power related problems. Power failure interrupts network downloads and to a large extent discourage users from accessing the desired content.

5.9 Recommendations for further research

There is no time when access to information will cease to be an area of focus by information professionals. Each information provider works towards improving access to information by its clientele. The findings of the study are only relevant for a short period of time. Some of these are also applicable to the Kabarak University situation at the time of study, and may be subject to change by the university’s efforts
to improve on information services. The researcher therefore recommends that this study be conducted after a period of time to incorporate new or surprise developments in ICT, dynamic nature of user categories, needs and approaches to information provision among other areas. The presence of postgraduate students in the university is likely to affect the results of the survey, especially in the use of scholarly resources.

Some of the areas that may require study are as follows:

i) Segmentation of the various user groups to determine their information needs and information seeking patterns, e.g. by course undertaken, year or level of study, gender and work roles.

ii) Opportunities presented by portable devices such as mobile phones in the dissemination of academic information.

iii) Exploration of ways in which integrated library systems can be improved and tailored to support the numerous applications and management of resources in a university setting, such as digital repositories, e-resources, local content, mobile devices and e-learning activities.
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<http://www.emeraldinsight.com/Insight/ViewContentServlet?contentType=Article&Filename=Published/EmeraldFullTextArticle/Articles/2870330207.html>
APPENDICES

APPENDIX 1: QUESTIONNAIRE FOR STUDENTS

QUESTIONNAIRE

I am a student at the School of Information Sciences, Moi University, and am undertaking a study on “Improving access to information by students and staff at Kabarak University”.

You have been chosen as one of the respondents in the study. Kindly spare a few minutes to fill the questionnaire. Your honest response will be useful in providing an understanding of the accessibility of information by students and staff and providing suitable study solutions.

The information gathered will be treated with confidence.

________________________________________

A. Personal information

Course studied_______________________ Year of study _________ Gender ______

B. Information needs

1. What kind of information do you require in order to effectively carry out your daily activities? (Tick all appropriate)

[ ] Course materials [ ] Lecture notes [ ] Manuals/guides
[ ] News updates [ ] Research articles [ ] Textbook resources
[ ] Statistics [ ] Recreational information
[ ] Others (Specify) ___________________________________________________

2. Where do you turn to for your information needs? (Tick all appropriate)

[ ] Library [ ] Internet [ ] Colleagues [ ] Lecturers
[ ] Others (specify) ___________________________________________________

3. What resources do you frequently consult? (Tick all appropriate)

[ ] Books [ ] Journals [ ] Electronic/Internet resources
[ ] Class notes [ ] Verbal information
[ ] Others (specify) ___________________________________________________
4. For what purpose do you consult these resources? (Tick all appropriate)

<table>
<thead>
<tr>
<th></th>
<th>Academic</th>
<th>General knowledge</th>
<th>Leisure</th>
<th>Correspondence</th>
<th>Others</th>
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<tr>
<td>Books</td>
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<td>Journals</td>
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<td>Electronic/Internet resources</td>
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<td>Class notes</td>
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<td>Others:</td>
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</table>

5. In what format do you consult or require the resources? (Tick all appropriate)

<table>
<thead>
<tr>
<th></th>
<th>Print</th>
<th>Electronic</th>
<th>Multimedia</th>
<th>Others:</th>
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</thead>
<tbody>
<tr>
<td>Books</td>
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<tr>
<td>Journals</td>
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<tr>
<td>Office manuals/documents</td>
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<tr>
<td>Others:</td>
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</tbody>
</table>

6. Comment on the appropriateness of each of the available formats of information resources to you.

   Print: ________________________________________________________________
   Electronic: ___________________________________________________________
   Multimedia: __________________________________________________________

7. Give your opinion on the usefulness of the content of each of the available resources to you

   Print: ___________________________________________________________________
   Electronic: ___________________________________________________________________
   Multimedia: ___________________________________________________________________

8. What suggestions would you give towards improving the usefulness of the information resources?
   ___________________________________________________________________________
   ___________________________________________________________________________
   ___________________________________________________________________________

C. **Use of Library**

9. Do you visit the university library? _______________________________________

10. If so, what do you do when you visit the library?
    _________________________________________________________________________
    _________________________________________________________________________
11. If no, please give reasons.
_____________________________________________________________________
_____________________________________________________________________

12. How does the library compare to other sources of information you may use?
_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________

13. What do you perceive to be your level of awareness of the library and its services?
[  ] Not aware   [  ] Slightly aware   [  ] Aware   [  ] Quite aware

14. Have you ever participated in giving suggestions on what information resources the library should acquire?
_____________________________________________________________________

15. What general opinions did you have?
_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________

16. What general opinions would you wish to give?
_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________

17. What other suggestions would you give towards the improvement of library information services?
_____________________________________________________________________

D. Use of ICT

18. Do you utilize any technologies when accessing and utilizing information?
_____________________________________________________________________

19. If yes, please tick all appropriate in relation to the tasks they assist you to accomplish.
<table>
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<tr>
<th></th>
<th>Academic</th>
<th>General knowledge</th>
<th>Leisure</th>
<th>Correspondence</th>
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</thead>
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<td>Computers</td>
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<td>Portable Digital Assistants (PDAs)</td>
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<td>Cell phones</td>
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<td>Digital cameras</td>
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<td>CD/DVD players</td>
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<td>Others (Specify):</td>
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</tbody>
</table>

20. What is the frequency of use of the selected technologies?

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<thead>
<tr>
<th></th>
<th>Never</th>
<th>Rarely</th>
<th>Occasionally</th>
<th>Frequently</th>
<th>Very frequently</th>
</tr>
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<tbody>
<tr>
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<td>Digital cameras</td>
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<td>Others (Specify):</td>
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</table>

21. If none, please explain why you do not use them.
_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________

22. Do you have any basic training or skills to enable you to effectively use the listed technologies?
_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________

23. If yes, how did you acquire the skills?
_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________

24. How do you perceive your level of competence on the use of each of the technologies you utilize?
<table>
<thead>
<tr>
<th>Not competent</th>
<th>Fairly competent</th>
<th>Competent</th>
<th>Quite competent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computers</td>
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<td>Portable Digital Assistants (PDAs)</td>
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<td>Cell phones</td>
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<td>Digital cameras</td>
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<td>Others (Specify):</td>
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</table>

25. What problems do you experience when using ICT?
_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________

26. Give suggestions on how the university can improve on the harnessing and use of technological resources in accessing information.
_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________

E. Electronic resources

27. From what sources do you access electronic resources? (Tick all appropriate)

[ ] Internet  [ ] CD-ROMs/DVDs  [ ] Local Area network
[ ] Others _______________________________________________________

28. What activities do you frequently carry out on the Internet?

[ ] Using search engines, e.g. Google  [ ] Correspondence
[ ] Accessing online databases  [ ] Visiting familiar sites
[ ] Downloading software  [ ]
[ ] Others _______________________________________________________

29. Are you aware of the existence of electronic databases subscribed by the university?
_____________________________________________________________________

30. If yes, how did you learn about their existence?

[ ] Colleagues  [ ] Library orientation  [ ] Posters/leaflets
[ ] Lecturers  [ ] Library website
[ ] Others (Specify) ________________________________________________
31. Have you ever accessed the online databases subscribed by the university?
________________________________________________________

32. If yes, what electronic databases/resources do you use frequently?

[ ] Gale Thomson  [ ] EBSCO Host  [ ] Emerald
[ ] JSTOR  [ ] Institute of Physics  [ ] Blackwell Synergy
[ ] Hinari  [ ] Oxford University Press  [ ] Wiley Interscience
[ ] Springer  [ ] Royal Society of Chemistry  [ ] Multilingual Matters

Others (Specify) _______________________________________________________

33. If no, please, give reasons.
________________________________________________________
________________________________________________________
________________________________________________________

34. List any other electronic resources that you frequently consult
________________________________________________________
________________________________________________________
________________________________________________________

35. What are the major critical problems you encounter when using electronic resources?
________________________________________________________
________________________________________________________
________________________________________________________

36. What type of assistance would you wish to get when using electronic resources?
________________________________________________________
________________________________________________________
________________________________________________________

37. What kind of training do you require in order to effectively use the Internet and other electronic resources?
________________________________________________________
________________________________________________________
________________________________________________________

38. What improvements would you want to see in the provision of electronic information?
________________________________________________________
________________________________________________________
________________________________________________________

F. Information literacy

39. Did you have access to a library in high school? ___________________________

40. If yes, what information resources were available for your use?
________________________________________________________
________________________________________________________
________________________________________________________
41. If not, in what ways did the school avail information resources to you?
_____________________________________________________________________
_____________________________________________________________________

42. What activities were in place to educate you on how to find and use the information resources in the school?
_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________

43. Are there any activities/programmes in the university that have generally helped you to learn how to find, evaluate and use information?
_____________________________________________________________________

44. If yes, please, list them.
_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________

45. How has each of these activities/programmes assisted you?
_____________________________________________________________________
_____________________________________________________________________
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46. If no, please explain what you think the university should do to impart the necessary skills.
_____________________________________________________________________
_____________________________________________________________________
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47. Please, give any other additional comments or recommendations.
_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________

Thank you very much. Kindly return the completed questionnaire to the Library Circulation counter by 19th December, 2008. For any clarification, please contact me on:

Tel.  0722214890
Email: danruttouk@yahoo.co.uk
      drutto@kabarak.ac.ke
APPENDIX II: INTERVIEW SCHEDULE FOR STAFF

INTERVIEW

I am a student at the School of Information Sciences, Moi University, and am undertaking a study on "Improving access to information by students and staff at Kabarak University".

You have been chosen as one of the respondents in the study. Kindly spare a few minutes for an interview. Your honest response will be useful in providing an understanding of the accessibility of information by students and staff and providing suitable study solutions.

The information gathered will be treated with utmost confidentiality.

_________________________________________

A. Personal information

Category: [ ] Teaching [ ] Non-teaching

Department __________________________________________________________

Designation __________________________________________________________

B. Information needs

1. What kind of information do you require in order to effectively carry out your daily activities? (Tick all appropriate)

[ ] Course materials [ ] Lecture notes [ ] Manuals/guides
[ ] News updates [ ] Research articles [ ] Textbook resources
[ ] Statistics [ ] Recreational information [ ] Others (Specify) ____________________________________________

2. Where do you turn to for your information needs? (Tick all appropriate)

[ ] Library [ ] Internet [ ] Colleagues
[ ] Offices [ ] Others (specify) ____________________________________________

3. What resources do you frequently consult? (Tick all appropriate)

[ ] Books [ ] Journals
[ ] Electronic/Internet resources [ ] Office manuals/documents
[ ] Verbal information [ ] Others (specify) ____________________________________________
4. For what purpose do you consult these resources? (Tick all appropriate)

<table>
<thead>
<tr>
<th></th>
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<th>Leisure</th>
<th>Correspondence</th>
<th>Work related</th>
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<tbody>
<tr>
<td>Books</td>
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<td>Office manuals/documents</td>
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</table>

5. In what format do you consult or require the resources? (Tick all appropriate)

<table>
<thead>
<tr>
<th></th>
<th>Print</th>
<th>Electronic</th>
<th>Multimedia</th>
<th>Others:</th>
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<tbody>
<tr>
<td>Books</td>
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<td>Journals</td>
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<td>Office manuals/documents</td>
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<td>Others:</td>
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</tbody>
</table>

6. Comment on the appropriateness of each of the available formats of information resources to you.

Print: ________________________________________________________________
Electronic: ___________________________________________________________
Multimedia: ___________________________________________________________
Others _______________________________________________________________

7. Give your opinion on the usefulness of the content of each of the available resources to you

Print: ________________________________________________________________
Electronic: ___________________________________________________________
Multimedia: ___________________________________________________________
Others _______________________________________________________________

8. What suggestions would you give towards improving the usefulness of the information resources?

_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________  

C. Use of Library

9. Do you visit the university library? ______________________________________
10. If so, what do you do when you visit the library?
_____________________________________________________________________
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11. If no, please give reasons.
_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________

12. How does the library compare to other sources of information you may use?
_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________

13. What do you perceive to be your level of awareness of the library and its services?
[  ] Not aware  [  ] Slightly aware  [  ] Aware  [  ] Quite aware

14. Have you ever participated in giving suggestions on what information resources the library should acquire?
_____________________________________________________________________
_____________________________________________________________________

15. What general opinions did you have?
_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________

16. What general opinions would you wish to give?
_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________

17. What other suggestions would you give towards the improvement of library information services?
_____________________________________________________________________

D. Use of ICT

18. Do you utilize any technologies when accessing and utilizing information?

19. If yes, please tick all appropriate in relation to the tasks they assist you to accomplish.
### 20. What is the frequency of use of the selected technologies?

<table>
<thead>
<tr>
<th></th>
<th>Academic</th>
<th>General knowledge</th>
<th>Leisure</th>
<th>Correspondence</th>
<th>Other:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computers</td>
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<tr>
<td>Portable Digital</td>
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<td>Assistants (PDAs)</td>
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<td>Cell phones</td>
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<td>Digital cameras</td>
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<td>Others (Specify):</td>
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</tr>
<tr>
<td>Computers</td>
<td>Never</td>
<td>Rarely</td>
<td>Occasionally</td>
<td>Frequently</td>
<td>Very frequently</td>
</tr>
<tr>
<td>Portable Digital</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Assistants (PDAs)</td>
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<td></td>
<td></td>
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<tr>
<td>Cell phones</td>
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<td></td>
</tr>
<tr>
<td>Digital cameras</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>CD/DVD players</td>
<td></td>
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<tr>
<td>Radio</td>
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<tr>
<td>Television</td>
<td></td>
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</tr>
<tr>
<td>Others (Specify):</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

21. If none, please explain why you do not use them.

_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________

22. Do you have any basic training or skills to enable you to effectively use the listed technologies?

_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________

23. If yes, how did you acquire the skills?

_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________

24. How do you perceive your level of competence on the use of each of the technologies you utilize?
<table>
<thead>
<tr>
<th></th>
<th>Not competent</th>
<th>Fairly Competent</th>
<th>Competent</th>
<th>Quite competent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computers</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Portable Digital</td>
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<tr>
<td>Assistants (PDAs)</td>
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<td>Cell phones</td>
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<tr>
<td>CD/DVD players</td>
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<td>Radio</td>
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<tr>
<td>Television</td>
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</tr>
<tr>
<td>Others (Specify):</td>
<td></td>
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</tr>
</tbody>
</table>

25. What problems do you experience when using ICT?
_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________

26. Give suggestions on how the university can improve on the harnessing and use of technological resources in accessing information.
_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________

E. **Electronic resources**

27. From what sources do you access electronic resources? (Tick all appropriate)

[ ] Internet  [ ] CD-ROMs/DVDs  [ ] Local Area network
[ ] Other _____________________________________________

28. What activities do you frequently carry out on the Internet?

[ ] Using search engines, e.g. Google  [ ] Correspondence
[ ] Accessing online databases  [ ] Visiting familiar sites
[ ] Downloading software  [ ] Others _____________________________________________

29. Are you aware of the existence of electronic databases subscribed by the university?
_____________________________________________________________________

30. If yes, how did you learn about their existence?

[ ] Colleagues  [ ] Library orientation  [ ] Posters/leaflets
[ ] Seminars/meetings  [ ] Library website  [ ] Other website
[ ] Others (Specify) _______________________________________________
31. Have you ever accessed the online databases subscribed by the university?

32. If yes, what electronic databases/resources do you use frequently?

| [   ] Gale Thomson | [   ] EBSCO Host | [   ] Emerald |
| [   ] JSTOR       | [   ] Institute of Physics | [   ] Blackwell Synergy |
| [   ] Hinari      | [   ] Oxford University Press | [   ] Wiley Interscience |
| [   ] Springer    | [   ] Royal Society of Chemistry | [   ] Multilingual Matters |

Others (Specify) ___________________________________________________

33. If no, please give reasons.

_____________________________________________________________________
_____________________________________________________________________

34. List any other electronic resources that you frequently consult

_____________________________________________________________________

35. What are the major critical problems you encounter when using electronic resources?

_____________________________________________________________________
_____________________________________________________________________

36. What type of assistance would you wish to get when using the electronic resources?

_____________________________________________________________________
_____________________________________________________________________

37. What kind of training do you require in order to effectively use the Internet and other electronic resources?

_____________________________________________________________________
_____________________________________________________________________

38. What improvements would you want to see in the provision of electronic information?

_____________________________________________________________________
_____________________________________________________________________

39. Did you have access to a library in college or previous place of work?

_____________________________________________________________________

F. Information literacy

39. Did you have access to a library in college or previous place of work?
40. If yes, what information resources were available for your use?
__________________________________________________________
__________________________________________________________

41. If not, in what ways did the institution avail information resources to you?
__________________________________________________________

42. What activities were in place to educate you on how to find and use the information resources in the institution?
__________________________________________________________
__________________________________________________________

43. Are there any activities/programmes in the university that have generally helped you to learn how to find, evaluate and use information?
__________________________________________________________

44. If yes, please, list them.
__________________________________________________________
__________________________________________________________

45. How has each of these activities/programmes assisted you?
__________________________________________________________
__________________________________________________________

46. If no, please explain what you think the university should do to impart the necessary skills.
__________________________________________________________
__________________________________________________________

47. Please, give any other additional comments or recommendations.
__________________________________________________________
__________________________________________________________

THANK YOU.
APPENDIX III: INTERVIEW GUIDELINES FOR INFORMANTS

Department ........................................ Designation ........................................

1. What information needs are frequently defined by students and staff of Kabarak University?

Students

_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________

Staff

_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________

2. How do you go about satisfying the information needs?

_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________

3. In what format do you provide the required information?

_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________

4. Comment on the effectiveness of the various formats of the information resources.

_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________

5. What facilities/channels/technologies are used to access information?

_____________________________________________________________________
_____________________________________________________________________

6. Comment on the effectiveness of each of the technologies/channels/facilities being used.

_____________________________________________________________________
_____________________________________________________________________
7. In what ways do you promote awareness of your services among students and staff?

_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________

8. Do you have any programs that assist students and staff to learn how to access, evaluate and use information? _________________________________________

9. If so, please list them.

_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________

10. Comment on the effectiveness of the programs in place.

_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________

11. How would you wish to see the literacy programs designed or improved to meet the needs of students of staff?

_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________

12. Give any policies that guide you in developing your information services/resources.

_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________

13. What in your opinion is an impeding factor in the provision of information in your department?

_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________

14. Please suggest solutions to the problems identified.

_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________

15. Give any other recommendation on the provision of information to students and staff of Kabarak University.
THANK YOU.