SELF-ASSESSMENT OF INFORMATION RETRIEVAL SKILLS IN USING ELECTRONIC INFORMATION RESOURCES: A CASE STUDY OF MASENO UNIVERSITY STUDENTS

By

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Declaration

I declare that this mini-dissertation is my original work and has never been submitted to any other university for academic award. All sources used are acknowledged within the text and in the list of references.

Name: Rosemary Akech Obat

Signature:  **Date**: December 2017

Dedication

To my husband Rev. Simeon Adera Ng'uono,

To my children: Rosemary, Nathanael and baby Alicia

and

To my mother Phelesiah Obat

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First and foremost, I thank the Almighty God for the love, care and strength throughout the study period. I would not have made it without God by my side. To Him be all Glory and Honour. Secondly, my sincere gratitude goes to my supervisor, Prof. Ina Fourie whose step by step guidance, encouragement and endless support made this study what it is. You are a real mentor and I will forever remain indebted to you.

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Abstract

Due to the rapid growth of World Wide Web and increased use of ICT, academic libraries worldwide have positioned themselves to be on par with the technological changes by providing services to their clients' changing needs. One of the services that has globally been embraced by the academic libraries is the provision of electronic information resources. The acquisition of the electronic information resources has either been done collectively through consortia or individually by the institutions. The optimal use of these resources is greatly dependant on the retrieval skills of individuals.

This study investigated the information retrieval skills of Maseno University students using the electronic information resources. In general, the study focussed on their own self-assessment on how they rate their skills. The objectives of the study were to: determine key findings relevant to the study from the subject literature, find out how the students at Maseno University use electronic information resources available through the library, determine how students at Maseno University self-rate their ICT skills relevant to information retrieval, determine how students at Maseno University self-rate their information retrieval skills, and to review their ability of self-rating,

Through a descriptive quantitative case study research approach, the study used a self-administered electronic questionnaire as the instrument for data collection. The participants were 275 students (90% undergraduates and 10% postgraduate). The study established that the majority of the students showed that both their information retrieval skills and their ability to self-rate their skills was good. The study further revealed that the majority of the students had good ICT skills. From this study, several factors emerged that could help in improving the students' information retrieval skills, namely: regular practice, training, self-learning, self-efficacy and positive attitude. Recommendations were made for theory and practice and for further research.

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List of acronyms and abbreviations

ACRL	Association of College and Research Libraries
ALA	American Library Association
EIRs	Electronic Information Resources
ICT	Information Communication Technology
KLISC	Kenya Library and Information Services Consortium
OPACs	Online Public Access Catalogues
SCONUL	Society of College, National, and University Libraries
UK	United Kingdom

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CHAPTER 1: INTRODUCTION AND BACKGROUND

1.1 INTRODUCTION

The rapid growth of the World Wide Web and the emergence of new technologies have resulted in wide utilisation of electronic information in all spheres of life (Gakibayo, et al., 2013[1]; Ingutia-Oyieke & Dick, 2010). As a result academic institutions such as college and university libraries have transformed into digital and virtual libraries to cater for the changing needs in technology. Most academic libraries have redirected their energies to the provision of electronic information resources as part of their collections to enrich learning, teaching and research activities (Okite-Amughoro, et al., 2014:1; Zhang, et al., 2011:67; Berg, et al., 2010).

Academic libraries are also increasingly taking advantage of Information and Communication Technology (ICT) to provide improved access to the electronic information resources through the provision of platforms for access to online information databases. These online databases include resources such as electronic books, journals, dissertations and theses among others (Okite-Amughoro, et al., 2014:1; Adegbore, 2011:1). This growing interest can be attributed to the exponential growth of electronic publishing. This has resulted into more scholarly electronic information resources and the availability of search tools which have created opportunities for global access to information and increased scholarly communication (Halttunen, 2003:307).

However, the optimal use of the electronic information resources greatly depend on information retrieval skills of the user. These skills are key as they enable one to identify, access, search, and retrieve accurate and up-to-date information related to information needs. In this way, they help reduce the time wasted in searching for relevant information (Ajiboye, et al., 2013:53; Ekenna & Iyabo, 2013:6; Sasikala & Dhanraju, 2011; Lennox & Walker, 1993 cited in Webber & Johnstone, 2000). Information retrieval skills can be gained through information literacy training that will help one to recognise when information is needed and to be able to locate, evaluate, and use effectively the needed information (American Library Association, 2000: 2).

[1] The references are organised according to the dates with the most current date first

According to the subject literature (Konappa, 2014; Ekenna & Iyabo, 2013; Dhanavandani, et al., 2012), lack of retrieval skills has been cited among the factors hindering effective use of electronic information resources among university students. This is the case despite the fact that huge budgets are spent every year on subscription fees to make these resources available.

There are different methods that can be used to determine if students have the required information retrieval skills. For instance, formal formative and summative assessment such as tests and assignments are some of the methods that can be used to determine the retrieval skills (Wiliam, 2011; Taras, 2010; Carrillo-de-la-Peňa, et al., 2009) as well as self-assessment (Johanson, 2013; Andrade & Valtcheva, 2009; Singh & Terry, 2008; Boud & Falchikov, 1989). However, it is important to point out that students' self-assessment of their skills is not without problems as they may over-estimate their capabilities or have difficulties in self-assessing their skills (Amstrong & Fukami, 2010; Sitzman et al., 2010). Despite the setback, the same can help students to identify issues that need improvement.

The purpose of this study is to collect data on students' self-reported levels of retrieval skill competencies when utilising electronic information resources at Maseno University library. Along with other factors, information retrieval skills influence the use of electronic information resources; data was collected on how their information retrieval skills influence their use of electronic information resources and their overall search experience.

1.2 BACKGROUND OF THE STUDY

Maseno University was founded in 1991 as an institution of higher learning among the public Universities in Kenya. This was later approved by the Commission of University Education in Kenya (Commission for University Education, 2015). The University is located in Maseno Township, along Kisumu-Busia Road, 25 km from Kisumu City and approximately 400 km west of Nairobi, the capital of Kenya. Maseno University currently has five campuses namely: Kisumu Campus, Homa Bay Campus, Siriba Campus, College Campus and The E-Campus, which are all located in different parts of Kenya. Through these campuses, the university caters for the ever expanding demand for university education in the region. The university has an enrolment of over 15,000 students spread across the campuses pursuing undergraduate and postgraduate courses (Maseno University, 2015).

All campuses are served by the main university library. The library's vision is "To provide facilities for education and research, participate in the discovery, creation, transmission, preservation, and enhancement

and to harness acquired knowledge on behalf of the University" (Maseno University Library, 2015). To accomplish this vision, the university library has print information resources as well as subscriptions to electronic information resources to satisfy the needs of its diverse clientele. Electronic information sources include databases, journal platforms and electronic books.

The use of electronic information resources which is a major source of scholarly information for teaching, learning and research has been embraced by academic communities all over the world (Olasore & Adekunmisi, 2015:55; Oyedapo & Ojoo, 2013:2). Maseno University library subscribes to electronic resources through Kenya Library and Information Services Consortium (KLISC) with the main objective of collective subscription to electronic information resources to cope with the increasing cost of information resources. Some of these databases are: EbscoHost, Emerald, Oxford University Press Journals, Cambridge University Press Journals, JSTOR, eBrary, and HINARI. The consortium draws its membership from university libraries, tertiary colleges, research institutions and public/national libraries (KLISC, 2017).

The electronic information resources are made available to on-campus students through Internet Protocol (IP) authentication and to off-campus students through EZproxy. Based on the researcher's observation[2] and frequent interaction with the students on the use of the electronic information resources, the question that is most frequently asked is "where can I find what" from the electronic information resources. Such a question is an indication of some lack of, or inadequate skills in using the electronic information resources. The answers to this question forms the basis of this study.

1.3 RESEARCH PROBLEM

The use of electronic information resources is a major source of scholarly information for teaching, learning and research. This has been embraced by academic communities all over the world. The capacity to access and the intensity to use electronic information resources vary from one environment to the other. For instance, in Kenya, a number of studies on the use of electronic information resources in institutions of higher learning have been carried out (Makori, 2015; Nyamboga, et al., 2014; Ingutia-Oyieke & Dick, 2010; Njoroge, 2008).

To justify subscription to electronic information resources and to ensure effective use thereof, it is important for the library at Maseno University to determine students' perceptions of their levels of information

[2] The researcher is a student at University of Pretoria

retrieval skills, which has been reported as a key factor in influencing the use of electronic information resources. An understanding of how their information retrieval skills influences their use of electronic information resources available in the library and their overall search experiences would also be useful.

This study therefore sought to find out whether the students at Maseno University consider their skills of information retrieval and their ability to use the diverse electronic information resources available through the library as adequate. The study also determined how their perceptions of their information retrieval skills influence their use of electronic information resources and their overall search experiences.

1.3.1 Research question

The research study addressed the following question:

> *What are the self-reported information retrieval skills of students at Maseno University Library and how are these impacting on their use of electronic information resources?*

1.3.2 Sub-questions

To answer the research question, the research aimed to answer several sub-questions as indicated below:

Sub-questions to answer from the literature review:

- How is electronic information resources used in academic contexts, with specific reference to use by students and the impact of information retrieval skills?
- What is the assessment of students' information retrieval skills, and specifically on their self-assessment of their skills?
- How does self-efficacy and the use of electronic information resources influence the overall search experience?

Sub-questions to answer from the empirical component:

- How do students at Maseno University self-rate their information retrieval skills in using electronic information resources?
- How does their perceptions on their ICT skills relevant to information retrieval influence their use of electronic information resources?
- How does their perceptions of their information retrieval skills influence their overall search experiences when using electronic information resources?

1.4 PURPOSE AND OBJECTIVES OF THE STUDY

This study sought to determine students at Maseno University's perceptions of their information retrieval skills (that is, their self-rating) with the aim of determining how it affects the use of electronic information resources and their overall search experiences. The focus was on resources made available by the library. The results of the study can therefore be used to implement appropriate information retrieval training programmes based on the students' needs at all levels of their studies within the university. The following objectives guided the study:

i. To determine key findings relevant to the study from the subject literature;
ii. To find out how the students at Maseno University use the electronic information resources available through the library;
iii. To determine how students at Maseno University self-rate their ICT skills relevant to information retrieval;
iv. To determine how students at Maseno University self-rate their information retrieval skills, and their ability of self-rating.

1.5 VALUE OF THE STUDY

This study is worth undertaking as it will be informative in the development of an appropriate information literacy programme with a stronger focus on information retrieval skills to support students at Maseno University. This will help students in meeting their information needs, and to strengthen students' abilities of self-assessment and constructivist learning. Findings can also be used to improve their overall experiences of information searching using the electronic information sources available through the library.

1.6 CLARIFICATION OF CONCEPTS

This section provides a list of core concepts used throughout the study, with a definition of each concept to provide the reader with the background necessary for understanding the study. As such, these serve as operational definitions to guide the rest of the study.

1.6.1 Information retrieval

Information retrieval is the process through which a person obtains information relevant to his/her needs from a collection of resources. It is defined by Ingwersen and Järvelin, (2005:385) as "the processes involved in representation, storage, searching, finding, filtering and presentation of potential information perceived relevant to a requirement of information desired by a human user in context". While Salton and

McGill (1983) cited in Thornley and Gibb, (2009:135) define information retrieval as a concept that is concerned with the representation, storage, organisation and accessing of information items. For purposes of this study, the definition by Ingwersen and Järvelin (2005) was used as it includes all the elements of searching, finding and filtering the relevant information desired.

1.6.2 Information retrieval skills

Information retrieval skills include the ability to handle the collection of information resources and knowing where and how to look for required information from the resources (Ekenna, 2013:6). This definition is very simplistic and does not acknowledge the finer detail of information retrieval skills. In comparison, the American Library Association (ALA) (2009:3) describes information retrieval skills as "techniques used to retrieve, evaluate, and synthesize information from diverse sources for use by individuals of all ages and groups".

For the purpose of this study, information retrieval skills is the ability of the students to understand and apply the techniques used in representation, storage, searching, finding, filtering and presentation of information.

1.6.3 Information literacy

Information literacy is defined as a set of abilities that enable individuals to "recognize when information is needed and have the ability to locate, evaluate and use effectively the needed information" (American Library Association, 2000:2). It is very closely related to information retrieval, and in fact skills of information retrieval falls under the umbrella concept of information literacy. Armstrong (2005:1) defines this concept as "knowing when and why you need information, where to find it, how to evaluate, use and communicate it in an ethical manner". Both these definitions have the same aspects of information literacy competencies and for the purposes of this study, the definition by the American Library Association will be used as it puts the aspect of ability centeral which links it clearly with the information retrieval as the main focus.

1.6.4 Assessment and self-assessment

Assessment refers to the evaluation of skill acquisition or learning progress and making a judgement on it after careful consideration (Great Schools Partnership, 2013). The *Oxford English Dictionary* (2015) defines assessment as the process or means of evaluating academic work through examinations or tests throughout the course of study to improve subsequent learning.

For this study, the definition by the Great Schools Partnership (2013) on assessment was used which refers to the method that is used to evaluate skill acquisition and making a judgement on it after careful consideration. This is because the research is keen on self-assessment as a method of assessment and not general learning assessment. Self-assessment as defined by Sitzman et al. (2010) is the perceived evaluations that learners make about their current knowledge/competency levels in a particular area.

1.7 BRIEF OVERVIEW OF THE LITERATURE

The purpose of this literature overview is to briefly contextualise the research problem by examining supporting literature, as well us identifying the gaps addressed by the present study.

Electronic information resources have become an inseparable part of today's academic libraries as they facilitate access to needed information in an easy and speedy manner (Ukachi, 2015:488; Bhukuvhani, et al., 2012). However, it is very important that one should be conversant with the use and exploitation of the electronic resources by being information literate. This is relevant as it helps one to achieve quicker and more effective usage of the resourcces. One of the basic skills associated with information literacy is information retrieval, the ability to interact with electronic information resources to locate relevant information, to sift it, to sort it, and to select it (Lau, 2006:8; American Library Association, 2000).

Information skills can be acquired through information literacy programmes (often offered by libaries) or through individual self-training (Okello-Obura & Magara, 2008). The same applies to information retrieval skills. The need for information retrieval skills is intensified by the complexity of the information retrieval tools such as databases and journal platforms, the rapid changing technologies and the impact of the electronic environment in academia (Makori, 2015; Ukachi, 2015; Okiki, 2013:4).

A number of studies have investigated the use of electronic information resources in academic libraries. Among the studies conducted in Africa are, Olasore and Adekunmisi (2015), Konappa (2014), Okite-Amughoro, et al. (2014), Ekenna and Iyabo (2013), Gakibayo, et al. (2013), Oyedapo and Ojoo (2013), and Dhanavandani, et al. (2012). These studies reported low usage of electronic information resources. In their findings, they give reasons accounting for the inadequate use of the electronic resources in the academic libraries. Such reasons include: inadequate computer skills, lack of awareness of the existence of the electronic resources, low bandwidth, lack of information retrieval skills, students' information behaviour, lack of information searching skills, limited space, and erratic power supply among others.

Of importance to this study is the lack of information retrieval skills as reported by Konappa (2014), Ekenna and Iyabo (2013), and Dhanavandani, et al. (2012). Information retrieval skills require some level of competency and confidence as noted in the study by Kurbanoglu (2003) on self-efficacy, which looks at not only the possession of the skills but also the feeling of confidence and competence in using the skills. According to Bandura (1977), learning and possessing skills is not enough and one should go an extra mile to develop confidence in the skills learnt. It is therefore clear that self-efficacy is an important element in retrieval skills development and use which would ultimately affect the use of electronic information resources.

There are different ways through which the retrieval skills can be assessed: formal formative and summative assessment such as tests and assignments (Wiliam, 2011; Taras, 2010; Carrillo-de-la-Peña, et al., 2009) as well as self-assessment (Johanson, 2013; Andrade & Valtcheva, 2009; Singh & Terry, 2008; Boud & Falchikov, 1989). Self-assessment of information retrieval skills and use of electronic information resources, however have received relatively little attention from information researchers. This study will therefore focus on the self-rating of the retrieval skills of the students at Maseno University.

1.8 RESEARCH METHODOLOGY

Research methodology is important for this study as it guided the way to systematically solve the research problem and answer the research question and sub-questions, and thus meet the initial aim of the research (Kothari, 2004).

1.8.1 Research design

This study used a quantitative case study approach with limited qualitative data which according to Taylor (2000:69) gives a valid and objective description of the phenomenon. A case study is a research method which provides a detailed story of the study case (Myers, 2007; Johnson & Christensen, 2004; Hancock, 2002; Key, 1997; Tellis, 1997). The choice of the case study as the research design for the research was necessitated by the nature of the study where the researcher would want to get a better understanding of the situation in one institution and hence a case study of Maseno University.

1.8.2 Method(s) of data collection

The answers to the research question and the sub-questions was sought from the interpretation of the literature on information retrieval skills and the self-assessment of such skills, and the interpretation of data gathered through an empirical study.

This study gathered data from members of the selected population with the aid of a questionnaire in order to determine the current status of the issue under study. Although individual and focus group interviews were useful methods of data collection, this study, in the essence of time, only employed a questionnaire as a method of data collection. The semi-structured self-administered questionnaire was in electronic format. It included a few open questions to collect qualitative data that contributed richer data on the problem. A questionnaire is a comparatively convenient and inexpensive means of data collection even though the response rate may be low and opportunity to clarify issues with the respondents may be lacking (Kumar, 2005:130).

1.8.3 Research population and sample

The research population comprised all students of Maseno University. The target population consisted of 1001 students of the eCampus of Maseno University (one of the campuses of Maseno University) comprising of both undergraduate and postgraduate students. The sample size was 286 students selected from the target population through a purposive sampling technique by use of a simplified formula for proportions for calculating sample sizes based on Yamane (1967:886), Israel (1992:1) and Huang et al. (2003:3) who propose a similar formula. A detailed explanation of the calculation of sample size is given in chapter 3 under section 3.2.4 on population and sampling.

1.8.4 Demarcation of the study

- Topic demarcation: Assessment, and specifically self-assessment of information retrieval skills in using electronic information resources.
- Target group demarcation: All undergraduate and postgraduate students of Maseno University's E-Campus, where a representative sample was drawn.
- Context demarcation: the context of this study is an academic context (a university).
- Geographic demarcation: the study was carried out in Maseno University, Kenya.

1.9 DIVISION OF CHAPTERS

CHAPTER 1: The chapter consists of the following: introduction, background to the study, a brief overview of the research problem and sub-problems, brief overview of the literature and explanation of the research methodology. Operational concepts are also defined, and the structure of the dissertation is briefly noted.

CHAPTER 2: This chapter covers the following: introduction, literature study and analysis, and description of literature findings with regard to information retrieval skills assessment and related issues such as use of electronic information resources in academic contexts and specifically the impact of perceptions of information retrieval skills, as well as self-efficacy and the use of electronic information resources. Relevant literature on information literacy is also considered.

CHAPTER 3: This chapter focuses on the methods that are used to gather and analyse data. The reasons for selecting the methods are discussed. In essence, it gives the research design with details on the research approach used, research method applied, data collection method, population and sample of the study and details on pilot of the study. It also covers a brief discussion on how reliability and validity were dealt with and how data was analysed with a brief on how the ethical clearance for the research was done.

CHAPTER 4: The chapter focuses on data analysis, interpretation of the findings from the data collected, evaluation of the data collected as well as the effectiveness of the data collection instruments and techniques. Reliability, validity and adherence to ethical requirements are also addressed.

CHAPTER 5: This chapter covers a brief summary of findings on the research question and sub-questions. Recommendations on theory as well as practice are also presented here together with recommendations for further research. Limitations to the study, meeting with the study purpose and objectives and a final conclusion to the study is also given.

CHAPTER 2: LITERATURE ANALYSIS

2.1 INTRODUCTION

This chapter focuses on the analysis of relevant literature on studies that have been done on information retrieval skills in relation to the utilisation of electronic information resources in academic library contexts. It explains the value and purpose of the literature review and specifically presents an analysis and discussion of the existing literature on: (a) the importance of electronic information resources in academic libraries; (b) the use of electronic information resources in academic contexts; (c) the assessment of students' information retrieval skills; (d) self-efficacy and the use of electronic information resources; and (e) the self-rating of the information retrieval skills. A theoretical framework to guide the study is also examined.

2.2 VALUE AND PURPOSE OF THE LITERATURE REVIEW

The value and purpose of the literature review is to clarify the research aims of this study, thereby contextualising the research problem with the supporting literature that already exist. As indicated in chapter one, the aim of literature review is to learn from the findings of related studies so as to build further on their work and compare their findings with the findings of this study (Creswell, 2014:25; Kumar, 2005:25). As Pickard (2007) opines, a literature review helps in discovering what is already known about a topic and therefore provides the depth and breadth of subject knowledge necessary for the study as well as informing the theoretical framework for the empirical investigation of the study.

2.3 LITERATURE SEARCHING AND RATIONALE FOR STRUCTURE OF LITERATURE ANALYSIS

In preparation for the literature review, the following databases were searched: Academic Search Complete, Emerald Insight, ERIC (EbscoHost), Google Scholar, JStor, Library and Information Science Abstracts, Library & Information Science Source, Library, Information Science & Technology Abstracts, Open Access Journal Search Engine, Science Direct, Taylor & Francis, and Web of Science (Thomson Reuters).

The search strategies used are:

information retrieval skills AND (assessment OR evaluation OR testing)

electronic information resources OR databases AND use

self-efficacy AND (electronic information resources OR databases OR information retrieval OR information searching OR information seeking)

(information retrieval skills OR information literacy) AND (electronic information resources OR databases)

2.4 ANALYSIS OF LITERATURE RELEVANT TO STUDY

The purpose of literature analysis is to find answers to the sub-questions from the literature as set out in Chapter 1. These questions were: (1) How are electronic information resources used in academic contexts, with specific reference to use by students and the impact of information retrieval skills? (2) What is the assessment of students' information retrieval skills, and specifically on their self-assessment of their skills? (3) How does self-efficacy and the use of electronic information resources influence their overall search experiences? (4) What has been reported on the importance of ICT skills relevant to information retrieval? In order to do this, available literature was analysed under related sub-headings. To put the discussion in context, section 2.4.1 on the importance of electronic information resources in academic libraries and section 2.4.5 on the importance of ICT and Internet skills on information retrieval were added.

2.4.1 Importance of electronic information resources in academic libraries

The importance and value of electronic information resources in academic institutions of higher learning is widely recognised (Olasore & Adekunmisi, 2015; Oyedapo & Ojoo, 2013; Bhukuvhani, et al., 2012; He, et al., 2012; Wu & Chen, 2011; Deng, 2010; Madhusudhan, 2010; Shuling, 2007). Literature on electronic information resources in academic institutions show that integration of the electronic information resources in academic libraries has evolved over the years. This is informed by the fact that most institutions of higher learning across the globe are making the electronic resources an integral part of their library's collection and are thus drastically changing the pattern of library and information services provision to the users (Kumar, 2016; Omosekejimi, et al., 2015; Salau & Gama, 2015; Okite-Amughoro, et al., 2014; Oyedapo & Ojoo, 2013; He, et al., 2012; Omeluzor, et al., 2012; Zhang, et al., 2011; Berg, et al., 2010; Shuling, 2007; Ramlogan & Tedd, 2006). This has been necessitated by the information explosion and the emergence of new technologies that facilitate information production and access. In addition, the changes can also be attributed to the emerging trends, standards of library service and the continued role and mandate of academic libraries to provide vital and relevant information for teaching and academic research (Ukachi et al., 2014; Ekenna & Iyabo, 2013; Wu & Chen, 2011).

The continued growth in electronic information resources in academic library collections plays a major role in enabling the libraries to fulfil their aim and quest for supporting teaching and research processes at the university level. This is done through the provision of quality resources to their users (Omosekejimi, et al., 2015:94). Madhusudhan (2010:493) succinctly points out that through the electronic information resources, library users can now get timely information without restrictions of time and location. This has also resulted in opportunities for global access to information, enhancing the speed of library service and increased quantity of access to information and knowledge (Ayoo & Lubega, 2014; Rioux, 2014; Liyi, 2011).

Adeniran (2013) in a study on the use of electronic information resources such as online databases, e-journals, internet sources and online public access catalogues (OPACs) points out that electronic resources offer a wide range of advantages over print information resources which have become the main motivations for their enormous use. These advantages are: (a) enabling access to information that might be restricted to the user due to geographical location or finances; (b) enabling access to more current information and other additional extensive links of related contents, and (c) enabling access to information without geographical barriers and physical location challenges. These findings are also in line with studies such as Ukachi et al. (2014), Dhanavandan (2012), Egberongbe (2011) and Deng (2010).

2.4.2 Studies of the use of electronic information resources in academic contexts

Electronic information resources are now widely used by different categories of users in academic libraries due to the rapid growth in access to the electronic information resources and information communication technology (Omosekejimi, et al., 2015:94; Swain & Panda, 2009:75; Mohamed, 2007:23). This has been confirmed through several studies on the use of electronic information resources and on different categories of users in academic contexts such as undergraduates, postgraduates, research scholars, and academic staff. He, et al. (2012) established through a study on comparative analysis on how undergraduate students from the USA and China interact with online information resources in their academic tasks that online electronic resources are commonly used by these group of students for their academic work. This research finding corroborates with findings by Omosekejimi, et al. (2015) who reported that electronic resources have tremendous impact on the academic performance of undergraduate students. Accordingly, Kumar and Kumar's (2010) study shows that majority of the academic community use electronic information resources for their academic work. A similar study by Karunarathna (2014) on the use of the electronic information resources by the law degree students of Open University, Sri Lanka, revealed that a majority of students use electronic information resources for their academic activities.

Ukachi's (2015) study on the use of electronic information resources in relation to information literacy in university libraries in Nigeria sought to establish the relationship between undergraduate students' information literacy skills and their use of the electronic information resources. This study found out that the undergraduate students do not possess adequate information literacy skills necessary for the utilisation of electronic information resources and therefore do not make adequate use of the resources. Similar findings were reported by Adeleke and Emeahara (2016), Vasudevan and Rakhi (2015), Ekenna and Iyabo (2013), Wu and Yeh (2012), Kinengyere (2007), and Ramlogan and Tedd (2005) who recorded lack of skills as a hindrance to retrieval of information from electronic resources, lack of awareness of the existence of resources and lack of information literacy as a stumbling block to the use of the electronic information resources, lack of accessibility and lack of training in the use of the electronic information resources. In a separate study, Ukachi, et al. (2014) examined the relationship between undergraduates' attitude and their use of electronic information resources in universities in South-West, Nigeria. The findings indicated that undergraduate students do not use electronic information resources due to their negative attitudes towards such resources. This finding is similar to findings by Kinengyere (2007) who mentioned attitudes and perceptions as an influence to the level of utilisation of electronic information resources.

Ingutia-Oyieke and Dick's (2010) comparative study on the use of electronic resources by undergraduate students at two Kenyan Universities reported a general low usage by the undergraduate students. On the use of electronic information resources by postgraduate students at institutions of higher learning, Okite-Omughoro, et al. (2014) in a study on the use of electronic information resources for academic research by postgraduate students at Delta State University, Nigeria established that students are aware of the existence of electronic information resources but its use is hampered by a lack of information searching skills. A similar study by Wu and Chen (2011) on how graduate students perceive, use and manage electronic resources indicate that the graduate students are frequent users of electronic resources which they consider important particularly during the period of writing their theses. In agreement with the two studies, Zang, et al. (2010) reported that most users of electronic information resources are graduate students and young staff members with scientific research, teaching and a need for self-development as the main reasons for utilising the electronic resources.

Madhusudhan (2010) in a study on the use of electronic resources by research scholars of Kurukshetra University established that electronic information resources is one of the integral parts of the information needs of the scholars and are a good substitute for conventional resources. These findings are similar to

Shuling (2007) who investigated the use of electronic resources at Shaanxi University of Science and Technology and who reported that half of those investigated were satisfied with the electronic information resources found at the library.

Kinengyere (2007) on the effect of information literacy on the utilisation of electronic information resources in selected academic and research institutions in Uganda revealed that the availability of electronic information resources does not equal their usage and that information literacy is very important in enabling effective utilisation of the electronic information resources.

Tahir, et al. (2010) studied the use of electronic information resources by humanities scholars at the University of Punjab and found that they still preferred printed information sources although they showed an interest in electronic information resources. Aderibigbe and Ajiboye's (2013) study on information resources usage at the Nimbe Adedipe University, Nigeria established that training is important for the effective use of the electronic resources and that the use of electronic information resources has a great impact on the academic activities at the university.

On the purpose for electronic information resources, Malemia (2014) in a study on the use of electronic journal articles by academics at Mzuzu University in Malawi found that academics preferred using the electronic journals for research and teaching. Similarly, Olasore and Adekunmisi (2015), on the use of library electronic information resources by academic staff in Olabisi Onabanjo University report that electronic information resources are preferred for research. Another similar study by Urquhart et al. (2003) on the uptake and use of the electronic information services by undergraduates in United Kingdom (UK) higher education reports that the undergraduates primarily use the electronic resources to help in preparing assignments alongside other reasons such as coursework, preparation of presentations and making lecture notes. However, Deng (2010) established that the purpose of using electronic information resources is solely dependent on the user with awareness to and quality of the electronic resources as the main factors.

Damilola, (2013) in a study on the assessment of factors affecting use of electronic information resources by distance learning students of National Open University in Lagos showed a general low usage due to certain factors such as download delay, high cost of access, failure to find information, inadequate or lack of search skills, difficulties in navigating through electronic resources, large mass of irrelevant information, and unfamiliarity with electronic information resources.

Oyeniyi (2013) investigated how gender difference affect information retrieval skills in using electronic information resources. The study found that gender difference does not exist on the basis of acquiring the information retrieval skills. However there was a slightly higher mean score on the male respondents' use of the electronic information resources as compared to the females.

Factors that influence the use of electronic information resources in academic context are: awareness of the existence of the electronic information resources; attitude towards the electronic information resources, searching and retrieval skills, information literacy, different approaches of organising the electronic information resources, purposes for which the electronic information resources are used, and accessibility of the electronic information resources.

2.4.3 Assessment of information retrieval skills

The abundance of available electronic information and information resources makes it challenging for individuals to assess the authenticity and validity of information for their studies, in workplaces and in their lives (Konappa, 2014; Rehman & Alfaresi, 2009:607). According to Ekenna and Iyabo (2013:8), information retrieval skills should enable one to recognise information needs and locate the information stored in the electronic resources. Researchers such as Ukachi et al. (2014), Ajiboye, et al. (2013), Tang and Tseng (2013), Ferdows and Ahmed (2015) have stressed the importance of information literacy skills.

For appropriate use of electronic information resources, there is need for information skills that one requires. For instance, Ukachi's (2015) study on the relationship between students' information literacy skills and their use of electronic information resources found that most students do not possess adequate information literacy skills necessary for optimal utilization of electronic information resources. The same study further revealed that there exists a positive relationship between the students' level of information literacy skills and the use of the electronic information resources.

On their part, Ilogho and Nkiko (2014) investigated student knowledge of information literacy and search skills in selected universities in Ogun, Nigeria. The findings of their study indicated that there is a low knowledge of information literacy skills and thus high deficiency in identifying information sources. Ekenna and Iyabo's (2013) study on the information retrieval skills of the university undergraduate students established that undergraduate students lacked requisite skills for the use of the electronic information resources. Similarly a study by Nyamboga, et al. (2014) on the e-resources complexities and their usage among the information science students of Mount Kenya University, Kigali campus, indicated that although

the students were aware of the availability of the electronic resources in the library, most of them indicated lack of information searching skills as a major hindrance.

In agreement with the above, Okello-Obura (2010) point out that among the problems experienced by students in accessing the information resources is the lack of skills on search strategies. Islam and Tsuji's (2010) study found that students have limited information skills. As a result of this, they recommended a need to incorporate an information literacy course in the curriculum to enable students to become information literate. On the other hand Korobili, et al.'s (2009) study of information literacy skills of students at Technological Education Institute of Thessaloniki, Greece reported that most students had not attended information literacy courses that are integrated in the curriculum. In this regard, students were not acquainted with scientific sources available in the library. The study also revealed that there was a slight difference between those who have attended the information literacy courses and those who have not in respect to the frequency of use of the electronic information resources and mastery of information retrieval processes. This is in agreement with studies by Tang and Tseng (2013), and Swain and Panda (2009) which revealed that students feel confident to use electronic information resources once they received proper training and guidance on their usage.

2.4.4 Self-assessment of skills

Self-efficacy has a direct correlation on the acquisition of the relevant skills for the use of the electronic information resources. Acquiring information retrieval skills is one thing and feeling confident to use them is yet another (Albertson & Ju, 2016; Bronstein & Tzivian, 2013; Tang & Tseng, 2013; Kurbanoglu et al., 2006; Bandura, 1977). Kurbanoglu (2003:636) explains that individuals must first feel confident and competent of their technological skills before they can apply them effectively. Tela et al. (2007) also opines that the confidence of one's ability to do things that one tries to do helps to drive the successful execution, completion and mastery of the tasks. It is therefore insinuated that the successful use of the electronic information resources does not only occur as a result of the possession of the information retrieval skills, but also require confidence and competence in the use of the skills. Wu and Yeh (2012) investigated whether students possess the capabilities to use electronic information resources. Their study revealed that students were not confident about their capabilities in using the library's electronic resources. This is supported by Ren (2000), who opines that performance accomplishment go hand in hand with self-efficacy to generate a positive attitude towards performance of tasks or acquisition of additional skills.

In a separate study by Kinengyere (2007) on the effect of information literacy on the utilisation of the electronic resources, findings revealed that attitudes and perceptions which could either lead to low self-efficacy or high self-efficacy can influence the level of utilisation of the electronic information resources. This is affirmed by Gakibayo et al. (2013) who reported that knowledge of computers and retrieval techniques has a close correlation with the attitude of the students towards learning and acquiring the skills and confidently using them. Perceptions of self-efficacy and individuals' ability to perform certain tasks can be measured on self-rating scales (Mahmood, 2017). Such scales have been used in areas such as computer literacy but little has been reported on self-rating of information retrieval skills.

2.4.5 Importance of ICT and Internet skills relevant to information retrieval

Ebijuwa (2005) defines ICT as the tools that make it easy for electronic information collection, processing, storage, transmission and dissemination. These are essential skills of information retrieval and usage. In this age, requirement for ICT and Internet skills and ability to use the computer and related information technologies cannot be overemphasized. Quadri (2012) asserts that ICT and the Internet are catalysts for improving access to electronic information resources which require competence and the right attitude.

2.5 THEORETICAL FRAMEWORK TO GUIDE THE STUDY

Although the researcher considered various models of information behaviour as well as frameworks for information literacy, there was no single suitable model or framework for this particular study. One of the models adopted in the study is Wilson's 1996 model (Case, 2007:127; Wilson, 1999:257). This model deals with information needs and information seeking (see Appendix F). The model examines information seeking behaviour of its users. This model also involves theories that explain three aspects of information seeking as: 1) Why some needs prompt information seeking more than others; 2) Why some information sources are used more than others; 3) Why people may or may not pursue a task successfully based on their perceptions of their own efficacy. The second model used in the study is the Johnson model which depicts the antecedent factors that motivates one to seek for information. Such factors include demographics, experience, salience and beliefs (see Appendix G). It goes further to explain that beliefs are not only tied to facts but are also tied to self-efficacy which brings about having a positive attitude that one can perform a task and believing in oneself. Further, it motivates information seeking actions which include searches (Case & Given, 2016).

The information literacy models/frameworks considered for this study were: 1) Association of College and Research Libraries (ACRL, 2006) model of information literacy which breaks information literacy into five

broad areas namely: know, access, evaluate, use and ethical. It further breaks down these broad areas into performance indicators focussing on both skill and awareness based indicators. 2) The Seven pillars model of information literacy developed through the work of the Society of College, National, and University Libraries (SCONUL) (American Library Association, 2009). The model describes seven pillars relating to a set of skills and competencies and a set of attitudes or understandings that are expected of an information literate person. The seven pillars described in the model are: identify, scope, plan, gather, evaluate, manage, and present. From both models evaluation is important for this study as they perceive the information literate person to be able to relate the information found to the search technique used and assess the quality and credibility of the information retrieved.

An eclectic approach was taken and relevant issues were selected from each of the models to guide this study. Wilson's model guided the choice to consider the context of students with regard to their level of study, and the schools in which they study. Their skills in ICT, Internet, use of search features and techniques, and use of electronic information resources, were explored as intervening variables. From the Johnson model, the study incorporated antecedents such as demographic information comprising of the level of study, the schools in which they study and their skill set (that is skills in ICT, Internet, use of search features and techniques, and use of electronic information resources). The ACRL and Seven pillar models guided questions on the ability to evaluate – not information or information sources, but their skills in ICT/computer use, internet use, use of search features and techniques and use of the electronic information resources available through the library.

2.6 CONCLUSION

This chapter discussed findings from the literature which are related to this study based on the research and sub-questions in chapter one. The findings influenced the choice of the research design that was used for the study. The next chapter gives the methodology that was used for the study.

CHAPTER 3: RESEARCH METHODOLOGY

3.1 INTRODUCTION

This chapter describes the research methodology and research design for the empirical component of the study. It covers the research approach for the study, the research method, the data collection methods, the sample and sampling technique, the method for data analysis, ethical requirements, and the reliability and validity of the study findings.

3.2 RESEARCH DESIGN

The research design provides the researcher with the strategies that give logical sequence that connects empirical data to the study's initial questions and its conclusions (Yin, 2003:20). It is important to give details on the research design used for the study as no one single design can serve the purpose of all types of research problems. As Kothari (2004:32) states, having a research design in place helps in the smooth sailing of the various research operations resulting to efficient research with minimal expenditure and maximum information. Kombo and Tromp (2006) observe that a research design is the glue that holds the elements in a research study together and it is the scheme that is used to generate answers to the research problem. This is supported by Yin (2003:21) who argues that a research design helps in avoiding the situation in which the evidence does not address the initial research questions. For purposes of this study the research design is accepted as the combination of the conditions and means for data collection and the analysis of data in a way that combines their relationship with the purpose and objectives of the research. The following sub-sections discuss the approach and methods used in this study.

3.2.1 Research approach

There are basically three approaches to research and the choice of the approach is dictated by the nature of the study. These are quantitative and qualitative (Kothari, 2004:5; Creswell, 2014:3) and a mixed methods approach which combines both the qualitative and quantitative approaches in the collection and the analysis of the data (Creswell, 2014; Leedy & Ormrod, 2013: 260). Whereas qualitative approach focuses on subjective assessment of attitudes, opinions and behaviours to bring out the human side of an issue, quantitative involves the expression of quantity and measurements of the phenomena (Kothari, 2004:3). According to Creswell (2009:3), the qualitative approach uses words and open ended questions while the quantitative approach uses figures and closed ended questions. For a mixed methods approach the researcher collects and analyses data in a single study by means of both quantitative and qualitative

methods, and integrates the findings by means of triangulation. Triangulation also includes the findings from the literature review (Pickard, 2013).

This study adopts a quantitative case study approach with limited qualitative data as it seeks a valid and objective description of the phenomenon. In this case, the study used graphs and tables to report the findings.

3.2.2 Research method

Research method refers to the methods and techniques that the researchers use in conducting the research to answer the research question and sub-questions (Kothari, 2004:7). One of the most commonly used methods is a case study. A case study is a descriptive study that reports data on one subject, individual or social process through an in-depth investigation of the discrete entity with the assumption that it is possible to derive knowledge of the wider phenomenon from a specific case (Gorman & Clayton, 2005:47). As observed by Singh (2007:65), case studies have been used worldwide as acceptable tools in research to report success stories, failures and innovative processes on one subject, individual or social process. One of the key strengths of case study research is that it establishes cause and effect in real-life context, especially when the phenomenon and context are not clearly evident (Yin, 2003:13). In this case, the relationship between information retrieval skills and using electronic information resources.

This study adopted a single case study method. The study is based on only students of one university, namely, Maseno University. Although the results might not be generalised to all students in all universities, other universities should be able to benefit from the findings by introducing relevant information literacy skill enhancement courses/programs to improve the students' information retrieval skills.

3.2.3 Methods of data collection

The methods of data collection used in this study include secondary and primary sources. The secondary sources was accessed in books, electronic sources, journals and empirical research as seen in the literature review section. The literature analysis covered related studies on the relationship between information retrieval skills and the use of electronic information resources in academic settings by students. This helped in the understanding of how the electronic information resources are used and how skills enhance the use of the electronic resources. The study in essence focused on the self-reported information retrieval skills of students at Maseno University and the impact on their use of the electronic information resources.

Primary data was collected by means of an electronic, semi-structured self-administered questionnaire. Questionnaires are widely used and useful instruments for collecting survey information as they usually

provide structured and numerical data, and can be effectively administered without the presence of the researcher (Cohen, et al. 2007). The use of the electronic questionnaire was appropriate for this study as the study population consisted of the students who are online and not physically present on-campus. A questionnaire is usually the best to employ when dealing with attitude and opinions (Saunders et al. 2007: 356). The questionnaire (see Appendix B) was made available via the eLearning portal of Maseno University.

3.2.4 Target population and sampling

Population is the aggregation of the study subjects from which the researcher wishes to draw the sample for study (Babbie, 2013:134). It refers to a group of people, activities or a collection of elements that the researcher wishes to investigate. Mugenda and Mugenda (2012) further define population as the entire group of individuals having common observable characteristics which conforms to a given specification. The target population for this study constitute 1001 students of Maseno University eCampus consisting of both undergraduate and postgraduate students. The choice of this population was informed by the ease of accessibility as the researcher would not require a lot of time to travel during the study.

Sampling is the means through which a selection of a few members of the population of study is done in carrying out the empirical study to give a representation of the population (Pickard, 2007:58). This selected members of the population is known as a sample. A sample is therefore a set of target respondents selected from the larger population for the purpose of the study (Singh, 2007). According to Kombo and Tromp (2006), sampling is the procedure a researcher uses to gather people, places and things to study. There are many types of sampling techniques that can be used which fall under two categories namely probability and non-probability sampling methods. While probability sampling gives each element a known probability of being included in the sample, non-probability sampling does not allow the researcher to determine such probability (Kothari, 2004:15).

For this study, a non-probability sampling technique known as deliberate or purposive sampling was used to select the desired number of students from the population of 1001. Purposive or deliberate selection of the population elements to constitute the sample to represent the universe and the inclusion is usually based on ease of access or convenience (Kothari, 2004). The researcher chose this method due to the fact that the population of study is well known to her and they can easily be reached hence this helped in redeeming time during the data collection process. Therefore, purposive sampling was used to select a sample from

the population of 1001 students of Maseno University eCampus which is one of the campuses within Maseno University.

From the 1001 students, the sample used was selected using a simplified formula for proportions for calculating sample sizes. According to Yamane (1967:886), for 95% confidence interval and P=0.5, the equation is:

$$n = \frac{N}{1 + N(e)^2}$$

Where *n* is the sample size, *N* is the population size, and *e* is the level of precision.

The level of precision, '*e*' sometimes called sampling error is the range in which the true value of the population is estimated to be. This range is often expressed in percentage points (that is + or - 5 percent) (Israel, 1992:1).

Confidence interval is an interval that contains the unknown parameter (such as the population mean, μ) with certain degree of confidence (Huang et al. 2003:3).

Applying the equation, to calculate the sample size,

$$n = \frac{1001}{1+1001(0.05)^2} = 286.$$

Therefore, the sample that was used was 286 students out of the target population of 1001 e-Campus students. Technical support was sought to help with the randomisation on who to be invited to participate.

3.2.5 Pilot study

The questionnaire was pilot tested. A pilot test is important in research and is usually done to ensure that the questionnaire is refined and hence as not to give respondents problems when answering questions and when recording the data (Saunders et al. 2007:386). Pilot tests also help in the assessment of the questions' validity and reliability by ensuring that the questions are well understood by the respondents. For this study, the pilot test of the questionnaires was done with peers who are fellow students undertaking Master of Information Technology as a course and colleagues at work who are pursuing undergraduate degree courses. This ensured validity and reliability of data collection tools. The questionnaire was adjusted accordingly based on the feedback during the pilot study.

3.3 RELIABILITY AND VALIDITY

Validity means the extent to which a research measuring instrument measures what it is supposed to measure and whether the findings are what they appear to be (Saunders et al. 2007:150; Leedy & Ormrod, 2005:29; Kothari, 2004:73). Reliability on the other hand is the consistency with which the measuring instrument yields a certain result or finding (Saunders et al. 2007:149). Reliability and validity take different forms depending on the nature of the research problem and the methodology. Validity and reliability are important in a research study as they concern the degree of error in measurements. To establish reliability, tests and retest methods are used where research is carried out more than once by other researchers (Pickard, 2013:22). For this study, a literature review together with quantitative and limited qualitative data from the questionnaire were used to ensure reliability.

3.4 DATA ANALYSIS

The quantitative data gathered was arranged, sorted and analysed using quantitative techniques of data analysis, then presented in the form of graphs and tables. A descriptive statistical method of data analysis was applied through the use of data analysis software, SPSS. On the other hand, the limited qualitative data is categorised in themes and analysed by means of an electronic based method. A detailed discussion and information on data analysis is given in chapter four of this study, indicating how data was analysed and interpreted.

3.5 ETHICAL CLEARANCE

Ethical clearance is critical in ensuring that the study adheres to the required standards of academic and research ethics. The researcher factored in the ethical considerations such as seeking ethical approval from the Department of Information Science Ethics Committee at the University of Pretoria (Appendix D) and from the Directorate, Maseno University Ethics Review Committee (Appendix F) where the research was conducted in a bid to maintain a high standard of integrity. Additionally, the researcher adhered to voluntary participation of respondents and maintained confidentiality of respondents in the study as indicated in the following sub-sections

3.5.1 Informed consent and assent

The guidelines for the protection of human subjects were followed as documented in the guidelines and procedures for collecting data at the eCampus of Maseno University. Written informed consent was obtained within the required standard of research operations following approval of the study procedures

from University of Pretoria and Maseno University (see Appendix C for the form for informed consent; Appendix D for letter of approval from University of Pretoria; Appendix E for letter of permission to collect data; and Appendix F for letter of approval from Maseno University). Each potential participant was given the informed consent form that addressed their rights and welfare as a participant in the study. The participants indicated consent by a yes or no to either continue with the online questionnaire or exit the questionnaire. All information collected during the study was treated with the necessary confidentiality.

3.5.2 Confidentiality

The researcher did not ask for information that could identify the participants such as their names and their student numbers. All results are reported in aggregate format and not according to individuals. No names of individuals are mentioned when reporting the results. Data was locked away safely using a safe and all the electronic documents with data are password protected. A copy of the informed consent documents was given to the participants for their records.

3.6 CONCLUSION

The chapter gave a summary of the research design, approach and method used together with a brief highlight on the data collection method used. Also given in the chapter is an outline of the population and sample size giving the method used in sampling and the reason for the choice of the sample population. A brief discussion on how the pilot study was used to test and evaluate the data collection tool is given and discussion on how the reliability and validity was dealt with. A description on how data was analysed and interpreted is also given. In the chapter, research ethical clearance issues are highlighted. All these informed the development of the questionnaire that was used for data collection and how the study was conducted. The next chapter reports the findings of the study.

CHAPTER 4: DATA ANALYSIS AND INTERPRETATION

4.1 INTRODUCTION

This chapter presents and discusses the findings of the data collected from the field research. The findings are presented according to the order of questions in the semi-structured questionnaire used to collect the data (*See Appendix B*). Quantitative findings are presented first, followed by the limited qualitative data collected through the open-ended questions. Qualitative data are presented according to themes developed from the thematic analysis coding. The following research question and sub-questions were addressed by the empirical data collected:

Research question:

> *What are the self-reported information retrieval skills of students at Maseno University Library and how are these impacting on their use of electronic information resources?*

Sub-questions:

Sub-questions addressed through literature analysis	**Sub-questions addressed by data collection**
How is electronic information resources used in academic contexts, with specific reference to use by students and the impact of information retrieval skills?	How do students at Maseno University self-rate their information retrieval skills in using electronic information resources?
What is the assessment of students' information retrieval skills, and specifically on their self-assessment of their skills?	How does their perceptions on their ICT skills relevant to information retrieval influence their use of electronic information resources?
How does self-efficacy and the use of electronic information resources influence the overall search experience?	How does their perceptions of their information retrieval skills influence their overall search experiences when using electronic information resources?

4.2 SUMMARY OF THE DATA COLLECTED

This section provides an understanding of the characteristics of the respondents and the response rate. The research study used a purposive sampling method as discussed in chapter 3 (Section 3.2.4). The 286 potential participants were purposively selected to participate in the survey. The selection was done across the various schools and proportionally distributed according to the level of study. A semi-structured self-administered electronic questionnaire was made available through the eLearning portal of Maseno University. From the 286 people invited, 278 questionnaires were completed, giving a return rate of 96.2%. Three records were omitted owing to the level of incompleteness. The participation rate is summarised in Table 4.1, Figure 4.1 and Figure 4.2.

Table 4.1: Questionnaire participation rate

Schools	First year Undergraduate n=30 (%)[3]	Second year Undergraduate n=65 (%)	Third year Undergraduate n=71 (%)	Fourth year Undergraduate n=82 (%)	Master n=27 (%)	Total n=275 (%)
Institute of Gender Studies	1 (3.3)	0 (0.0)	0 (0.0)	1 (1.2)	0 (0.0)	2 (0.7)
School of Planning and Architecture	0 (0.0)	0 (0.0)	1 (1.4)	1 (1.2)	6 (22.2)	8 (2.9)
School of Public Health and Community Development	0 (0.0)	1 (1.5)	3 (4.2)	4 (4.9)	12 (44.4)	20 (7.3)
School of Science	0 (0.0)	6 (9.2)	6 (8.5)	7 (8.5)	0 (0.0)	19 (6.9)
School of Agriculture and Food Security	4 (13.3)	12 (18.5)	7 (9.9)	8 (9.8)	0 (0.0)	31 (11.3)
School of Biological and Physical Sciences	1 (3.3)	2 (3.1)	0 (0.0)	4 (4.9)	0 (0.0)	7 (2.5)
School of Business and Economics	10 (33.3)	19 (29.2)	6 (8.2)	15 (18.3)	0 (0.0)	50 (18.2)
School of Computing and Informatics	0 (0.0)	1 (1.5)	3 (4.2)	8 (9.8)	0 (0.0)	12 (4.4)
School of Development and Strategic Studies	3 (10.0)	2 (3.1)	14 (19.7)	8 (9.8)	1 (3.1)	28 (10.2)
School of Education	8 (26.7)	13 (20.0)	20 (28.2)	16 (19.5)	7 (25.9)	64 (23.3)

[3] For all % the number is given in brackets after the number of respondents

School of Environmental and Earth Sciences	0 (0.0)	1 (1.5)	2 (2.8)	4 (4.9)	0 (0.0)	7 (2.5)
School of Mathematics, Applied Statistics and Actuarial Science	3 (10.0)	2 (3.1)	3 (4.2)	1 (1.2)	0 (0.0)	9 (3.3)
Did not Indicate the school	0 (0.0	6 (9.2)	6 (8.5)	5 (6.1)	1 (3.7)	18 (6.5)
Total	**30 (100.0)**	**65 (100.0)**	**71 (100.0)**	**82 (100.0)**	**27 (100.0)**	**275 (100.0)**

In the analysis of data, no consideration was put on to which school the respondents come from and their level of study even though it was important to know the representation per schools and level of study.

The findings in table 4.1 demonstrate that all the schools had participants which were distributed proportionally according to the levels of study. The respondents from the different schools for the different levels ranged between 0 and 64. Of those who participated, eighteen respondents out of the total 275 (6.5%) participants did not indicate their schools. The findings also showed that the School of Education had the highest (64/275; 23.3%) number of respondents while Institute of Gender Studies had the lowest (2/275; 0.7%) number of respondents.

Figure 4.1: Questionnaire participation per school

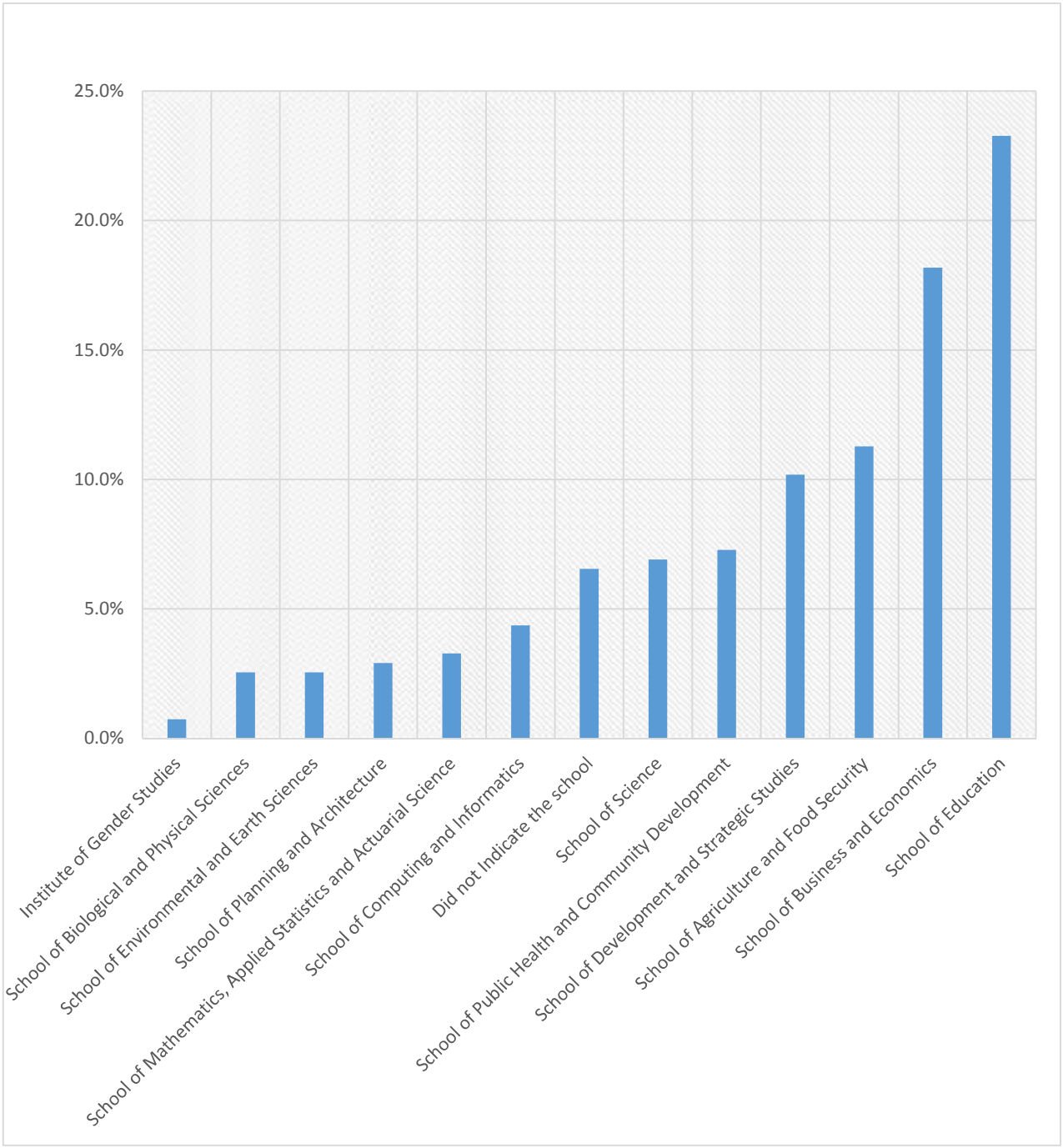

Figure 4.1 is a graph showing how the participants were selected across the thirteen schools of Maseno University eCampus. It gives the percentages of participation starting from the lowest percentage to the highest. This is not reflected in the analysis of the result.

Figure 4.2: Questionnaire participation per level of study

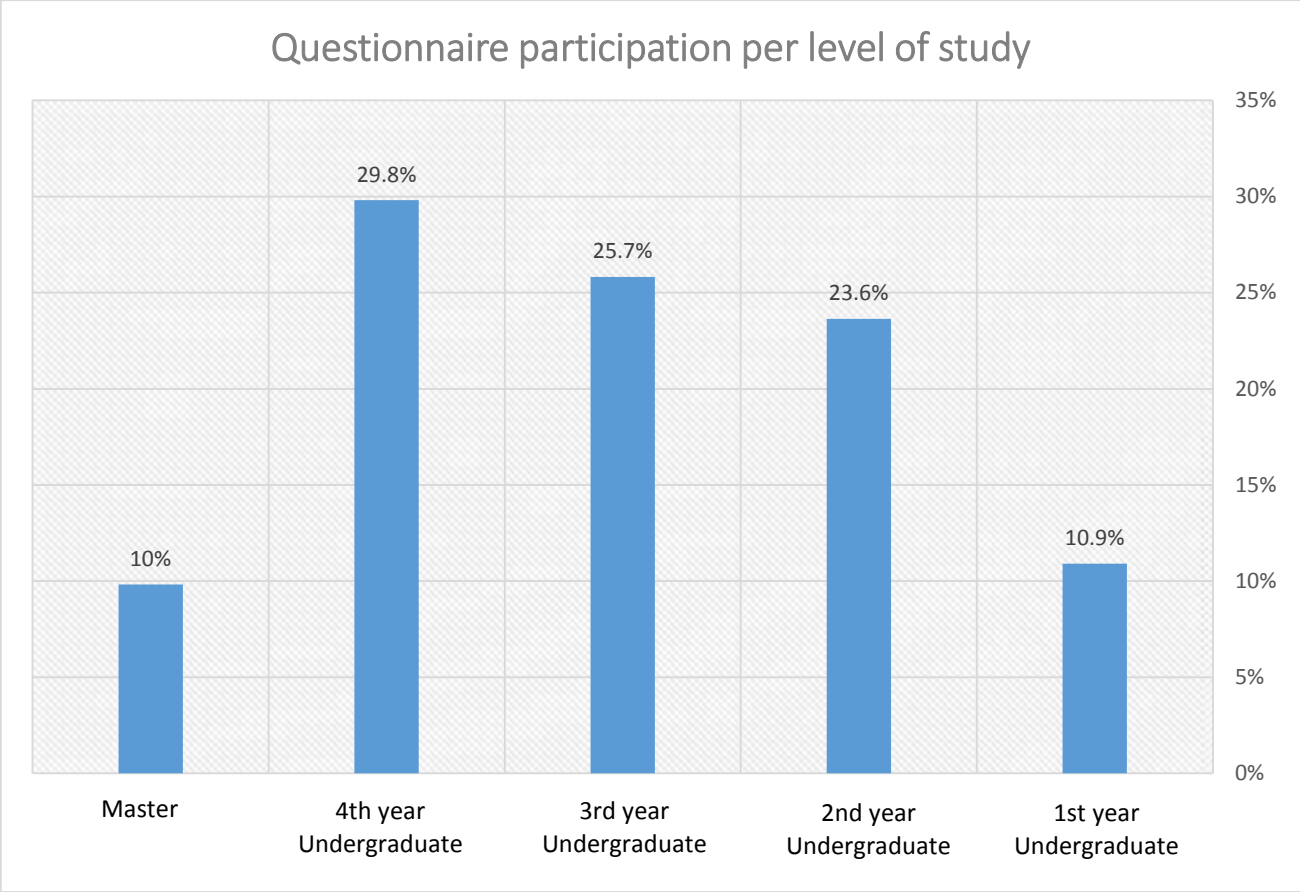

Figure 4.2 depicts the level of study of the respondents. The findings in this figure show that the participation rate per level of study ranged between 10% and 29.8%. From this figure, undergraduates had the highest (90%) participation and the postgraduate had 10% participation. Of the undergraduate participants, 4th year students were the majority (29.8%).

4.3 QUANTITATIVE FINDINGS AND ANALYSIS

4.3.1 Perceptions of students on their ICT skills

Question 3 (Appendix B) asked the participants to rate their ICT skills. A four point Likert scale (very good, good, fair and poor) was used to enable the students to self-rate their skills on the various ICT tasks listed that are relevant to information retrieval. 275 participants responded to the question. Table 4.2 displays a summary of the findings. From the result of the findings, it was noted that majority of the participants rated their skills on general use of computers and computer devices as very good 199/275 (72.4%) and good

61/275 (22.2%), with a few indicating fair 14/275 (5.1%) and poor 1/275 (0.4%). The aggregated results for very good and good for the ICT related tasks are: 260/275 (94.5%) for general use of computers and computer devices, 248/275 (90.2%) for basic computer operations, 244/275 (88.7%) for storing information on alternative devices, 206/275 (74.9%) for using cloud storage, 240/275 (87.3%) for transferring information form one computer device to another, 248/275 (90.2%) for downloading information, 243/275 (88.4%) for printing information, 226/275 (82.2%) for finding information stored on devices, 253/275 (92%) for web browsing, and 253/275 (92%) for online communication via e-mail. A small percentage (45/275; 16.4%) of participants rated their skills in performing the different ICT tasks listed as poor. The results for Question 3 (Appendix B) are summarised in Table 4.2 below.

Table 4.2: Students' perceptions of their ICT skills

ICT Tasks	Very good n=275 (%)	Good n=275 (%)	Fair n=275 (%)	Poor n=275 (%)
General use of computers and computer devices like a mouse, touchpad and keyboard	199 (72.4)	61 (22.2)	14 (5.1)	1 (0.4)
Basic computer operations e.g. using Word processing software	163 (59.3)	85 (30.9)	25 (9.1)	2 (0.7)
Storing information on alternative devices e.g. flash disc/USB, external hard drive	167 (60.7)	77 (28.0)	30 (10.9)	1 (0.4)
Using cloud storage	110 (40.0)	96 (34.9)	47 (17.1)	22 (8.0)
Transferring information from one computer device to another	145 (52.7)	95 (34.5)	31 (11.3)	4 (1.5)
Downloading information	167 (60.7)	81 (29.5)	26 (9.5)	1 (0.4)
Printing information	156 (56.7)	87 (31.6)	28 (10.2)	4 (1.5)
Finding information stored on a device or cloud storage	129 (46.9)	97 (35.3)	41 (14.9)	8 (2.9)
Web browsing	164 (59.6)	89 (32.4)	21 (7.6)	1 (0.4)
Online communication via e-mail, telecommunication, online discussion forums, etc.	160 (58.2)	93 (33.8)	21 (7.6)	1 (0.4)

4.3.2 Perceptions of students of their Internet skills

Question 4 (Appendix B) asked students to self-rate their internet skills. A four point Likert scale was used, namely: very good, good, fair and poor. A list of internet related tasks were given where they were required to rate all Internet skills listed. The results are as summarised in Table 4.3. From the results, 275 participants responded to all the Internet skills listed for this question. The results indicate that the majority of the respondents chose very good and good for their skills in browsing, using search engines for personal

information needs, downloading information, printing information, sharing information via social media, using cloud storage, online communication via e-mail, telecommunication, and online discussion forums. Reponses for "very good" regarding Internet skills ranged between 41.8% and 66.5%. Responses for "good" regarding Internet skills ranged between 26.9% and 37.5%.

It was also noted from the results that some respondents indicated their skills in some internet tasks as poor; 1/275 (0.4%) for browsing, 5/275 (1.8%) for printing information, 2/275 (0.7%) for sharing information through social media, 13/275 (4.7%) for using cloud storage, 1/275 (0.4%) for online communication and 1/275 (0.4%) for social media use. The summary of the results is given in Table 4.3.

Table 4.3: Students' self-rated Internet skills

Internet related tasks	Very good n=275 (%)	Good n=275 (%)	Fair n=275 (%)	Poor n=275 (%)
Browsing	183 (66.5)	74 (26.9)	17 (6.2)	1 (0.4)
Using search engines for personal information needs	156 (56.7)	95 (34.5)	24 (8.7)	0 (0.0)
Downloading information	176 (64.0)	77 (28.0)	22 (8.0)	0 (0.0)
Printing information	150 (54.5)	99 (36.0)	21 (7.6)	5 (1.8)
Sharing information such as via social media	160 (58.2)	88 (32.0)	25 (9.1)	2 (0.7)
Using cloud storage	115 (41.8)	103 (37.5)	44 (16.0)	13 (4.7)
Online communication via e-mail, telecommunication, and online discussion forums.	164 (59.6)	91 (33.1)	19 (6.9)	1 (0.4)
Social media such as Facebook, Instagram	183 (66.5)	74 (26.9)	17 (6.2)	1 (0.4)

4.3.3 Frequency of use of the electronic information resources by students

Question 5 (Appendix B) asked participants to indicate how often they used the various electronic information resources. A five point Likert scale namely: daily, weekly, fortnightly, monthly and not at all was used. The results are summarised in Table 4.4. From the results, majority of the participants indicated that they use electronic information resources daily and weekly, some indicated that they use the various electronic information resources fortnightly and monthly, a considerable number of participants also indicated that they do not use them at all. The findings of these items showed that Internet sources received the highest 162/275 (58.9%) daily usage. The daily usage for online databases was 115/275 (41.8%), 82/275 (29.8%) for OPAC, 77/275 (28%) for e-books, 64/275 (23.3%) for reference management software, 61/275 (22.2%) for e-journals and 60/275 (21.8%) for institutional repositories. There were participants who did

not use electronic information resources at all. Reference management software had the highest non-use which was rated at 71/275 (25.8%), followed by institutional repositories 45/275 (16.4%), OPAC 37/275 (13.5%), e-journals 33/275 (12%), e-books 29/275 (10.5%), online databases 17/275 (6.2%) and Internet sources 2/275 (0.7%).

Table 4.4: Use of the electronic information resources by students

Electronic information resources	Daily n=275 (%)	Weekly n=275 (%)	Fortnightly n=275 (%)	Monthly n=275 (%)	Not at all n=275 (%)
E-books	77 (28.0)	99 (36.0)	40 (14.5)	30 (10.9)	29 (10.5)
E-journals	61 (22.2)	102 (37.1)	37 (13.5)	42 (15.3)	33 (12.0)
Institutional repositories	60 (21.8)	100 (36.4)	42 (15.3)	28 (10.2)	45 (16.4)
Internet sources	162 (58.9)	75 (27.3)	22 (8.0)	14 (5.1)	2 (0.7)
Online databases	115 (41.8)	94 (34.2)	26 (9.5)	23 (8.4)	17 (6.2)
Online Public Access Catalogue (OPAC)	82 (29.8)	82 (29.8)	41 (14.9)	33 (12.0)	37 (13.5)
Reference management software such as Zotero, Mendely, Refworks	64 (23.3)	73 (26.5)	42 (15.3)	25 (9.1)	71 (25.8)

4.3.4 Perceptions of students on their skills in using electronic information resources

The students were asked in question 6 (Appendix B) to self-rate their skills in using the various information resources that they use. A four point Likert scale (very good, good, fair and poor) was used. The summary of the findings is displayed in Table 4.5. The result from this analysis showed that the majority of the respondents rated their skill for using the various information resources as very good and good. A small percentage of the respondents rated their skills for using the electronic resources as poor.

Table 4.5: Students' self-rated skills in using electronic information resources

Electronic information resources	Very good n=275 (%)	Good n=275 (%)	Fair n=275 (%)	Poor n=275 (%)
E-books	109 (39.6)	116 (42.2)	35 (12.7)	15 (5.5)
E-journals	83 (30.2)	124 (45.1)	50 (18.2)	18 (6.5)
Institutional repositories	99 (36.0)	95 (34.5)	48 (17.5)	33 (12.0)
Internet sources	162 (58.9)	88 (32.0)	20 (7.3)	5 (1.8)
Online databases	121 (44.0)	107 (38.9)	39 (14.2)	8 (2.9)
Online Public Access Catalogue (OPAC)	98 (35.6)	96 (34.9)	50 (18.2)	31 (11.3)
Reference management software such as Zotero, Mendely, Refworks	75 (27.3)	91 (33.1)	54 (19.6)	55 (20.0)

The findings as depicted in table 4.5 show that majority of the respondents have very good and good skills in using various electronic information resources. Of these resources, internet sources had the highest rating 250/275 (90.9%) for very good and good. The aggregated results for very good and good for the skills in the use of the other electronic resources were online databases, 228/275 (82.9%); e-books 225/275 (81.8%); e-journals, 207/275 (75.3%); institutional repositories, 194/275 (70.5%); OPAC, 194/275 (70.5%); and reference management software, 166/275 (60.4%). In addition, a number of respondents ranging between 5 and 55 indicated their usage of various electronic information resources as poor with reference management software having the highest number, 55/275 (20%).

4.3.5 Perceptions of students on their skills in using search features and techniques

Question 7 (Appendix B) asked the participants to self-rate their skills in using the search features and techniques. Different search features and techniques were listed where the participants used a five point Likert scale (very good, good, fair, poor and have never used) to rate their skills. The findings are presented in Table 4.6. The results indicated that, majority rated their skills for the various search features as very good and good. From the findings, some participants indicated their skills in using the search features and techniques as poor. A number of participants indicated that they had never used the various search features and techniques.

Table 4.6: Students' self-rated skills in using search features and techniques

Search features and techniques	Very good n=275 (%)	Good n=275 (%)	Fair n=275 (%)	Poor n=275 (%)	Have never used n=275 (%)
Locating electronic databases from the library website	104 (37.8)	109 (39.6)	38 (13.8)	7 (2.5)	17 (6.2)
Selecting an appropriate database(s)	101 (36.7)	109 (39.6)	49 (17.8)	5 (1.8)	11 (4.0)
Searching more than one database at once	98 (35.6)	106 (38.5)	48 (17.5)	8 (2.9)	15 (5.5)
Title searches	126 (45.8)	97 (35.3)	38 (13.8)	8 (2.9)	6 (2.2)
Author searches	116 (42.2)	102 (37.1)	44 (16.0)	4 (1.5)	9 (3.3)
Keyword searches	126 (45.8)	103 (37.5)	34 (12.4)	4 (1.5)	8 (2.9)
Boolean operators (OR, AND, NOT)	78 (28.4)	94 (34.2)	55 (20.0)	14 (5.1)	34 (12.4)
Truncation techniques (such as $, *, +)	82 (29.8)	97 (35.3)	55 (20.0)	15 (5.5)	26 (9.5)
Searching in a combination of specific fields such as an author in the author field and a search term in the title field	95 (34.5)	98 (35.6)	54 (19.6)	12 (4.4)	16 (5.8)
Filtering search results such as specifying the year of publication, language	101 (36.7)	103 (37.5)	46 (16.7)	12 (4.4)	13 (4.7)
Displaying the search results	107 (38.9)	110 (40.0)	42 (15.3)	9 (3.3)	7 (2.5)
Recognising relevant information	124 (45.1)	97 (35.3)	44 (16.0)	4 (1.5)	6 (2.2)
Selecting relevant information for further use	107 (38.9)	112 (40.7)	44 (16.0)	6 (2.2)	6 (2.2)
Downloading relevant records to reference management software	113 (41.1)	98 (35.6)	48 (17.5)	9 (3.3)	7 (2.5)
Sharing relevant records via e-mail	125 (45.5)	92 (33.5)	47 (17.1)	6 (2.2)	5 (1.8)
Printing relevant records	124 (45.1)	99 (36.0)	36 (13.1)	10 (3.6)	6 (2.2)
Setting up alerts such as to be notified about new information on a topic, the work of an author	89 (32.4)	125 (45.5)	42 (15.3)	7 (2.5)	12 (4.4)
Downloading the full-text of an article such as in PDF, HTML format	130 (47.3)	100 (36.4)	36 (13.1)	6 (2.2)	3 (1.1)
Gaining access to an e-book/chapters of a book or other electronic publication	103 (37.5)	113 (41.1)	42 (15.3)	8 (2.9)	9 (3.3)
Requesting an article/book through the library	101 (36.7)	100 (36.4)	46 (16.7)	9 (3.3)	19 (6.9)

The findings in table 4.6 show that majority of the respondents had good skills in using the search features and techniques with the percentage of "very good" and "good" ranging between 28.4% and 47.3% for very

good and 33.5% and 45.5% for good. A number of respondents indicated that their skills in using the search features and techniques is fair. The percentages of the "fair" ratings range between 12.4% and 20% across the use of various search features and techniques. However, the findings also showed that a few respondents with the percentages ranging between 1.5% and 5.5%, rated their skill in using the various search features and techniques as poor. In addition, there were respondents ranging between 1.1% and 12.4% who had "never used" various search features and techniques. Search features and techniques such as truncation techniques and Boolean operators had the highest "never used" percentages of 9.5% and 12.4% respectively.

4.4 QUALITATIVE FINDINGS AND ANALYSIS

Question 8 and 9 (Appendix B) were open ended questions which were asked with the intention to collect qualitative data. They covered the opinion of the respondents on their self-rating skills and their opinion on how they could improve their information retrieval skills.

4.4.1 Students' opinion on their ability to self-rate their skills

Question 8 (Appendix B) tried to find out opinions of respondents on how they are equipped on self-rating their information retrieval skills. From the responses, certain categories emerged. These included: well equipped, above average, average, fair, not sure. The respondents who said they were well equipped were 197/275 (71.6%); while those who indicated their self-rating skill as above average were, 43/275 (15.6%), 11/275 (4%) for average 21/275 (7.6%) for fair and 3/275 (1.1%) were not sure. Some of the responses were as follows: 'I am comfortable that I have sufficient skills to self-rate'; I am 80% well equipped to self-rate my retrieval skills'; 'I am well equipped and believe in my skills'; 'I think I am properly equipped'; 'I am above average'; 'I am neither perfect, but above average'; 'Moderately equipped'; 'On a scale of 0-10, I can give myself a score of 6'; 'I would give myself 50%'; 'Neither good nor bad'; 'Fair'; 'Not sure'.

From question 8 (Appendix B), the researcher hoped to get opinions that are qualitative as the question was open ended without any leading answer but instead ended up getting responses that are more quantitative than qualitative

4.4.2 Students' opinion on how to improve their information retrieval skills

Question 9 (Appendix B) asked the respondents to give their suggestion on how to improve their information retrieval skills. They were allowed to write as many answers as they could. Thematic analysis was used to analyse the responses. Four categories emerged as follows: (1) Regular practice; (2) Training;

(3) Self-learning; (4) Self-efficacy and positive attitude. These are briefly explained in section 4.4.2.1 - 4.4.2.4 with supporting quotations from the respondents' answers. These responses were not edited.

4.4.2.1 Regular practice

It was found that 102/275 (37.1%) of the respondents preferred to improve their information retrieval skills through regular practice. The following are some of the responses: 'I believe that practice makes perfect and asking for guidance or help where I am stuck will give me an opportunity to learn more and improve my skills'; 'Practicing more and involving myself more in information retrieval tasks'; 'Frequent practice can help me learn a lot'; 'Daily use and access to the online databases can help me to enhance my skills'; 'To improve my information retrieval skills, I need to do thorough daily practice'; 'To learn more, I must practice'; 'In my own opinion, I need to practice more to improve my skills'.

However, on the contrary, some respondents indicated that they do not have problems with their information retrieval skills as what they have is sufficient for them. Some of the responses received in this regard included: 'I am good to go with my information retrieval skills'; and 'I consider what I have as sufficient as I can be able to get what I need.'

4.4.2.2 Training

A number of respondents, 146/275 (53.1%), indicated that they needed training or consultation in order to improve their information retrieval skills. Some of the responses received are as follows: 'We should be taught more often to gain the skills for information retrieval'; 'I need to consult the librarian for training on areas that can help me improve my skills'; I am ready to study further about information retrieval to improve my skills'; 'I need to interact more with experts in this field to enhance my skills'; 'Consulting experts plus some training can greatly boost my information retrieval skills'; 'Need to attend regular training'; 'I suggest that there should be a course where we are taught these skills'; 'Take an online course on the same if available'. On the contrary, with responses such as: 'I am good to go with my information retrieval skills'; 'I consider what I have as sufficient as I can be able to get what I need', it can be noted that a few respondents do not need training as they indicated that what they already have is sufficient.

4.4.2.3 Self-learning

A few respondents, 8/275 (2.9%), stated they can improve their information retrieval skills through self-learning. The following were their responses: 'I need to have an open mind set to learn new things to enable

me improve my skills'; 'I will have to read more to know more'; I should be eager to know more in order to improve my skills'; 'I am ready to study more of the skills so as to improve my information retrieval skills'; 'Being ready to learn more about the skills'; 'Asking my friends'; 'Learning from others'.

4.4.2.4 Self-efficacy and positive attitude

A few respondents, 3/275 (1.1%) stated that for them to improve their information retrieval skills, they need to have a positive attitude and believe that they can do it. The following are their responses: 'By developing a very positive interest towards learning the skills'; 'I need to have the interest and do more practice as well'; 'Setting my mind that I can do it and having a positive attitude will enable me to enhance my retrieval skills'. While 2/275 (0.3%) indicated that they have sufficient skills that do not need any improvement, 1/275 (0.4%) indicated that he/she will do nothing to improve the skills in information retrieval.

4.5 TRIANGULATION

From the analysis of quantitative and the limited qualitative data, it is clearly evident that the perceived students' skills in relation to ICT, Internet, use of electronic information resources, search features and techniques are generally good as the majority rated these skills as either good or very good. These are confirmed from the qualitative data where the majority of the students indicated that they have good information retrieval skills. However, a number of students indicated their skills as fair and poor. This is also reinforced through the qualitative findings where there are needs for regular practice, training and positive attitude to help improve and develop the skills.

The findings from the literature as discussed in section 2.4.5 reveal that skills in ICT and Internet play a major role in improving access to electronic information resources. This as seen from the findings confirm that there is a direct correlation between students' skills in ICT and Internet, and the use of the electronic information resources, information retrieval skills and skills in using search features and techniques.

Contrary to what the findings from the literature revealed, from the questionnaire findings, the majority of the students self-rated their skills as good while those of the other studies as discussed in sections 2.4.2 and 2.4.3 showed that students did not have adequate skills in using the electronic information resources and hence low usage reported. However other studies as discussed in section 2.4.1 indicate that the electronic information resources have become important in institutions of higher learning and have been embraced by institutions worldwide.

A few students also indicated that there was a need to have the right attitude and confidence in order to have the information retrieval skills. This finding is in agreement with previous studies such as Wu and Yeh (2012) and Ren (2000) who found that students were not confident about their capabilities in using the library's electronic resources and that acquisition of skills generates from positive attitude.

While self-assessment has been used in several studies in information literacy and learning in higher education to yield solid findings, it cannot be overlooked that using this kind of assessment has also been criticised to have some short-comings. As reported in studies by Rosman, et al. (2015), Freund and Kasten (2012) and Gavin, et al. (2015), among other studies carried out in different contexts of learning, it has been indicated that people with lower skills tend to rate themselves high and this calls for use of other methods of assessment alongside the self-assessment. This study focussed only on self-assessment.

4.6 CONCLUSION

This chapter has presented and discussed the findings of the data that was collected through the use of a semi-structured self-administered questionnaire and analysed according to the sub-questions. Qualitative data were categorised in themes. The findings were presented through the use of tables, graphs and text narratives. The researcher investigated respondents' self-assessment of information retrieval skills in using the electronic information resources. The next chapter focuses on the main findings that emerged from the study, giving conclusions and recommendations based on the findings and the literature review in chapter 2.

CHAPTER 5: SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 INTRODUCTION

This chapter presents the summary of main findings of the study and highlights the methodology that was used. The summary of the findings is in line with the research question and sub-questions. The value of the study and study limitations are also highlighted. It further provides the conclusions and recommendations for further improvement. Recommendations on areas for future research are also presented.

The following research question and sub-questions were addressed in the study:

Research question:

> *What are the self-reported information retrieval skills of students at Maseno University Library and how are these impacting on their use of electronic information resources?*

Sub-questions addressed through literature analysis:

(a) How is electronic information resources used in academic contexts, with specific reference to use by students and the impact of information retrieval skills?
(b) What is the assessment of students' information retrieval skills, and specifically on their self-assessment of their skills?
(c) How does self-efficacy and the use of electronic information resources influence the overall search experience?

Sub-questions addressed by data collection:

(a) How do students at Maseno University self-rate their information retrieval skills in using electronic information resources?

(b) How does their perceptions on their ICT skills relevant to information retrieval influence their use of electronic information resources?

(c) How does their perceptions of their information retrieval skills influence their overall search experiences when using electronic information resources?

The findings from the above questions is discussed in section 5.3.

5.2 SUMMARY OF THE STUDY

The study was a case study of students at Maseno University eCampus. It sought to investigate how the students self-rate their information retrieval skills in using the electronic information resources available in the library. The focus was on one of the campuses of the University, the eCampus. Table 5.1 gives a summary of how the study was conducted, details of the participants and the sample, the research methods and approaches used as well as the data collection method. It also gives the institution used as case study and the number of participants. Period of the study, ethical issues and adherence to confidentiality as well as how the researcher ensured validity and reliability of the study are also indicated.

Table 5.1 Summary of the study

Study conducted	The study was a case study on self-assessment of information retrieval skills in using electronic information resources by students at Maseno University.
Participants and sample	The target population was eCampus students comprising of both undergraduate and postgraduate students. Purposive sampling as well as random sampling was used since the researcher had knowledge of who the participants were.
Institution used as case study	Maseno University
Research methods	Multiple method (quantitative with limited qualitative)
Research approach	Case study
Methods of data collection	A semi-structured self-administered electronic questionnaire was used to collect data from the participants.
Number of participants	The electronic questionnaire was sent to 286 participants, 278 completed the questionnaire, 3 were incomplete and 275 were analysed.
Period of the study	Data collection was carried out between September to mid-October 2017.

Ethical clearance issues adherence	Ethical approval was granted through a letter by the Department of Information Science, University of Pretoria (which is the degree-granting institution) in August 2017 (see Appendix D). Permission to carry out research at Maseno was requested through the Maseno University Ethical Review Committee in September 2017 and approval was granted through a letter in September 2017 (see Appendix E and F). All participants signed a form of informed consent.
Confidentiality addressed	A declaration letter was signed by the researcher before conducting the research (see Appendix G).

5.3 FINDINGS FOR SUB-QUESTIONS

In this section, a summary of answers to the sub-questions as outlined in chapter 1, section 1.3.2, and Section 5.1 is presented.

5.3.1 Findings from the literature

5.3.1.1 Use of electronic information resources in academic contexts

The literature as discussed in chapter 2, section 2.4.2 revealed that the electronic information resources are now widely used in most institutions of higher learning for academic purposes by students of all levels, lecturers and researchers. It was noted that certain factors contribute to the use of these resources. These factors include among others: access to information that might be restricted to the user due to geographical location or finances; access to more current information and other additional extensive links of related contents; and access to information without geographical barriers and physical location challenges.

However, other research findings also revealed that students do not use electronic information resources due to some of the following factors: inadequate computer skills, lack of awareness of the existence of the electronic resources, low bandwidth, lack of information retrieval skills, students' information behaviour, lack of information searching skills, limited space, and erratic power supply among others. Of interest to

this study is the lack of information retrieval skills which was reported in studies by Konappa (2014), Ekenna and Iyabo (2013), and Dhanavandani, et al. (2012).

5.3.1.2 Assessment of students' information retrieval skills

Research results from previous studies as discussed in section 2.4.3 indicated that possession of and acquisition of relevant information retrieval skills by students lead to effective searching and use of the electronic information resources. Particular studies have been discussed in section 2.4.3 of this study such as those by Islam and Tsuji (2010), Korobili, et al. (2009), Tang and Tseng (2013) and Swain and Panda (2009) indicating that students have limited information skills and that a good number of students have not attended the information literacy courses. They also revealed that there is a slight difference between those who have attended the information literacy course and those who have not in respect to the frequency of use of the electronic information resources and mastery of information retrieval process and use of the electronic information resources. Even though the findings of these studies indicated that the majority of the students have good skills in the various aspects of information retrieval, it however affirmed the need for training and regular practice as indicated by a good number of students.

5.3.1.3 Self-efficacy and the use of electronic information

From the literature, studies revealed that successful use of electronic information resources does not only occur as a result of the possession of the information retrieval skills, but also requires one to have confidence and competence in the use of the skills as discussed in detail in section 2.4.4 of this study. Such studies relate self-efficacy to the use of the electronic information resources. Some of these studies were done by Wu and Yeh (2012) and Ren (2000) which revealed that students were not confident about their capabilities in using the library's electronic resources. They also show that there exists a correlation between positive attitude and acquisition of the skills in using the electronic information resources. This study confirms that positive attitude is one of the aspects that can help in the improvement of the information retrieval skills and in using the electronic information resources.

5.3.2 Findings from the empirical component

The majority (90%) of the respondents were undergraduate students with a small percentage (10%) postgraduate students. Of the 90% undergraduate students, the majority (40%) of the respondents were fourth year students. All thirteen schools were represented with a high percentage (23.3%) of participation coming from the school of Education.

5.3.2.1 How do students at Maseno University self-rate their information retrieval skills in using electronic information resources?

According to the literature reviewed, students do have limited skills in using the electronic information resources. This study, however, established that students had good information retrieval skills. However, it must be acknowledged that as a limitation of self-rating, students may rate their skills higher than what they actually are. This was established from both the qualitative and quantitative data collected which listed various aspects of the information retrieval skills about which students were confident: Internet skills (browsing, using search engines for personal information needs, downloading information, printing information, sharing information such as via social media, using cloud storage, online communication via e-mail, telecommunication, online discussion forums).

Furthermore, they also showed confidence in the use of electronic information resources (e-books, e-journals, institutional repositories, internet sources, online databases, OPAC, reference management software such as Zotero, Mendely, Refworks); and confidence in using search features and techniques (locating electronic databases from the library website, selecting an appropriate database(s), searching more than one database at once, title searches, author searches, keyword searches, boolean operators (OR, AND, NOT), truncation techniques (such as $, *, +), searching in a combination of specific fields such as an author in the author field and a search term in the title field, filtering search results such as specifying the year of publication, language, displaying the search results, recognising relevant information, selecting relevant information for further use, downloading relevant records to reference management software, sharing relevant records via e-mail, printing relevant records, setting up alerts such as to be notified about new information on a topic, the work of an author, downloading the full-text of an article such as in PDF, HTML format, gaining access to an e-book/chapters of a book or other electronic publication, requesting an article/book through the library).

A number of students, however, indicated that they have poor skills in various aspects of the information retrieval skills and yet a few have never used some of the search features and techniques and the electronic information resources. Generally, the indication of good information retrieval skills and the use of the electronic information resources impact positively as the majority of the students indicated to be using the electronic information resources either daily or weekly.

5.3.2.2 How does their perceptions of their ICT skills relevant to information retrieval influence their use of electronic information resources?

From the literature, it was found as discussed in section 2.4.5 of this study that the ICT skills are important as they are catalysts for improving the use of the electronic information resources. This is confirmed through this study as the majority of the students rated their skills in ICT tasks as very good and good. These tasks were listed as: general use of computers and computer devices such as a mouse, touchpad and keyboard; basic computer operations such as using Word processing software; storing information on alternative devices such as flash disc/USB, external hard drive; using cloud storage; transferring information from one computer device to another; downloading information; printing information; finding information stored on a device or cloud storage; web browsing; online communication via e-mail, telecommunication, and online discussion forums.

It is therefore clear that the high frequency of usage of the electronic information resources is greatly influenced by the good ICT skills of the students. However, there was also an indication of poor skills in ICT as stated by a number of students. These poor skills account for the non-use of the various electronic information resources as reported by a few students.

5.3.2.3 How does their perceptions of their information retrieval skills influence their overall search experiences when using electronic information resources?

From this study, it emerged that the majority of the students perceive their information retrieval skills as good. Through their opinions, it is noted that the majority rated their skills as: ‘Excellent’, ‘Above average’, ‘Very good’, and ‘Good’ even though a few students rated their skills as ‘Fair’ and ‘Poor’. In comparison to the use of the electronic information resources and search features and techniques, it can be noticed that (see Table 4.4 and Table 4.6) the majority of the students use them frequently and a few do not use them at all. The analysis as presented in chapter four of this study clearly established that the perceptions of the students of their information retrieval skills directly influences the use of the electronic information resources and the search features and techniques. In improving the retrieval skills and search experiences, the students indicated that they would need regular practice, training, self-learning and self-efficacy and positive attitude.

5.4 LIMITATIONS OF STUDY

The study was only carried out with students at one institution. The results might have been different if more than one case institution were involved.

A semi-structured questionnaire was the only tool that was used to collect data as the target population could not be easily reached physically due to their mode of learning. Focus group interviews could have added more weight to the data collected.

The study was based on the self-rating which is a valid method to get some idea especially on low ratings. However, for high ratings this kind of evaluation need to be supplemented with other methods of evaluations for better results.

5.5 VALUE OF THE STUDY

This study is beneficial to librarians who can use it to inform the development of an appropriate information literacy programme with a stronger focus on information retrieval skills to support students at Maseno University in meeting their information needs, and to strengthen students' abilities of self-assessment and constructivist learning. Findings can be used to improve their overall experiences of information searching using the electronic information sources available through the library. The findings of this study may also be useful for information literacy practitioners, researchers and policymakers to further strengthen and contribute to the field of knowledge. Findings of this study can be used to inform the need for supplementary forms of evaluation.

5.6 RECOMMENDATIONS

This section addresses the practical and theoretical recommendations of the study as well as recommendations for further research.

5.6.1 Recommendations for practice

From the respondents' opinions, it was noted that there are certain practices that can be used to help improve information retrieval skills of the students. Some of these practices are:

- Regular practice: Students need to take it upon themselves to regularly practice on the various aspects of information retrieval in order to be more acquainted with these and to improve their skills.
- Training: The library should offer some regular formal training opportunities to enable the students to develop the skills in using the electronic information resources. This can be factored in the annual library budget so that it is not only done for the newly admitted students at the university once-off. Areas of need can be sourced from the students so that the training can focus on specific issues. As a current practice at the university, only undergraduate students go through the once-off library

orientation or training. It can be recommended that training on information skills should not only be limited to undergraduate students but should also extend to the postgraduate students.

- Self-learning: There is need to encourage self-learning of skills which can be done through creation of peer to peer sharing platforms or any other means that can encourage personal sharing and self-learning.

- Self-efficacy and positive attitude: There is need to explore methods that can be used to enhance students' self-efficacy and positive attitude which are core elements in building skills.

From the results of this study, it can also be recommended that the university need to incorporate an information literacy programme in all course curricula to enable students to learn and become information literate and learn the skills that are important for them to find, store and use information in relation to specific subject fields. This can be done by devoting some hours of the university time-table to the library.

5.6.2 Recommendations for theory

- The theory of self-efficacy as proposed by Bandura (1977) should be explored in more depth.
- There is also a need to explore the theories of constructivism and constructivist learning.

5.6.3 Recommendations for further research

This study was more of a quantitative research study with limited qualitative data. The following are suggested areas for further research:

- A repetition of the study using a different methodology such as focus group interviews which can reveal more on how the students perceive their skills in information retrieval, as well as the self-assessment of such skills.

- Further comparative studies of this kind can also be done using students from different universities to get a more comprehensive understanding and comparisons on how students perceive their skills, which can be used to generalise the findings.

- A bigger population of students can also be studied in the same setting to give a wide view on how students perceive their information retrieval skills.

- A systematic literature review can be conducted to identify supplementary methods of evaluation.

- A systematic literature review can be conducted to determine means to deal with the limitations of self-rating.

5.7 CONCLUSION

This chapter summarised the results and conclusions based on the findings of the research question and sub-questions. From this study, it is proved that the students have the ability to self-rate their information retrieval skills as their perceived skills in this study have indicated a direct impact on their use of the electronic information resources as discussed in this chapter and the previous chapter. The study also revealed the need to identify evaluation and assessment methods to supplement the self-rating of skills in information retrieval (comprising of ICT skills, Internet skills, skills in use of search features and techniques and skills in the use of electronic information resources).

REFERENCES

Adegbore, A. 2011. University faculty use of electronic resources: A review of the recent literature. *PNLA Quarterly, the official publication of the Pacific Northwest Library,* 75(4):1-11.

Adeleke, D.S. & Emeahara, E.N. 2016. Relationship between information literacy and use of electronic information resources by postgraduate students of the University of Ibadan. *Library Philosophy and Practice (e-journal)*: paper 1381[Online]. Available at: http://digitalcommons.unl.edu/libphilprac/1381 [Accessed 23 August 2017].

Adeniran, P. 2013. Usage of electronic resources by undergraduates at the Redeemer's University, Nigeria. *International Journal of Library and Information Science*, 5(10):319-324.

Aderibigbe, N.A. & Ajiboye, B.A. 2013. User education program as determinant of electronic information resources usage in Nimbe Adedipe University Library, Nigeria, *The Electronic Library,* 31(2):244-255.

Ajiboye, B.A., Oyedipe, W.J. & Alawiye, M.K. 2013. Use of information retrieval tools by the postgraduate students of selected universities in South Western Nigeria. *Information and Knowledge Management*, 3(5):53-59.

Albertson, D. & Ju, B. 2016. Perceived self-efficacy and interactive video retrieval. *Journal of Documentation,* 72(5):832-857.

American Library Association. 2000. *Information Literacy Competency Standards for Higher Education*. Chicago, IL: The Association of College and Research Libraries.

American Library Association. 2009. ALA's Core Competences of Librarianship. Available at: http://www.ala.org/educationcareers/sites/ala.org.educationcareers/files/content/careers/corecop/corecompetences/finalcorecompstat09.pdf [Accessed 12 October 2016].

Andrade, H. & Valtcheva, A. 2009. Promoting learning and achievement through self-assessment. *Theory into Practice,* 48(1):12-19.

Armstrong, C. 2005. Chartered Institute of Library Information Professionals (CLIP) defines information literacy for the UK. Available at: http://www.informationliteracy.org.uk [Accessed 10 October 2015].

Armstrong, S.J. & Fukami, C.V. 2010. Self-assessment of knowledge: a cognitive learning or affective measure? Perspectives from the management learning and education community. *Academy of Management Learning & Education,* 9(2):335-341.

Ayoo, P.O. & Lubega, J.T. 2104. A framework for e-learning resources sharing (FeLRS). *International Journal of Information and Education Technology,* 4(1):112-119.

Babbie, E.R. 2013. *The Practice of Social Research*. 13th ed. Belmont, Calif.: Wadsworth Cengage Learning.

Bandura, A. 1977. Self-efficacy: Toward a unifying theory of behavioural change. *Psychological Review,* 84(2):191-215. Available at: http://www.uky.edu/~eushe2/Bandura/Bandura1977PR.pdf [Accessed 5 October 2015].

Berg, S., Hoffmann, K. & Dawson, D. 2010. Not on the same page: Undergraduates' information retrieval in electronic and print books. *The Journal of Academic Librarianship*, 36(6):518-525.

Bhukuvhani, C., Chiparausha, B. & Zuvalinyenga, D. 2012. Effects of electronic information resources skills training for lecturers on pedagogical practices and research productivity. *International Journal of Education and Development Using Information and Communication Technology (IJEDICT),* 8(1):16-28.

Boud, D. & Falchikov, N. 1989. Quantitative studies of student self-assessment in higher education: a critical analysis of findings. *Higher Education,* 18(5):529-549.

Bronstein, J. & Tzivian, L. 2013. Perceived self-efficacy of library and information science professionals regarding their information retrieval skills. *Library & Information Science Research*, 35(2013):151-158.

Carrillo-de-la-Pena, M.T. *et al*. 2009. Formative assessment and academic achievement in pre-graduate students of health sciences. *Advances in Health Science Education,* 14:61-67.

Case, D.O. 2007. *Looking for information: A survey of research on information seeking needs and behaviour*. 2nd ed. Amsterdam: Elsevier.

Case, D.O & Given, L.M. 2016. *Looking for information: A survey of research on information seeking needs and behaviour*. 4th ed. Bingley: Emerald.Cohen, L., Manion, L. & Morrison, K. 2007. *Research Methods in Education*. 6th ed. London: Routledge.

Commission for University Education. 2015. Status of Universities, Kenya. Available at: http://www.cue.or.ke/services/accreditation/status-of-universities [Accessed 29 September 2015].

Creswell, J.W. 2009. *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches.* 3rd ed. California: SAGE Publications.

Creswell, J.W. 2014. *Qualitative, Quantitative and Mixed Methods Approaches*. 4th ed. New Delhi: SAGE Publications.

Damilola, O.A. 2013. Use of electronic resources by distance students in Nigeria: The case of the National Open University, Lagos and Ibadan Study Centers. *Library Philosophy and Practice (e-journal)*, 2013(April): paper 915. [Online]. Available at: http://digitalcommons.unl.edu/libphilprac/915 [Accessed 28 December 2015].

Dhanavandan S., Esmail, S.M. & Nagarajan, M. 2012. Use of electronic resources at Krishnasamy College of Engineering and Technology Library, Cuddalore. *Library Philosophy and Practice (e-journal)*, 2012(February): Paper 698. [Online]. Available at: http://digitalcommons.unl.edu/libphilprac/698 [Accessed 10 June 2015].

Deng, H. 2010. Emerging patterns and trends in utilizing electronic resources in a higher education environment: An empirical analysis. *New Library World*, 111(3/4):87-103.

Ebijuwa, A.A. (2005). Information and Communication Technology in university libraries: The Nigeria experience. *Journal of Library and Information Science*, 7(1&2):23-30.

Egberongbe, H.S. 2011. The use and impact of electronic resources at the University of Lagos. *Library Philosophy and Practice* (e-journal), 2011(January): paper 472. [Online]. Available at: http://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1490&context=libphilprac [Accessed 28 December 2015].

Ekenna, M.M. & Iyabo, M. 2013. Information retrieval skills and use of library electronic resources by university undergraduates in Nigeria. *Information and Knowledge Management*, 3(9):6-14. Available at: http://www.iiste.org/Journals/index.php/IKM/article/viewFile/7510/7748 [Accessed 9 July 2015].

Ferdows, J. & Ahmed, S.M.Z. 2015. An empirical investigation of information skills among undergraduate students at Dhaka University. *Library Review*, 64(4/5):274-284.

Freund, P.A. & Kasten, N. 2012. How smart do you think you are? A meta-analysis on the validity of self-estimates of cognitive ability. *Psychological Bulletin*, 138(2):296-321.

Gakibayo, A., Okello-Obura, C. & Ikoja-Odongo, J. 2013. Electronic information resources utilization by students in Mbarara University library. *Library Philosophy & Practice (e-journal),* (February): paper 869. Available at: http://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=2055&context=libphilprac [Accessed 12 July 2015].

Gavin, T.L.B, Heidi, L.A. & Fei, C. 2015. Accuracy in student self-assessment: directions and cautions for research. *Assessment in Education: Principles, Policy & Practice*, 22(4):444-457.

Gorman, G.E. & Clayton, P. 2005. *Qualitative Research for the Information Professionals*. London: Facet Publishing.

Great Schools Partnership, 2013. The Glossary of Education Reform. Available at: edgeglossary.org/assessment/ [Accessed 9 July 2015].

Halttunen, K. 2003. Students' conceptions of information retrieval implications for the design of learning environments. *Library & Information Science Research*, 25(3):307-332.

Hancock, B. 2002. Trent focus for research and development in primary health care: An introduction to qualitative research. Available: http://classes.uleth.ca/200502/mgt2700a/Articles/Qualitative%20Research.pdf (Accessed 17 October 2015).

He, D., Wu, D., Yue, Z., Fu, A. & Thien Vo, K. 2012. Undergraduate students' interaction with online information resources in their academic tasks: A comparative study. *Aslib Proceedings*, 64(6):615-640.

Huang, N.E. *et al*. 2003. A confidence limit for the position empirical mode decomposition and Hilbert spectral analysis. *Proceedings of the Royal Society of London*. Series A, 459(2003):2317-2345. Available at: http://rcada.ncu.edu.tw/ref/reference004.pdf [Accessed 20 November 2016].

Ilogho, J.E. & Nkiko, C. 2014. Information literacy search skills of students in five selected private universities in Ogun State, Nigeria: a survey. *Library Philosophy and Practice (e-journal)*. (January): paper 1040. [Online]. Available at: http://digitalcommons.unl.edu/libphilprac/1040 [Accessed 1 January 2016].

Ingutia-Oyieke, L. & Dick, A.L. 2010. A comparative analysis of the use of electronic resources by undergraduate students at two Kenyan universities. *Mousaion*, 28(2):64-81.

Ingwersen, P. & Järvelin, K. 2005. *The Turn: Integration of Information Seeking and Retrieval in Context.* Dordrecht, The Netherlands: Springer.

Islam, M. & Tsuji, K. 2010. Assessing information literacy competency of information science and library management graduate students of Dhaka University. *IFLA Journal*, 36(4):300-316.

Israel, G.D. 1992. *Sampling the Evidence of Extension Program Impact*. Gainesville: Program Evaluation and Organizational Development, IFAS, University of Florida.

Johanson, S. 2013. The relationship between students' self-assessed reading skills and other measures of achievement. *Large-scale Assessments in Education*, 1(3):1-17.

Johnson, B. & Christensen, L. 2004. *Educational Research: Qualitative, Quantitative and Mixed Method Approaches*. Boston, MA: Pearson.

Karunarathna, H.M.P.P. 2014. Use of electronic resources by law degree students at Anuradhapura Regional Centre of the Open University of Sri Lanka. *Journal of the University Librarians Association of Sri Lanka*, 18(2):41-61.

Kenya Libraries & Information Services Consortium. 2017. KLISC Website. Available at: http://www.klisc.org/ [Accessed 15 January 2017].

Key, J.P. 1997. Qualitative research. Available at: http://www.okstate.edu/ag/agedcm4h/academic/aged5980a/5980/newpage21.htm [Accessed 18 October 2015].

Kinengyere, A.A. 2007. The effect of information literacy on the utilization of electronic information resources in selected academic and research institutions in Uganda. *The Electronic Library*, 25(3):328-341.

Kombo, D.K. & Tromp, D.L.A. 2006. *Proposal and Thesis Writing: An Introduction*. Nairobi, Kenya: Paulines Publications Africa.

Konappa, K. 2014. Use of electronic information resources in university libraries of Tirupati: An analytical study. *International Journal of Library and Information Science*, 6(1):5-13.

Korobili, S., Malliari, A. & Christodoulou, G.N. 2009. Assessing information literacy skills in the Technological Education Institute of Thessaloniki, Greece. *Reference Services Review*, 37(3):340-354.

Kothari, C. 2004. *Research Methodology: Methods and Techniques.* 2nd rev. ed. New Delhi: New Age International Publishers.

Kumar, R. 2005. *Research Methodology: A Step by Step Guide for Beginners*. 2nd ed. New Delhi: Pearson Education.

Kumar, R. 2016. Use of e-resources by medical students of M.M. University, Ambala. *DESIDOC Journal of Library & Information Technology*, 36(1):10-16.

Kumar, B.T.S. & Kumar, G. 2010. Perception and usage of e-resources and the internet by Indian academics. *The Electronic Library*, 28(1):137-156.

Kurbanoglu, S.S. 2003. Self-efficacy: a concept closely linked to information literacy and lifelong learning. *Journal of Documentation*, 59(6):635-646.

Kurbanoglu, S.S., Akkoyunlu, B. & Umay, A. 2006. Developing the information literacy self-efficacy scale. *Journal of Documentation*, 62(6):730-743.

Lau, J. 2006. Guidelines on information literacy for lifelong learning. IFLA. Available at: http://www.ifla.org/files/assets/information-literacy/publications/ifla-guidelines-en.pdf [Accessed 24 October 2015].

Leedy, P.D. & Ormrod, J.E. 2013. *Practical Research: Planning and Design*. 10th ed. Upper Saddle River, N.J.: Pearson Education.

Leedy, P.D. & Ormrod, J.E. 2006. *Practical Research: Planning and Design*. 8th ed. Upper Saddle River, N.J.: Pearson Education.

Liyi, Z. 2011. A survey of the use of electronic resources at seven universities in Wuhan, China. *Electronic Library and Information System*, 45(1):67-77.

Madhusudhan, M. 2010. Use of electronic resources by research scholars of Kurukshetra University. *The Electronic Library*, 28(4):492-506.

Mahmood, K. 2017. Reliability and validity of self-efficacy scales assessing students' literacy skills: A systematic review. *The Electronic Library*, 35(5):1035-1051.

Makori, E.O. 2015. Micro factors influencing use of electronic information resources among postgraduate students in institutions of higher learning in Kenya. *Library Hi Tech News*, 32(1):18-21.

Maseno University. 2015. Maseno University library website. Available at: http://maseno.ac.ke/index/index.php?option=com_content&view=article&id=155&Itemid=105 [Accessed 8 August 2015].

Maseno University. 2015. Maseno University website. Available at: www.maseno.ac.ke [Accessed 8 August 2015].

Maseno University. 2017. Guidelines and procedure for collecting data at the eCampus of Maseno University. Maseno: eCampus.

Malemia, L. 2014. The use of electronic journal articles by academics at Mzuzu University, Malawi. *Library Philosophy and Practice (e-journal)*, April: paper 1097. [Online] Available at: http://digitalcommons.unl.edu/libphilprac/1097 [Accessed 3 January 2016].

Mohamed, H.K. 2007. Use of ICT based resources and services in special libraries in Kerala. *Annals of Library and Information Studies*, 54(March):23-31.

Mugenda, A. & Mugenda, O. 2012. *Research Methods Dictionary*. Nairobi, Kenya: ARTS Press.

Myers, D.M. 2007. Qualitative research in information systems. *Management Information Systems Quarterly*, 21(2):241-242.

Njoroge, R. 2008. An evaluation of the use of electronic databases by academic institutions: a case study of Catholic University of Eastern Africa. Nairobi, Kenya: Strathmore University.

Nyamboga, C., Bosire, J., Tinega, H. & Mucyo, V. 2014. E-resources complexities and their usage among the information science students in Mount Kenya University, Kigali Campus. *Global Journal of Engineering Science and Research Management*, 1(7):14-23.

Okello-Obura, C. 2010. Assessment of the problems LIS postgraduate students face in accessing e-resources in Makerere University, Uganda. *Collection Building*, 29(3):98-105.

Okello-Obura, C. & Magara, E. 2008. Electronic information access and utilization by Makerere students in Uganda. *Evidence Based Library and Information Practice*, 3(3):39-56.

Okiki, O. 2013. User education and information handling skills as determinants of information resources use among undergraduate students of the University of Lagos, Nigeria. *Library Philosophy and Practice*, No 993. Available at: http://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=2398&context=libphilprac [Accessed 26 September 2015].

Okite-Amughoro, F.A., Makgahlela, L. & Bopape, S. 2014. The use of electronic information resources for academic research by postgraduate students at Delta State University, Abraka, Nigeria. *South African Journal of Library & Information Science*, 80(2):1-7.

Olasore, R.E. & Adekunmisi, S.R. 2015. Use of library electronic information resources by academic staff in Olabisi Onabanjo University. *Global Advanced Research Journal of Educational Research and Review*, 4(4):55-62.

Omeluzor, S.U., Madukoma, E., Bamidele, I. & Ogbuiyi, S.U. 2012. Use of electronic information resources and research output by academic staff in private universities in Ogun State, Nigeria. *Canadian Social Science*, 8(3):8-15.

Omosekejimi, F.A., Eghworo, R.O. & Ogo, P.E. 2015. Usage of electronic information resources (EIRs) by undergraduate students of Federal University of Petroleum Resources Effurun. *Information and Knowledge Management*, 5(4):94-102.

The Oxford English Dictionary. 2015. The definitive record of the English Language. Oxford University Press. [Online]. Available at http://0-www.oed.com.innopac.up.ac.za/view/Entry/11858?redirectedFrom=Assessment#eid [Accessed 19 October 2015].

Oyedapo, R. & Ojoo, R. 2013. A survey of the use of electronic resources in Hezekiah Oluwasanmi Library, Obafemi Awolowo University, Ile-Ife, Nigeria. *Library Philosophy & Practice (e-journal)*,

2013(February): paper 884. [Online]. Available at: http://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=2200&context=libphilprac [Accessed 25 September 2015].

Oyeniyi, A.S. 2013. Gender differences in information retrieval skills and use of electronic resources among information professionals in south-western Nigeria. *International Journal of Library and Information Science*, 5(7):208-215.

Pickard, A.J. 2007. *Research Methods in Information*. London: Facet Publishing.

Pickard, A.J. 2013. *Research Methods in Information*. 2nd ed. London: Facet Publishing.

Quadri, G.O. 2012. Impact of ICT skills on the use of e-resources by information professionals: A review of related literature. *Library Philosophy and Practice (e-journal)*: paper 762. [Online]. Available at: http://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1836&context=libphilprac [Accessed 23 August 2017].

Ramlogan, R. & Tedd, L.A. 2006. Use and non-use of electronic information sources by undergraduates at the University of the West Indies. *Online Information Review*, 30(1):24-42.

Rehman, S. & Alfaresi, S. 2009. Information literacy skills among female students in Kuwaiti high schools. *Library Review*, 58(8):607-616.

Ren, W. 2000. Library instruction and college student self-efficacy in electronic information searching. *The Journal of Academic Librarianship*, 26(5):323-328.

Rioux, K. 2014. Teaching social justice in an information literacy course: an action research case study. *Qualitative and Quantitative Methods in Libraries (QQML).* Special Issue: Social Justice, Social Inclusion. 23-30.

Rosman, T., Mayer, A.-K. & Krampen, G. 2015). Combining self-assessments and achievement tests in information literacy assessment: empirical results and recommendations for practice. *Assessment & Evaluation in Higher Education*, 40(5):740-754.

Salau, S.A. & Gama, U.G. 2015. Access to and use of electronic journals in selected federal university libraries in the Federal Capital Territory and North Central Zone of Nigeria. *African Journal of Library, Archives & Information Science,* 25(2):161-171.

Sasikala, C. & Dhanraju, V. 2011. Assessment of information literacy skills among science students of Andhra University. *Library Philosophy and Practice (e-journal),* No. 626. Available at: http://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1658&context=libphilprac [Accessed 20 September 2015].

Saunders, M., Lewis P. & Thornhill, A. 2007. *Research Methods for Business Students*. 4th ed. New York: Pearson Education.

Shuling, W. 2007. Investigation and analysis of current use of electronic resources in university libraries. *Library Management*, 28(1/2):72-88.

Singh, K. 2007. *Quantitative Social Research Methods*. New Delhi: SAGE Publications.

Singh, K. & Terry, J. 2008. *Fostering Students' Self-assessment Skills for Sustainable Learning.* Australia, Edith Cowan University.

Sitzmann, T., Ely, K., Brown, K.G. & Bauer, K.N. 2010. Self-assessment of knowledge: a cognitive learning or affective measure? *Academy of Management Learning & Education*, 9(2):169-191.

Swain, K.D. & Panda, K.C. 2009. Use of electronic resources in business school libraries of an Indian state: A study of librarians' opinion. *The Electronic Library*, 27(1):74-85.

Tahir, M., Mahmood, K. & Shafique, F. 2010. Use of electronic information resources and facilities by humanities scholars. *The Electronic Library*, 28(1):122-136.

Tang, Y. & Tseng, H.W. 2013. Distance learners' self-efficacy and information literacy skills. *The Journal of Academic Librarianship,* 39(2013):517-521.

Taras, M. 2010. Assessment - summative and formative - some theoretical reflections. *British Journal of Educational Studies,* 53(4):466-478.

Taylor, G.R. 2000. *Integrating Quantitative and Qualitative Research*. London: Sage.

Tella, A., Ayeni, C.O. & Omoba, R.O. 2007. Self-efficacy and use of electronic information as predictors of academic performance. *Electronic Journal of Academic & Special Librarianship*, 8(2). Available: http://southernlibrarianship.icaap.org/content/v08n02/tella_a01.html [Accessed 23 August 2017].

Tellis, W. 1997. Introduction to case study. *The Qualitative Report* 3(2):1-5. Available: http://www.nova.edu/ssss/QR/QR3-2/tellis1.html [Accessed 15 October 2015].

Thornley, C. & Gibb, F. 2009. Meaning in philosophy and meaning in information retrieval. *Journal of Documentation*, 65(1):133-150.

Ukachi, N.B. 2015. Information literacy of students as a correlate of their use of electronic resources in university libraries in Nigeria. *The Electronic Library*, 33(3):486-501.

Ukachi, N.B., Onuoha, U.D. & Nwachukwu, V.N. 2014. Students' attitudes as a determining factor to electronic information resources use in university libraries in South-West, Nigeria. *DESIDOC Journal of Library & Information Technology*, 34(4):333-341.

Urquhart, C. *et al*. 2003. Uptake and use of electronic information services: trends in UK higher education from the JUSTEIS project. *Program*, 37(3):168-180.

Vasuderan, T.M. & Rakhi, N.R. 2015. Use of electronic information resources by doctoral students of Calicut University. *SRELS Journal of Information Management*, 52(3):205-212.

Webber, S. & Johnstone, B. 2000. Conceptions of information literacy: new perspectives and implications. *Journal of Information Science*, 26(6):381-397.

Wiliam, D. 2011. Formative assessment: getting the focus right. *Educational Assessment*, 11(3-4):283-289.

Wilson, T. D. 1999. Models in information behaviour research. *Journal of Documentation*, 55(3):249-270.

Wu, M. & Chen, S. 2011. How graduate students perceive, use, and manage electronic resources. *Aslib Proceedings*, 64(6):641-652.

Wu, M. & Yeh, S.-T. 2012. Effects of undergraduate student computer competence on usage of library electronic collections. *Journal of Library and Information Studies*, 10(1):1-17.

Yamane, T. 1967. *Statistics: An Introductory Analysis*. 2nd ed., New York: Harper and Row.

Yin, R.K. 2003. *Case Study Research: Design and Methods*. 3rd ed. New Delhi: SAGE Publications.

Zhang, L., Ye, P., Liu, Q. & Rao, L. 2010. Survey on the utilization of NSTL electronic resources in colleges and universities in Wuhan, China. *The Electronic Library*, 29(6):828-840.

Zhang, L., Ye, P. & Liu, Q. 2011. A survey of the use of electronic resources at seven universities in Wuhan, China. *Program*, 45(1):67-77.

APPENDIX A: INVITATION TO PARTICIPATE IN A QUESTIONNAIRE BASED STUDY

Self-assessment of information retrieval skills in using electronic information resources: A case study of Maseno University students

Dear Respondent,

My name is Rosemary Akech Obat, a student at the University of Pretoria pursuing the Master's of Information Technology degree. My topic concerns how students perceive their information retrieval skills in using the electronic information resources available through the library. The questionnaire can be completed unanimously and your response will be treated with utmost confidentiality and will solely be used for the purposes of this research project, and for reporting on the project (for instance in the dissertation, articles, conference papers).

Thank you in advance for your willingness to participate by completing the questionnaire. Should you need any clarification on any of the questions, kindly get in touch with me through the details provided below.

Kind regards

Rosemary Obat

Email: raketch@gmail.com

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Prof. Ina Fourie (supervisor)

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APPENDIX B: QUESTIONNAIRE

Self-assessment of information retrieval skills in using electronic information resources: A case study of Maseno University students

SECTION A: GENERAL INFORMATION

1 Your level of study (Please tick the appropriate box):

- ☐ Undergraduate
  - ☐ 1st year
  - ☐ 2nd year
  - ☐ 3rd year
  - ☐ 4th year
- ☐ Postgraduate
  - ☐ Master
  - ☐ Doctoral

2 Please select your school by ticking the appropriate box:

- ☐ Institute of Gender Studies
- ☐ School of Agriculture and Food Security
- ☐ School of Biological and Physical Sciences
- ☐ School of Business and Economics
- ☐ School of Computing and Informatics
- ☐ School of Development and Strategic Studies
- ☐ School of Education
- ☐ School of Environmental and Earth Sciences
- ☐ School of Mathematics, Applied Statistics and Actuarial Science
- ☐ School of Medicine
- ☐ School of Planning and Architecture
- ☐ School of Public Health and Community Development
- ☐ School of Science

SECTION B: ICT SKILLS

3 Please rate your ICT skills/knowledge in performing the following tasks. You must reply on all tasks.

ICT Tasks	Very good	Good	Fair	Poor
General use of computers and computer devices like a mouse, touchpad and keyboard				
Basic computer operations e.g. using Word processing software				
Storing information on alternative devices e.g. flash disc/USB, external hard drive				
Using cloud storage				
Transferring information from one computer device to another				
Downloading information				
Printing information				
Finding information stored on a device or cloud storage				
Web browsing				
Online communication via e-mail, telecommunication, online discussion forums, etc.				

4 Please rate your Internet skills/knowledge in performing the following tasks. You must reply on all tasks.

Internet related tasks	Very good	Good	Fair	Poor
Browsing				
Using search engines for personal information needs				
Downloading information				
Printing information				
Sharing information e.g. via social media				
Using cloud storage				
Transferring information from one computer device to another				
Downloading information				
Online communication via e-mail, telecommunication, online discussion forums, etc.				
Social media e,g. Facebook, Instagram				

SECTION C: USE OF ELECTRONIC INFORMATION RESOURCES

5 Please indicate how often you use the following electronic information resources by ticking the most appropriate box for each one of them.

Electronic information resources	Daily	Weekly	Fortnightly	Monthly	Not at all
E-books					
E-journals					
Institutional repositories					
Internet sources					
Online databases					
Online Public Access Catalogue (OPAC)					
Reference management software e.g. Zotero, Mendely, Refworks					

6 Please rate your skills in using each of the following electronic information resources.

Electronic information resources	Very good	Good	Fair	Poor
E-books				
E-journals				
Institutional repositories				
Internet sources				
Online databases				
Online Public Access Catalogue (OPAC)				
Reference management software e.g. Zotero, Mendely, Refworks				

SECTION D: INFORMATION RETRIEVAL TECHNIQUES

7 Please rate your skills in using the following search features and techniques. Please tick the appropriate option for each.

Search features and techniques	Very good	Good	Fair	Poor	Have never used
Locating electronic databases from the library website					
Selecting an appropriate database(s)					
Searching more than one database at once					
Title searches					
Author searches					
Keyword searches					
Boolean operators (OR, AND, NOT)					
Truncation techniques (e.g. $, *, +)					
Searching in a combination of specific fields e.g. an author in the author field and a search term in the title field					
Filtering search results e.g. specifying the year of publication, language					
Displaying the search results					
Recognising relevant information					
Selecting relevant information for further use					
Downloading relevant records to reference management software					
Sharing relevant records via e-mail					
Printing relevant records					
Setting up alerts e.g. to be notified about new information on a topic, the work of an author					
Downloading the full-text of an article e.g. in PDF, HTML format					
Gaining access to an e-book/chapters of a book or other electronic publication					
Requesting an article/book, etc. through the library					

8 In your opinion, how well are you equipped to self-rate you information retrieval skills?

……
……
……

9 In your opinion, what can YOU do to improve your information retrieval skills?

……
……
……

Thank you for taking your time to fill out this questionnaire

APPENDIX C: INFORMED CONSENT FORM

(Form for research subject's permission)

1 Title of research project: **Self-assessment of information retrieval skills in using electronic information resources: A case study of Maseno University students**

2 I …… hereby voluntarily grant my permission for participation in the project as explained to me by Rosemary Akech Obat.

3 The nature, objective, possible safety and health implications have been explained to me and I understand them.

4 I understand my right to choose whether to participate in the project and that the information furnished will be handled confidentially. I am aware that the results of the investigation may be used for the purposes of publication.

5 Upon signature of this form, you will be provided with a copy.

Signed: _____ Date: _____

Witness: _____ Date: _____

Researcher: _____ Date: _____

APPENDIX D: ETHICAL CLEARANCE LETTER FROM UNIVERSITY OF PRETORIA

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

Enquiries : Dr Marlene Holmner
Tel. nr. : +27 (0)12 420-5215
Fax nr. : +27 (0)12 362-5181
E-mail : marlene.holmner@up.ac.za
Office : IT 6-43

Faculty of Engineering, Built Environment and Information Technology
School of Information Technology

2017-08-02

ETHICAL CLEARANCE FOR ROSEMARY OBAT

Dissertation Title: Self-assessment of information retrieval skills in using electronic information resources: students of Maseno University as case study

This is to confirm that the Research Committee of the Department of Information Science approved the application by Rosemary Obat for ethical clearance. Ms Obat complied with the standard requirements for ethical clearance as set out by the University of Pretoria's Faculty of Engineering, Built Environment and Information Technology (EBIT), as follows:

- She signed and submitted all the application forms required for ethical clearance;
- She submitted her data collection instruments for vetting by both the Research and Ethics Committees; and
- She implemented all corrections recommended by the above-mentioned committees.

The Research Committee of the Department of Information Science therefore requests permission for Ms Obat to collect the data she needs in order to complete and submit her mini-dissertation for examination. The Committee further appreciates any effort by appropriate authorities to expedite this process, and expresses its gratitude in anticipation.

Yours sincerely

Dr Marlene Holmner

Dr Marlene Holmner
Academic Coordinator: Carnegie MIT
Department of Information Science
E-mail: marlene.holmner@up.ac.za

APPENDIX E: LETTER OF PERMISSION TO COLLECT DATA[4]

MASENO UNIVERSITY
OFFICE OF THE DIRECTOR, E-CAMPUS

INTERNAL MEMO

FROM: DIRECTOR, E-CAMPUS — **REF:** MSU/KCCC/EL/PR/063/ (38)

TO: ROSEMARY OBAT (2637) — **DATE:** 11th September, 2017

APPROVAL TO COLLECT DATA AT THE E-CAMPUS OF MASENO UNIVERSITY

I wish to notify you that your request letter for permission to collect research data at the eCampus on 23rd January, 2017 and your application to the ethical committee on 22nd August, 2017 is being acted upon by Maseno University Ethical Review Committee. Nevertheless, we wish to acknowledge that your research ethical clearance from the University of Pretoria is sufficient to allow us grant you permission to conduct research for your mini-dissertation.

Kindly liaise with our Research Officer, Monitoring and Evaluation to upload your questionnaire in the eLearning portal.

The data collection guidelines and procedure is attached for your reference.

MASENO UNIVERSITY
11 SEP, 2017
DIRECTOR E-CAMPUS

DR. BETTY OBURA OGANGE
DIRECTOR, E-CAMPUS

Maseno University is ISO 9001:2008 Certified

[4] Through this letter, the researcher had permission to collect data awaiting the official letter of ethical clearance

APPENDIX F: ETHICAL CLEARANCE LETTER FROM MASENO UNIVERSITY[5]

MASENO UNIVERSITY ETHICS REVIEW COMMITTEE

Tel: +254 057 351 622 Ext: 3050
Fax: +254 057 351 221

Private Bag – 40105, Maseno, Kenya
Email: muerc-secretariate@maseno.ac.ke

FROM: Secretary - MUERC

DATE: 4th December, 2017

TO: Rosemary Akech Obat
Faculty of Engineering,
Built Engineering and Information Technology
School of Information Technology
University of Pretoria
Private Bag X20 Hatfield, Pretoria 0028

REF: MSU/DRPI/MUERC/00473/17

RE: Self Assessment of Information Retrieval Skills in using Electronic Information Resources: Students of Maseno University as Case study. Proposal Reference Number MSU/DRPI/MUERC/000473/17

This is to inform you that the Maseno University Ethics Review Committee (MUERC) determined that the ethics issues raised at the initial review were adequately addressed in the revised proposal. Consequently, the study is granted approval for implementation effective this 4th day of December, 2017 for a period of one (1) year.

Please note that authorization to conduct this study will automatically expire on 3rd December, 2018. If you plan to continue with the study beyond this date, please submit an application for continuation approval to the MUERC Secretariat by 2nd November, 2018.

Approval for continuation of the study will be subject to successful submission of an annual progress report that is to reach the MUERC Secretariat by 2nd November, 2018.

Please note that any unanticipated problems resulting from the conduct of this study must be reported to MUERC. You are required to submit any proposed changes to this study to MUERC for review and approval prior to initiation. Please advice MUERC when the study is completed or discontinued.

Thank you.

Yours faithfully,

DIRECTORATE OF RESEARCH PUBLICATION & CONSULTANCIES 04 DEC 2017 MASENO UNIVERSITY

Dr. Bonuke Anyona,
Secretary,
Maseno University Ethics Review Committee.

Cc: Chairman,
Maseno University Ethics Review Committee.

MASENO UNIVERSITY IS ISO 9001:2008 CERTIFIED

[5] This letter of ethical clearance delayed due to political situation in the country and the strikes at the universities; an interim letter of permission was used to collect data

APPENDIX G: RESEARCHER DECLARATION

Self-assessment of information retrieval skills in using electronic information resources: A case study of Maseno University students

I, Rosemary Akech Obat, hereby declare that in my capacity as researcher:

1 Research subjects will be informed, information will be handled confidentially, research subjects reserve the right to choose whether to participate and, where applicable, written permission will be obtained for the execution of the project (example of permission attached).

2 No conflict of interests or financial benefit, whether for the researcher, company or organisation, that could materially affect the outcome of the investigation or jeopardise the name of the university is foreseen.

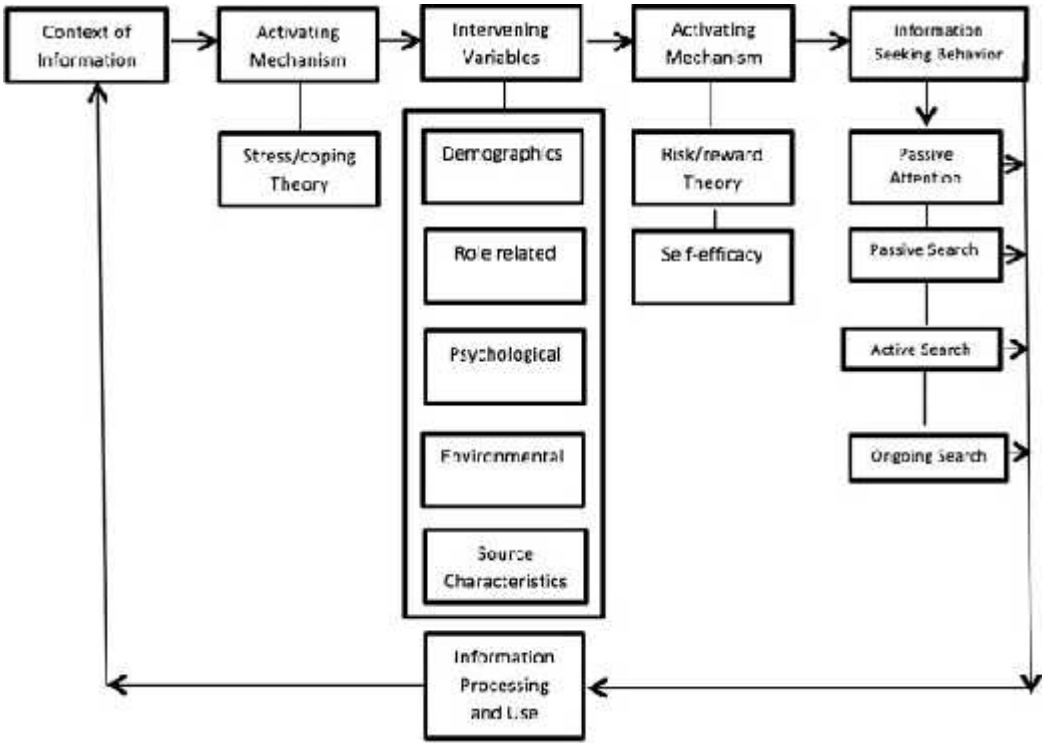
3 Inspection of the experiments in loco may take place at any time by the committee or its proxy.

4 The information I furnish in the application is correct to the best of my knowledge and that I will abide by the stipulations of the committee as contained in the regulations.

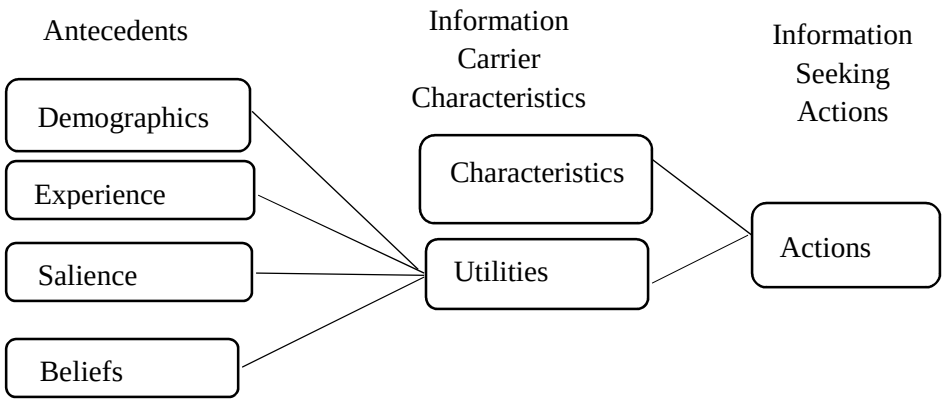
5 Signed:  Date: 31st July 2017

APPENDIX H: INFORMATION BEHAVIOUR AND INFORMATION LITERACY MODELS AND FRAMEWORKS/STANDARDS

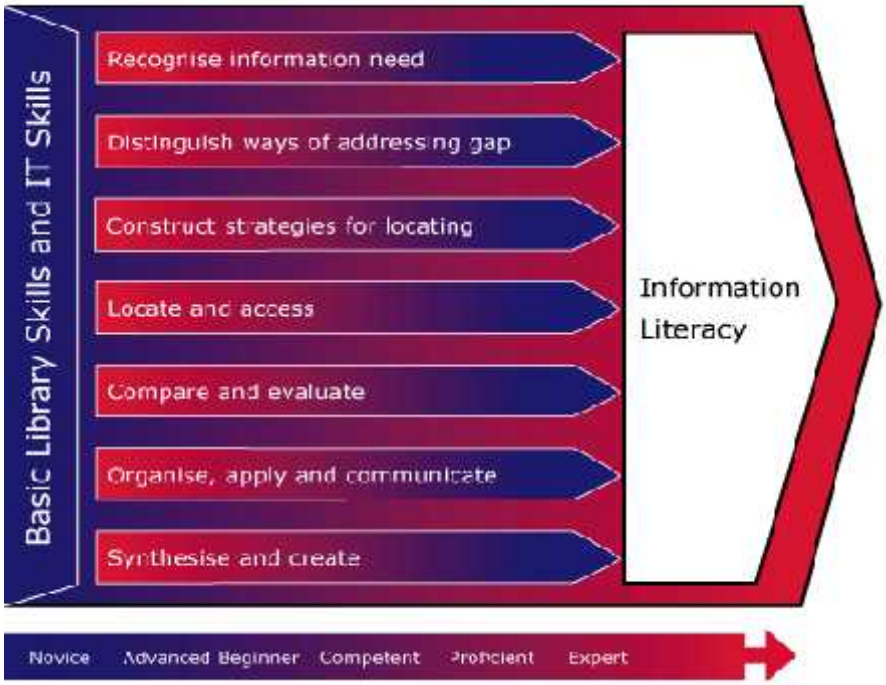
1. The Wilson's Model. Source: Wilson (1999)



2. The Johnson's Model. Source: Case and Given (2016)



3. **SCONUL Seven Pillars Model for Information Literacy. Source: American Library Association (2009)**



4. **The ACRL Literacy Competency Standards. Source: American Library Association (2000)**

The information literacy competency standards depict an information literate individual as one who is able to:

a) Determine the extent of information needed;
b) Access the needed information effectively and efficiently;
c) Evaluate information and its sources critically;
d) Incorporate selected information into one's knowledge base;
e) Use information effectively to accomplish a specific purpose;
f) Understand the economic, legal and social issues surrounding the use of information, and access and use information ethically and legally.