

FACTORS AFFECTING UTILISATION OF ELECTRONIC INFORMATION RESOURCES AND SERVICES BY MEDICAL STUDENTS AT THE UNIVERSITY OF ZAMBIA

By

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the requirements for the award of the degree of Master of Library and
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
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Declaration

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Abstract

Despite the fact that research has proved that electronic information resources (EIRs) have provided a wider access to information in most higher learning institutions for teaching, learning, and research as compared to printed materials, it is puzzling that these resources have not yet been appreciated in some higher learning institutions. For example, studies done at the University of Zambia, including this study, have all shown low usage levels of EIRs. These resources have remained underutilised.

With this background, this survey therefore was conducted to investigate factors that affect the usage of EIRs and to indentify measures that would improve their usage. The study population comprised Medical students of the University. The study combined qualitative and quantitative methods of research, while questionnaires and focus group discussions (FGDs) were used to collect data from the respondents in the field. A sample size of 127 students was randomly selected to answer questionnaires while another sample of 22 students was selected to take part in FGDs.

The research findings revealed that the usage levels of the available electronic information resources were low with 40% indicating that they used them while 60% revealed that they did not use them. Among the factors believed to be contributing towards the low usage levels of electronic information resources were lack of encouragement and proper guidance from lecturers and librarians to students to effectively use electronic information resources; lack of effective Internet searching skills by students to effectively exploit EIRs; fewer computers made available for the students to use; poor Internet connectivity such as Internet corruption, power failure and insufficient bandwidth; and lack of awareness of the available EIRs. Other factors included less value placed on the importance of using EIRs by students; limited time for students to access EIRs due to too much academic pressure; and long distance from students hostels to the Library.

Following the above findings, the research made the following recommendations to the Library as well as the University: To improve Internet infrastructure i.e. increasing number of computers and Internet access area to reduce congestion; to improve the Internet connectivity in terms of bandwidth and wireless connections; the Library to increase and improve its sensitisation programmes on the availability, importance and advantages of using EIRs to increase library opening hours to 24 hours daily. Other recommendations were that the Library should offer professional training to all students while information-literacy training should be part of the curriculum; to provide students with cheap computers and e-mail accounts for communication purposes; and provide user passwords/IDs to students where they are required.

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List of Acronyms and symbols

CD ROM	Compact Disk Read Only Memory
CDC	Centers for Disease Control and Prevention
DANIDA	Danish International Development Agency
DFID	Department for International Development
EIR	Electronic Information Resources
E-journals	Electronic journals
E-print	Electronic print
E-resources	Electronic resources
ESSP	Educational Sector Support Programme
FINIDA	Finish International Development Agency
H_0	Null hypothesis
H_1	Alternative hypothesis
HINARI	Health InterNetwork Access to Research Initiative
ICSU	International Council for Science
ICTs	Information Communications Technologies
INASP	International Network for the Availability of Scientific Publications
IT	Information Technology
MSL	Medical Sciences Library

NSF	National Science Foundation
OPAC	Online Public Access Catalogue
PC	Personal computer
PERI	Programme for the Enhancement of Research Information
SPSS	Statistical Package for Social Sciences
SIDA	Swedish International Development Cooperation Agency
UNZA	University of Zambia
UNZALIBS	University of Zambia Library System
UOS	University Development Cooperation
VLIR	<i>Vlaamse Interuniversitaire Raad</i> (Flemish Interuniversity Council)
WHO	World Health Organisation
χ^2	Chi-square
ZALICO	Zambia Library Consortium

Chapter 1: Background to the Study

1.1 Introduction

Information and communication technologies (ICTs) play a vital role in bringing about change in society. For instance, Internet is neither a luxury nor an alternative but a necessity in one's life because it gives information professionals the opportunity to bring knowledge together to meet the information needs of various categories of people (Muller, 2005 and Shuva, 2005). As technology gets more sophisticated and more affordable every day, the range of services that it provides to people either at organisational or individual level increases accordingly. For example, recent technological advancements resulting from the use of ICTs in library operations have brought about many changes in terms of the format and mode of access to library information resources and services. One of the results has been an increase in electronic databases, which has led to the existence of electronic information resources (EIRs) in libraries, thus changing the way librarians interact with their users and the type of information they provide to them. In this respect, Ani and Ahiauzu (2008) argue that through the use of ICTs by library patrons, EIRs have provided a wider access to information in universities for teaching, learning, and research than the traditional print. The transition from print to electronic medium, apart from resulting in the growth of electronic information, has provided users with new tools and applications for information seeking and retrieval. For example, Ani and Ahiauzu further state that through the use of EIRs, Nigerian researchers have access to global information resources, particularly through the Internet, for their scholarly communication. Meanwhile literature analysis by Ellis and Oldman (2005) and Forsman (1998) indicates that the tremendous increase in EIRs in libraries has also led to changed ways libraries acquire, store and disseminate information to their clients.

It is therefore, worth noting that this effect is not just limited to the supply side of information transmission, but covers the entire process of information transmission to include the information users. As noted by Tenopir (2003), an increase in EIRs has resulted in libraries and other information centres of all sizes and kinds to embrace digital collections. These are specifically meant to offer EIRs and their related services to library users. Tenopir has further observed that new purchases of journals, magazines, abstracting and indexing services are heavily weighted towards digital information, while digital or e-books are also increasing in number in library collections. She argues that the aim is to enable library users to fully exploit all the available electronic resources in libraries which they require in their day-to-day endeavours. However, Forsman and Tenopir have also observed that most libraries will continue to offer both print and digital collections, known as hybrid collections, for many years to come (Forsman, 1998; Tenopir, 2003). Consequently, digital libraries have existed either as pure digital collections offering EIRs and services only or as hybrid collections offering a combination of both print and digital information resources.

The University of Zambia (UNZA) Library has not lagged behind in embracing these new developments in ICTs. As such, it has adopted the latter version, which provides both digital information resources alongside the print information materials which have existed ever since the inception of the Library.

1.2 The University of Zambia Library

The University of Zambia Library was established in 1966. Its first location was at Ridgeway Campus until in 1969 when it was moved to its present location at the Great East Road Campus (UNZA, 2007). Over the years, the Library has expanded and is now running two other branch libraries namely, the Medical Library and the Samora Machel Veterinary Library. The Medical Library is meant to serve the School of Medicine, while the Samora Machel Veterinary Library is meant to serve the Samora Machel

School of Veterinary Medicine. UNZA Library also has one affiliated documentation centre, situated at the Institute of Economic and Social Research.

The mission of UNZA Library is to offer access to information for the purpose of supporting the learning, teaching and research activities of the University. The Library therefore, supports all subject areas offered by the University at both undergraduate and post-graduate levels, including distance education. Among its services are to acquire and make available information materials, which include electronic information resources and to offer training programmes to its users. As such, the mission of the Library is closely related to the overall goals of the University, which are to meet the needs of individuals and society through excellence in teaching and learning, research, and service, in order to foster sustainable human development and a culture of peace, human rights and justice (UNZA, 2007). The Library therefore has the mandate of providing this required information in order to enable the University meet its core activities.

With the use of Unicorn, a web based library management system, the Online Public Access Catalogue (OPAC) can be accessed by users from anywhere even in the comfort of their homes. Since the Library is designated as a national reference library, it has also extended its services to the general public for the purpose of assisting individuals and organisations to access the available information materials in the Library (UNZA, 2009).

1.3 Introduction of ICTs at UNZA Library

The introduction of ICTs in UNZA Library dates far back to 1974/1975 when all the periodical holdings were manually entered onto A3 coding sheets with about 25% of the journal titles put onto IBM punched cards. With its Internet connections in 1990, the Library was able to create its own in-house local databases using dBase III Plus applications to manage the Short Loan and Serials collections (Mwacalimba, 1999). With the help of foreign funding agencies such as the Finish International Development Agency (FINIDA), the development of ICT related services in the Library improved tremendously. For instance in 1992, FINIDA, through the Educational Sector Support

Programme (ESSP), funded the Library to fully automate its operations. The Library managed to automate six modules namely: Acquisitions, Cataloguing, Circulations, Serials, Short loan collection (Book reserves), and the OPAC (Makondo, 2002).

The Library installed Dynix Library Management system in June 1995 with its six modules fully paid for, and in 1996, UNZALIBS was established making the OPAC accessible world-wide to users through the use of a username and password. During this period, the manual bibliographic records were retrospectively converted into electronic formats. The maintenance of Dynix Library Management System was made possible by the coming of the Belgian VLIR [Vlaamse Interuniversitaire Raad (Flemish Interuniversity Council)] programme. VLIR also helped the Library to purchase more computers for students' use and training in the Library. VLIR was founded in 1976 as an umbrella consultation body between the Flemish universities and the Belgian authorities responsible for higher education and research (VLIR-UOS Secretariat, 2009).

However, since technology is dynamic and keeps on changing for the better, it renders previous technologies obsolete. In the same manner, as a result of changing technologies in terms of its capabilities and efficiency, there came a time when it was no longer good enough for the University Library to keep on using Dynix management system because of its experienced weaknesses such as being a disk operating system (DOS) as opposed to web based format and lack of support in terms of software updates. This made the Library to start planning to migrate from Dynix software to Unicorn management system in 2005 and finally migrated in the early 2008. The understanding was that Unicorn was better than Dynix in terms of functionality and efficiency and that the producers were the same. It became difficult to remain with Dynix because the producers of Dynix were no longer updating it because they had migrated to other newer and better versions such as Unicorn. In this respect, the Library had to also move on to software which would be easy to manage, current on the market and efficient. For this purpose Unicorn was chosen for adoption.

So far, Unicorn software is a good management system. It would enable the Library to offer various and tremendous services to its clients when all its functions are well and fully exploited. For instance, since the system is web-based and more user-friendly, library users can access Library services at anytime from anywhere, whether the physical library is open or not provided they are connected to the Internet. Library clientele can also transact online with the library such as booking in advance or check their accounts from the comfort of their homes. This also implies that users can access EIRs from anywhere at any time making their work much easy and quicker. In situations where a user requires certain information from specific publishers, they can request the library to make an order for them without them having to physically go to the library to make such a request. It therefore remains a challenge to the Library and its information users to make quality use of these services the system can offer in order to get the best out of it.

1.4 EIRs and their Use at UNZA Library

The collection of electronic resources at the University of Zambia Library has greatly increased over the years. This has been made possible by various organisations and publishers/databases that provide free access to EIRs. Among them is the Programme for the Enhancement of Research Information (PERI), World Health Organisation (WHO), which provides access to Health InterNetwork Access to Research Initiative (HINARI) and the United States (US) National Library of Medicine (NLM), which provides access to PubMed and Medline. For instance through PERI, the Library has been enjoying free access as well as subscribing to full-text electronic resources from well-established websites and publishers since 2000 (Akakandelwa, 2007). PERI is one of the International Network for the Availability of Scientific Publications (INASP) institution's programmes meant to enhance access to research information by the people in developing and emerging countries. PERI was established with the aim of reducing the digital divide between the developing and developed countries. Among its other

programmes, PERI focuses on providing affordable access to international scholarly literature to learning and research institutions (INASP, 2006).

However, over the years, some donor agencies have changed their funding policies and have reduced their contributions towards the PERI programme. This has left beneficiary countries with no choice but to find alternative ways of sustaining subscriptions to EIRs. For example, changing policies resulting from change in the government, made the Danish International Development Agency (DANIDA) to start channeling its assistance through its embassies. This meant that expectant individual countries could solicit for these funds from the respective embassies individually or lose out if they do not do that. Other donor agencies for PERI include Swedish International Development Cooperation Agency (SIDA), the Department for International Development (DFID) and the International Council for Science (ICSU). In order to sustain PERI services, many countries were compelled to find other means of funding, among which was through the formation of library consortia in member countries. Through consortia, member libraries are able to put together their financial resources for the sustainability of these electronic information resources.

It is for this reason that libraries in Zambia agreed to come together to form the Zambia Library Consortium (ZALICO) in 2004 to which UNZA Library is a member. The formation of ZALICO was also made possible with the help of Electronic Information for Libraries (eIFL), whose main aim is to make available EIRs at affordable prices on consortia-basis in developing countries. ZALICO's membership ranges from public, school, colleges, research and university libraries to archives and documentation centres. The main objective of ZALICO is to enhance access to information through resource sharing. It also coordinates access to EIRs to educational and research institutions at affordable prices to allow users and other stakeholders to benefit. UNZA Library is PERI country co-ordination centre and it also hosts offices for ZALICO. After collecting funds from member libraries, ZALICO then sends it to PERI through INASP who negotiates for prices from different publishers and databases on behalf of the members.

Today, UNZA Library and other academic and research institutions in Zambia subscribe to EIRs through PERI at subsidized and negotiated prices from many different publishers and databases, most of which are for free. As at 2006, PERI was providing access to over 14,000 full-text journals in Science and Humanities from various publishers and online databases. These resources cover a wide range of subjects such as veterinary medicine, human medicine and many other subjects. Out of these, there are many publishers and databases which offer information on Medicine. These include publishers such as Nature Publishing Group, Cambridge University Press, Liebert Online, Blackwell Publishing and Oxford Journals while databases include, Cochrane Library, African Journals Online (AJOL), and JSTOR.

INASP, through PERI has also gone further by providing funding to individual libraries to run workshops to facilitate training activities. The main objective of these programmes is to achieve effective use of ICTs in accessing and using EIRs within libraries, university and research communities in member countries.

1.4.1 EIRs in the Health Sciences

There are many organisations and websites/ publishers that offer information specifically in the field of medicine and other related fields, most of which are freely accessible as already indicated above. These EIRs are accessible through HINARI, PubMed Central and Biomed Central amongst many others.

HINARI is a partnership between WHO and publishers that mainly provide free access to the major journals in biomedical and related sciences to local, non-profit-making institutions in developing countries. At its launch in January 2002, it was providing 1, 500 journals from six major publishers of medical/health literature. These included Blackwell, Elsevier Science, the Harcourt Worldwide STM Group, Wolters Kluwer International Health & Science, Springer Verlag and John Wiley. Since that time, the number of participating publishers of journals and other full-text resources has grown

continuously. Today, more than 150 publishers have joined offering more than 7,000 journals (WHO, 2010).

Categories of institutions that are eligible to join HINARI include national universities, research institutes, professional schools (medicine, nursing, pharmacy, public health, and dentistry), teaching hospitals, government offices and national medical libraries. All staff members and students are entitled to access the journals. Consequently, the University of Zambia benefits from the HINARI programme; hence its users have access to these e-resources.

PubMed Central is another available database; which is a free digital archive of full-text biomedical and life sciences journal literature. It is developed and managed by the United States National Library of Medicine. It provides access to abstracts and full text articles on life sciences and biomedical topics published mostly in English (National Library of Medicine, 2010). These can be accessed through the PubMed/Medline, which has over 18 million citations.

Medline is a bibliographical database with over 3,900 journal articles in medicine, dentistry and health sciences and 11 million citations and abstracts from health, medical journals and other news sources. It further provides links to related articles and full-text (National Library of Medicine, 2010). However, both PubMed and Medline are services of the US National Library of Medicine. BioMed Central publishes journal literature in the open access model, which is freely and permanently accessible online. All these information access programmes are meant to provide electronic information to users in low income countries.

To help the students have access to these available electronic information resources, the University of Zambia, School of Medicine has established a computer laboratory while the Medical Library has also established an Internet Access Area within the Library to allow medical students access the EIRs. Librarians at Medical Library take time to train medical students (both postgraduates and undergraduates) on how to access these

resources. The Internet access area at Medical Library is open from 09:00 to 21:00hrs Monday to Friday; 08:30 to 12:00 hrs on Saturdays and 14:00 to 18:00 hrs on Sundays. The computer laboratory is open from 09:00-17:00 hrs Monday to Friday. All this effort is to enable medical students advance their knowledge in their profession and make them life-long learners. To this effect, Romanov and Aarnio (2006) observe that one of the major goals of medical education is to encourage students to maintain their knowledge of medical science by becoming life-long learners. They further argue that adequate skills in information seeking and regular use of original scientific sources are key elements in this process. This makes both information processing and information technology relevant for the quality of healthcare.

In its marketing strategies, the Library has been using posters, the Internet and brochures to sensitise students on the availability of EIRs. Librarians have also been promoting e-resources directly to deans and directors of schools and departments by physically delivering brochures to their offices; asking them to share with everyone in their schools or departments. Despite all these efforts, earlier research (Akakandelwa, 2000; Makondo, 2002; Njobvu, 2002; Akakandelwa, 2007) have indicated that the usage levels of these resources by both faculty and students are low.

Given this picture and assuming that the situation has not changed, one may be persuaded to conclude that the Library may be wasting its resources in making EIRs available and accessible to students who seem not to appreciate the value of using such resources. Another worry would be that students may have continued using insufficient and mostly outdated print materials, which may have affected their performance and the quality of their output. This would make them less productive in society upon completion of their studies.

In view of this background, this study set out to investigate the factors that affect the utilisation of the available EIRs by medical students at UNZA. However, considering the fact that user groups (students and lecturers) in the institution keep changing, methods of teaching have become dynamic and people's information needs change, the

study endeavoured to also assess the current usage levels of EIRs in order to determine the extent to which the study findings confirm the findings of earlier research mentioned above.

1.5 Statement of the problem

The Library provides access to many EIRs to students at the University as indicated earlier, but it has been observed that only a small portion is utilised, probably by a small number of students. This problem has continued even after publicising these resources and services through posters, the Internet, brochures/ fliers and training students on how to access EIRs. UNZA being an academic and research institution, one would expect a higher usage of electronic resources considering the potential benefits EIRs provide to institutions that are involved in teaching, learning and research.

It is also worth noting that, among its many needs weighed against its limited financial resources, UNZA Library has opted to invest in EIRs hoping that such resources would provide quality information to students in their education. This is also with the expectation that EIRs would facilitate and speed up the achievement of the institution's goals and objectives of providing high quality learning, teaching and research services in the country. Since these materials are less used, the ultimate result is likely to be the wastage of the Library's finances where subscriptions are required to access EIRs. This also implies that students will continue to use old print materials in their school-work, which may compromise the quality of their output as most print materials contain outdated and superseded information.

Based on this background, this study was intended to investigate factors behind the perceived less usage of these valuable resources, especially in an academic, medical and research institution like the University of Zambia by the students in the School of Medicine.

1.6 Objectives

The General objective of the study was to investigate the factors that lead to underutilisation of EIRs and services by Medical students at the University of Zambia.

The Specific objectives were to:

1. Assess the current usage levels of EIRs in order to ascertain the extent to which the study findings confirm earlier research findings
2. Establish students' awareness levels on the availability of EIRs and services provided by UNZA Library and other medical e-databases
3. Evaluate the effectiveness of the Library's communication tools used in publicizing EIRs
4. Examine students' Internet skills in accessing EIRs
5. Establish the effectiveness of ICT training students had received
6. Investigate factors that lead to underutilisation of EIRs provided by UNZA Library
7. Suggest measures that would improve students' access and utilisation of the available EIRs

1.7 Research questions

The main research questions in the study were:

1. What were the current usage levels of EIRs by students at UNZA?
2. Were the students aware of the available EIRs provided by UNZA Library and other medical databases?
3. How effective were the Library's communication tools in publicizing EIRs to students?
4. Did the students possess Internet skills to access and use EIRs
5. How effective was the ICT training students had received?

6. What were the contributing factors towards low usage of EIRs by students in their academic work?
7. What measures would improve student's access and utilisation of the available EIRs?

1.8 Significance of the study

The study was meant to assist the Library identify and respond to key factors that lead to low usage of the available e-resources by Medical students by establishing effective measures to help students access and use EIRs in their school work. This would bring about a positive change to the present situation on the usage of EIRs.

It was further anticipated that the Library's response to the research findings would not only enable Medical students but all UNZA students to access the available e-resources. This would enable the students to understand and appreciate the importance of using EIRs in both their academic and professional world. This way, the students would benefit from using EIRs.

1.9 Operational definition of terms

- **Affecting:** Anything that is disturbing or upsetting or has a negative impact on something. In this dissertation, factors affecting usage of EIRs refer to issues that have a negative bearing on the usage of EIRs by students.
- **Digital library:** The study adopted a combined definition of a digital library as defined by the National Science Foundation and Seadle and Greifeneder. A digital library/collection is a collection of materials in electronic format and makes these materials available for use by users to help them make informed decisions (National Science Foundation, 1999; Seadle and Greifeneder, 2007).
- **Electronic information resources (EIRs):** In this study, EIRs means online information resources, which include bibliographic databases, electronic reference books, search engines for full text collections, individual e-books and e-journals, etc. These may be acquired by institutional libraries, as well as through library co-operation. The term EIRs means the same as electronic resources sometimes spelt as e-resources, and these terms are used interchangeably.
- **Medical students:** The term is used to refer to all the students that are in the School of Medicine regardless of their specialties. These are scholars or learners undertaking specialisations in the field of medicine such as pharmacy, environmental health and physiotherapy.
- **Utilisation:** The term utilisation means the exploitation or usage of EIRs. It is used interchangeably with the term usage or use.

Chapter 2: Literature Review

2.1 Introduction

This chapter covers the literature written by various scholars, which were reviewed by the researcher in relation to the topic of study. This chapter is very important because it has helped the researcher gain a better understanding of and insights into previously related research work. It has also assisted the researcher to limit the research problem, define it better and come up with much more important specific goals and research questions for her research. The literature reviewed further helped the researcher to get exposed to, and get familiarised with, a variety of research methodologies used by other researchers. This way, she was able to learn their limitations in order to help her refine and adopt the most suitable one(s) for her study. It also helped the researcher get to know already researched topics thereby avoiding duplication as well as identifying gaps in the existing knowledge so far for further study.

This chapter is divided into six sections. The first section gives an introduction to the chapter, second section looks at the importance of electronic information resources and their positive effects on the quality of academic work when they are used; the third section looks at the usage of EIRs. This section has two subdivisions where one covers literature that has shown high usage of EIRs and the other one, covers the literature that has shown low usage of EIRs world-wide. The fourth section narrows down on research done on the usage of EIRs specifically at the University of Zambia; the fifth section reviews different methodologies used by different researchers in the reviewed literature; and finally the sixth section gives a summary of the reviewed literature.

2.2 The importance of electronic information resources and their positive effect on the quality of academic work

Electronic resources are invaluable research tools which complement print-based resources in any library and their increasing use will ever be experienced due to the advantages they have over print materials. Various researchers have argued why information users have felt that these resources should be made available for use in all spheres of life. For instance, Brophy (1993) and Ani and Ahiauzu (2008) have argued that EIRs have transformed education by providing a wider and organised access to high quality information in universities. They further argue that the use of ICTs by library patrons has brought about innovations in teaching, learning, and research at all levels of education i.e. from undergraduate through postgraduate and beyond. Ray and Day (1998) argue that EIRs are important because they are comprehensive, diverse, current and accessible to many users concurrently from anywhere, anytime, whether or not the physical library is open. This therefore caters even for distance learners or those with limited time to use the library.

Dadzie (2005) and Renwick (2004) further argue that electronic resources provide access to information that might be restricted to some users because of their geographical location or financial constraints. People need not come physically to the library but can access online library resources and services via networks from anywhere. It could be from the actual library, Internet café, offices or from the comfort of their homes at any time of the day. Meanwhile in cases where access is free or has already been paid for by an institution, the users can freely access the available e-resources. Electronic information resources provide extensive links to additional resources or related content. Medical information should be accessible, authoritative, reliable, accurate and timely due to the needs of medical professionals for high-quality information. Medical libraries should therefore be early adopters of electronic resources in order to provide this information and services. Similarly, Majid and Abazova (1998) argue that medical faculty should have ready access to medical information due to the

nature of their work. Henderson (1997) further reveals that electronic resources have exploded in popularity and use because they bring about innovation in teaching, enhanced research as well as the creation of new fields of inquiry.

Another study by Tenopir (2003) revealed that both faculty and students use and like electronic resources and most readily adopt them if they are perceived to be convenient, relevant, and time saving to their natural workflow. She further recommends that academic and research institutions should take advantage of these resources so that they can benefit from such a fortune that has improved and facilitated access to good quality and reliable information resources. She reveals that EIRs have improved the running of many teaching and research institutions world-wide through quality innovation and education. Further, Columbia University (2001) researched the use of electronic resources among undergraduate and graduate students and found that electronic resources were useful tools to quality academic work. It was however found that the usefulness of EIRs depended on the approach users took, i.e. using the appropriate information searching channels and databases for the information need at hand. The students also view EIRs as a positive asset to their schoolwork resulting into their papers being more comprehensive with ideas pulled together in a more coherent and well thought out manner (Columbia University, 2001).

Similarly, Romanov and Aarnio (2006) also observed that the use of computerized information systems by medical professionals could improve the quality of care, enhance the use of evidence-based treatments, and help them maintain and regularly update their knowledge. They also revealed that previous studies on doctors' use of online evidence have reported that over 80% of practitioners believed that the use of EIRs has the potential to improve patient care (Westbrook, Gosling and Coiera, 2004; Magrabi, et al., 2005). The studies further reported that one of the major goals of medical education is to encourage students to maintain their knowledge of medical science by becoming life-long learners.

In another study by Maxwell, McQueen and Ellaway (2006), it is reported that medical students need current information to learn an ever-increasing number of prescribed drugs and their names. These are generally not logical or intuitive to medical students but are as good as learning a foreign language. The findings further reveal that prescribing drugs is a key responsibility of a doctor and requires a solid grounding in the relevant scientific disciplines of pharmacology and therapeutics. EIRs would therefore provide such information to medical students. Access to databases of online-refereed journals provides up to the minute information, international in scope and sometimes not available elsewhere. This makes their work unique and provides them with a lot of facts (Dalglish, 2000).

It is for these and many other reasons that most scholars and researchers have felt that higher learning institutions are challenged to provide access to electronic resources to their communities to promote high quality teaching, research and learning. However, as Dadzie (2005) notices, library resources whether print or electronic are expensive and for the latter in particular, so their continued use depends to a large extent on the sustainability of the current technological, financial base, infrastructural development and the willingness of the intended users to make use of them to get the benefits they offer.

2.3 The usage of EIRs

Various studies have been carried out on the use of electronic resources by different categories of users. Surveyed users include students, lecturers, researchers, experts of various professions and scientists. While some researchers claim that there are more studies that have reported high usage of Internet resources, others have argued that the opposite is the case. For example Dadzie (2005) has argued that most studies done have shown a high usage of Internet resources thereby confirming the findings of de Vicente et al. (2004), Falk (2003) and Waldman (2003). They attribute high usage of EIRs to the following factors:-

1. The fact that most Internet resources are free once connected
2. EIRs are easy to use
3. Mostly, EIRs contain accurate and current information

On the other hand, Romanov and Aarnio (2006), Watts and Ibegbulam (2006) and Alasa and Kalechukwu (1999) have argued that research has shown low usage of EIRs. These have based their conclusion on studies that have been undertaken mainly in Nigeria. They have explained that the factors that have led to the low usage of EIRs include lack of adequate ICT infrastructure, unaffordable online access and poor ICT skills of librarians to adequately serve their clients.

Despite this difference between the two groups of researchers, most of them agree that online databases have not been equally patronized by clients due to lack of awareness of the availability of electronic resources, lack of time to access them and the use of passwords (Romanov and Aarnio, 2006; Ani, 2005; Dadzie, 2005; Ibrahim, 2004; Tenopir, 2003; Majid and Tan, 2002; Crawford and Daye, 2000; Alasa and Kalechukwu, 1999).

However, looking at the extensiveness of this topic and the attention it has attracted in the recent past, it is reasonable to argue that it is not possible to tell exactly which side of research takes lead. This is because all these conclusions are based on the generalizations made from what one was exposed to during their literature research, which usually does not cover all the research that has been done on the same topic. This therefore makes different researchers' conclusions to be true depending on what they covered. Various researches, as covered under sections 2.3.1 and 2.3.2 of this chapter, have been done on the usage of electronic resources driven by a number of factors. Among others are issues such as accountability funders of certain researches demand from the institutions or research they support. For instance some researchers would want to know how useful their research findings are towards the targeted population. If it is beneficial, the conclusion is that resources have not been wasted hence worthy investing in. Other funders would want to ensure that the institutions they fund in acquiring EIRs

meet their set goals and objectives. For example, if it is an academic and research institution of higher learning, funders would ensure that the usage rate of EIRs is monitored to gauge the extent to which such resources support the learning, teaching and research activities of that particular institution. Despite these different aims of such researchers and funders, the literature researched for the purpose of this study covered both the literature showing high usage of e-resources and that showing low usage of e-resources and services by different user groups.

2.3.1 High usage of EIRs

Among the studies conducted that have shown high usage of e-resources by users was Renwick's study. Renwick (2004) surveyed the knowledge and use of Medical Sciences Library's (MSL) EIRs by medical professionals at the University of the West Indies. His findings showed that 97% of the respondents indicated that they were daily computer users, computer literate and had high awareness of the available electronic resources provided by the MSL. However, the results further showed that the utilisation of MSL-specific resources was low. Renwick (2004) suggested that the reasons for the low usage rate of MSL-specific resources could have been because many respondents had Internet connections at home. As such, respondents could have been accessing most of the electronic information they needed for teaching, clinical practices and research using search engines at home.

Renwick however, revealed that it was challenging to determine the usage levels of EIRs because the question on the use of EIRs in the questionnaire had a high number of non-responses or "don't know it". This could imply that non-respondents probably were not aware of the availability of EIRs in the library. Renwick (2004) further concludes that the faculty's high response rate that they regarded e-resources to be useful and important to their work. Faculty also indicated that they used e-resources to support their teaching, research, and clinical practice activities. They further indicated that they needed to be trained on how to access e-resources where possible. Generally, e-resources in this study

were used to support faculty's research (83%), teaching (65%), and to a lesser extent, clinical practice (37%). However, the conclusion was that among the factors that led to high usage of e-resources in teaching was because lecturers recommended the use of e-resources (73%) to their students. This is because most lecturers expected their students to use e-resources in their presentations.

These findings agree with those of Waldman (2003) who found that 28% of students under study at Baruch College, City University of New York, reported that they learnt about electronic resources from their professors. Thirty percent (30%) indicated that they learnt about electronic resources from the library workshops. The difference however between the two researchers is that, Renwick (2004) discovered that faculty mostly recommended other Internet resources and only few (33%) recommended the MSL-specific e-resources to their students. Meanwhile Waldman (2003) reveals that students were told of the library-specific e-resources by their professors.

Waldman (2003) further reports that although 88% of the respondents knew they could access the library's electronic resources from home, 50% used them from home while 61% had no problems using the library's electronic resources either from home or the library. However 50% indicated that there was a difference between the library's electronic resources and Internet resources, which Waldman thought could have been the reason why 77% said they started their research with free Internet resources and not the library's subscribed resources. Sixty-seven percent (67%) got most of their information for their papers through the Internet, while 27% reported using the library's electronic resources and 20% reported using non-electronic resources (Waldman, 2003).

In another set of research, Tenopir (2003) analysed previous studies on the use and users of electronic library resources (Tier 1 and Tier 2 studies). The studies used a variety of research methods such as observation, surveys, interviews, experiments, and transaction log analysis. The aim of using a variety of methods was to get a full picture of what users actually do, why they do it, what they would prefer, and what they were likely to do in the future. Her findings revealed that both faculty and students used and

liked electronic resources and most readily adopted them if they were perceived convenient, relevant, and time saving to their natural workflow. It was further found that experts in different subject disciplines (work fields) had different usage patterns and preferences for print or electronic. Hence there was no one right solution for services or system design for every subject discipline. It was understood that print was still being used for some reading and was part of research in almost every discipline. Tenopir (2003) further reported that the Pew Studies revealed that almost three-quarters of the observed college students (73%) reported that they used electronic resources rather than print resources because it was convenient. The students revealed that they first used the Web for research, although their search was affected by their lecturers' specific assignments or requests to use particular resources. Tenopir further argues that since it was considered important in certain disciplines like humanities for college and high school students to use the Internet more than the library for research, they were required to exercise quality judgments about materials they retrieved from the Internet. Such quality judgments could not exactly match faculty members' criteria for quality, but they had to apply their best judgment (Tenopir, 2003).

Other findings, like those of Dadzie (2005) reveal that the general computer usage for information access from the Internet and the usage of some specific Internet resources were very high. This was attributable to the University's (Ashesi University College) state-of-the art IT infrastructure. However, like many other researchers, Dadzie found that the use of scholarly databases and some search tools were quite low as a result of inadequate information about the existence of these library resources. Similar results about low usage of online databases were reported in other studies (Ibrahim, 2004; Majid and Tan, 2002; and Crawford and Daye, 2000). Their findings show that respondents were not as enterprising as they ought to be and as such were limiting their searches to only a few tools. To this effect, Dadzie recommended among others, the introduction of information competency courses across the curriculum and the introduction of a one-unit course to be taught at all levels. Dadzie further recommended a provision of more PCs on campus for use.

The concern to maximize the use of electronic resources is also raised by the low usage of important resources. This is because it becomes difficult to convince the funders to continue providing financial support for subscriptions for online databases during project evaluation or when the funding comes to an end. Despite the fact that advantages outweigh the perceived disadvantages or concerns on the value achieved from using EIRs, users of electronic resources have indicated that there are disadvantages associated with electronic library collections (Tenopir, 2003). These include concerns like limited online materials such as journals and e-books, discomfort of reading from the screen or poor graphic quality which usually has an effect on one's sight, takes long to download pages from the Internet, difficult to tell materials which genuinely offer correct information, and disruptions resulting from power cuts. These and many other factors have caused users to avoid using EIRs in some institutions of higher learning.

2.3.2 Low usage of EIRs

Despite some research revealing high usage of electronic resources, other research has indicated low usage of electronic resources, among which are discussed in this subsection. In a study by Romanov and Aarnio (2006), aimed at evaluating medical and dental students' utilisation of EIRs, the findings showed that only one-third of medical students and one-tenth of dental students under study were regular users of full-text articles online. For instance 24% of medical students and 19% of dental students searched Medline two times per month for study purposes, and 32% of medical students and 24% of dental students searched Medline for research. Twelve percent (12%) of both medical and dental students never utilised either Medline or full-text article in other databases and 40% were non-users of full-text articles.

The findings further showed that the use of electronic resources differed among students. Ultimately, the determining factor on how one would either use EIRs or not was the Internet-searching skills one had. This means that information-searching skills were correlated with the use of electronic resources. This therefore implies that adequate

training in Internet information-searching skills by the students would lead to an increased usage of EIRs. Similarly, preliminary investigation into the situation regarding access to electronic healthcare information in developing countries done by Watts and Ibegbulam (2006) at the College of Medicine and University of Nigeria revealed that there was low usage of e-resources. The factors that were identified to have been hindering usage of e-resources included inadequate ICT infrastructure, expensive online access and poor ICT skills of librarians to adequately serve their clients.

Another study conducted by Alasa and Kalechukwu (1999) revealed that the usage statistics of electronic resources in university libraries in Nigeria were very low. This was due to lack of Internet skills by many users and more reliance on outdated print materials, which could be critical for knowledge generation and dissemination. Alasa and Kalechukwu further lamented the 1999 state of information network in Nigeria. They observed that the state of information network was deplorable, which could lead to serious consequences on the socio-economic development of the country. They further recommended that major stakeholders needed to consider funding libraries to enable them provide access to current information to researchers. This would promote national development.

In reacting to the above findings of Alasa and Kalechukwu, Ani and Ahiauzu (2008) conducted another study in 2007 to explore levels of developing EIRs in university libraries in Nigeria. This was in view of the fact that good Internet connectivity would provide a wider access to information in universities for teaching, learning, and research through the use of ICTs in libraries than the traditional print. The findings showed that Internet connections had the major source of developing EIRs in Nigerian university libraries with 17 (89.5%) in the surveyed libraries. This was followed by 13 (68.4%) subscription to electronic databases/ online databases, 11 (57.9%) for CD-ROMs, 10 (52.6%) for electronic journals and library computerisation. Meanwhile digitisation of library materials received the least response of 3 (15.8%).

In 2005, Manda assessed the conditions under which electronic resources were used in 10 academic institutions in Tanzania. Focus was on the use of electronic resources which were made available through PERI. The findings revealed that there were limited levels of usage of PERI resources. The reasons behind this were due to inadequate availability of basic technical and human resources for electronic resources access and use; limited access to PCs for students to use; variations among institutions in accessing electronic resources; problems in marketing electronic resources; and inadequacy in end-user training. Manda further identified challenges of using electronic resources as being slow Internet connectivity; limited access to PCs; poor searching skills to effectively use electronic resources by students and power cuts. Based on these findings, the study made policy recommendations on training in the use and marketing of electronic resources to specific user groups and resources (Manda, 2005).

2.4 Usage of EIRs at UNZA

Akakandelwa (2000) in his study reported that the students at the University of Zambia rarely used the available e-resources because they did not have skills to access such materials. Meanwhile other students indicated that they did not need such resources because they depended on familiar print resources. The reasons brought out for not using the available e-resources were that the respondents were not aware of the availability of these resources, repeated breakdown of equipment, high fee charges for Internet use especially e-mail. But since then there has been continuous training of students after 2000 past by librarians on how to access and use e-resources, no charges to access academic materials and an increased number of and well maintained computers, what other factors are at play? Confirming the existence of training of students by the library staff, Njobvu (2002) in his comparative study on the use of e-resources between UNZA students and Strathclyde students, reported that the Library offers training on how to access the OPAC and electronic resources to new students and all others interested in knowing how. Training is very important because it equips one with skills to use e-resources efficiently. A trained person therefore, would be able to access what is

available and know how to use it. This ultimately would lead one to properly define their research problem.

Njobvu (2002) further revealed that out of 33 students that responded, 30% indicated that they normally used Internet for latest information, while 75% indicated that they used print materials. Seventy percent (70%) revealed that they accessed Internet elsewhere out of which 67% showed they found it expensive paying for such services. The fact that students were willing to pay for such expensive Internet services showed how important they regarded and probably found the use of EIRs both to their school and other information updates. This can be proved by the students' responses that they regarded Internet services to be important and that it would improve the quality of education in the university if they were made available and accessible to everyone. EIRs would provide a variety of up-to-date materials to help them in their research; make lectures more interactive and interesting and allow access to reviewed scholarly publications that only exist in electronic form.

The reasons given by Njobvu for the low usage of electronic resources included lack of ICT infrastructure. This factor was also mentioned by Makondo (2002), who reported low levels of Internet service satisfaction by the students and lecturers at the University.

However, since the year 2002, efforts have been made to improve the Internet infrastructure, which include increased bandwidth and procurement of more computers. As such, additional computer accessing areas have been established such as Internet laboratories in some schools and libraries. This therefore, implies that there should be an improvement in the usage of EIRs. In this respect, this research, among its many objectives, assessed the current usage levels of EIRs in order to determine if usage has improved or not.

Another study by Akakandelwa (2007), targeting both students and lecturers, reported that even though respondents indicated high levels of computer literacy, daily computer usage and relatively high levels of awareness, usage levels were low. For example,

HINARI was being used by 12% only, 36% had not used it and 52% were not aware of it; Medline was being used by 38% only, 32% had not used it and 30% were not aware of it. Therefore, Akakandelwa argues that access and availability to EIRs were not a guarantee of maximum utilisation of electronic resources. The reasons for low usage of these resources were that EIRs were not well known to many due to poor marketing strategies by the Library and bureaucratic barriers where brochures and leaflets sent to heads of schools and departments were not circulated to everyone concerned.

To get round this problem, promotion of these resources has been done through posters in schools and computer laboratories and through the Internet, while most staff members in the Library have made efforts to personally speak to those users they come across about the availability of EIRs. Even if research conducted has shown that respondents feel that EIRs are valuable resources to their academic work, the usage level of EIRs is still low. For example Akakandelwa (2007) confirmed that even if the respondents did not actively use e-resources, the majority (87%) felt that EIRs were very important and only a few (1%) felt that EIRs were not important in their work.

Based on the findings of all researches covered (Akakandelwa, 2000; Makondo, 2002; Njobvu, 2002; Akakandelwa, 2007) at UNZA, it has become clear that the main reasons for the low usage of EIRs by the students are poor ICT infrastructure, lack of Internet searching skills by users and lack of awareness of the availability of EIRs. While other reasons brought out include dependence on familiar print resources, high fee charges for Internet use especially e-mail and incompetent librarians to adequately serve their client.

Therefore, the above findings and those covered earlier on in section 2.2 (that EIRs provide a wider and organised access to high quality information and innovations in teaching, learning, and research because they are comprehensive, diverse, current and accessible to many users concurrently from anywhere, anytime) suggest that EIRs are important. Meanwhile the value of these resources on academic achievement seems less appreciated by the UNZA information user community and others.

Why is there less usage of EIRs by students at UNZA when in other areas such as Ashesi University College and University of the West Indies, their usage levels are high (Renwick, 2004; Dadzie, 2005)? For example the literature reviewed in part 2.3.1 has revealed high usage of EIRs because of various reasons associated with EIRs. These included the fact that EIRs lead to quality academic work through the promotion of innovation in teaching and research. While in medicine they can improve the quality of care by enhancing the use of evidence-based treatments and providing current information in learning newly prescribed drugs and their names (Romanov and Aarnio, 2006). It is for these reasons that his study set out to establish the factors that affect utilisation of EIRs by students at UNZA.

2.5 Methodologies used in the reviewed literature

Different researchers covered in the literature review used different methodologies in their studies. The major methodology used was a survey (Ani and Ahiauzu, 2008; Romanov and Aarnio, 2006; Dadzie, 2005; Renwick, 2004; Waldman, 2003; Makondo, 2002; Njobvu, 2002; Akakandelwa, 2000). Akakandelwa (2007) combined surveys and informetrics while Tenopir (2003) combined a variety of research methods which included observations, surveys, interviews, experiments, and transaction log analysis. The idea was to get a full picture of the problems under investigation. The main instruments used for data collection were questionnaires. Apart from Akakandelwa (2000) and Makondo (2002), the rest pre-tested their research instruments before embarking on the actual research. The main aim of pre-testing their research instruments was to ensure that the final instruments were suitable for the research and would bring out necessary information that would meet all the set objectives. Other data collection instruments used included interviews, observations, personal experiences and documentary evidence.

The sample sizes used ranged from 20 to 837 and sampling methods included simple random sampling, stratified random sampling and purposive sampling, while software

used for data analysis included Statistical Package for Social Sciences (SPSS) and Microsoft excel.

The common method of research used in the covered literature was a survey. The advantages of using surveys are that surveys are relatively inexpensive and easy to conduct. They can cover large populations making results statistically significant even when analysing multiple variables. Referring to this attribute, Colorado State University (1993) argues that no other method of observation can provide this. Surveys also allow considerable flexibility at the creation phase in deciding how the questions will be administered (either face-face-interviews, by telephone, group administered, written or oral survey, or by electronic means). Questions can either be open-ended to allow flexibility on responses or standardised so that pre-selected uniform responses can be chosen from given options. However, surveys have a major weakness of relying on standardisation, which forces the researcher to develop questions general enough to be minimally appropriate to all respondents. This would lead to failure to bring out information from respondents with unique characteristics (Colorado State University, 1993).

After considering both advantages and disadvantages of each methodology used in the literature covered, the researcher decided to combine quantitative and qualitative research approaches in order to capture all the desired data. For the methods and instruments of data collection, the researcher employed questionnaires and focus group discussions (FDGs). This was for the purpose of capturing all valuable information required to meet the set objectives of the study.

2.6 Summary of the literature review

This chapter reviewed the literature the extent to which EIRs are utilised by different types of user groups and the factors that affect usage of EIRs. The main user groups that have been studied include students, teachers/lecturers, researchers, scientists and other professionals in various fields. The studies on the usage of EIRs have become an area of concern in the recent past due to various reasons. These reasons are that some funders want to ensure that money spent on their projects is easily accountable to the targeted group or funded projects solve the specific problems they were meant to solve. There is need to ensure that such resources are beneficial to both the research and project endeavors they were meant for if funding has to continue.

Meanwhile research has revealed that EIRs have the potential to enhance the quality of professional activities. This therefore makes them critical in both academic and research institutions which are involved in learning, teaching and research activities. Where high usage was reported, the findings revealed that this was because electronic resources were invaluable research tools which complemented print-based resources in any traditional library. They also provided access to information that could have been restricted to the user because of geographical location or finances. EIRs provided access to current information and were convenient to use since users could access information from anywhere at anytime. It was for some of these reasons that university libraries in Ghana, and probably all other universities are being challenged to provide access to electronic resources to support teaching, research and learning. In this regard, Dadzie (2005) recommended that with falling library budgets, there is need to maximize the use of available electronic resources to justify the financial investment involved in the maintenance of these systems in academic libraries.

The studies that showed low usage of EIRs in certain parts of the world revealed that among the factors that have led to low usage levels of EIRs were poor ICT infrastructure i.e. limited number of computers to cater for users and continuous breakdown of the

available computers. Other factors were poor marketing strategies to make known the availability of EIRs; Lack of Internet searching skills by users and information providers; reliance on print resources; and electricity disruptions. This literature review therefore provided background information on the current research problem, to refine it into a research topic and bring out all the required information to meet the set objectives.

Apparently, the major reasons for low usage of these resources have not been established, hence the need to carry out this study. This study therefore is meant to establish and eliminate factors that hinder usage of EIRs and come up with measures that will promote usage of EIRs in the institution.

Chapter 3: Methodology

3.1 Introduction

This chapter deals with the methods that were used to conduct this research. The term research methodology refers to the activities of the research, such as how to proceed from the stage of data collection up to the presentation of the findings. It defines how to progress in terms of data collection, data analysis, the interpretation of the findings and the discussion of these findings. According to Colorado State University (1993), the term methodology refers to strategies surrounding the use of multiple methods of data collection as required by different types of attempts to achieve higher degree of reliability and validity. Its purpose is to enable the researcher to come up with results that are as valid and reliable as possible. Methodologies may involve one or more of the following tools: questionnaire administration, interviews, focus group discussions, library research and observation. Each methodology is used as and when appropriate to the situation. This chapter on methodology is divided into seven parts. Part one gives an introduction, part two deals with research design, part three looks at the total population under study, part four covers the actual study sample, part five shows research instruments that were used for data collection, part six looks at the methods that were used to analyse the data that was collected from the field and part seven covers limitations of the study.

3.2 Research design

A research design is an analytic approach to conducting an investigation. It provides structure to the research and holds together all elements in the research project. It shows how all the major parts of the research project (such as the samples/groups, measures, treatments or programmes and methods of assignment) work together to try to address the central research questions (Trochim, 2006). Makondo (2002) defines research design as a logical sequence that connects empirical data to a study's initial research questions

and ultimately its conclusions. In this study, the researcher was primarily interested in investigating factors that lead to less usage of EIRs by medical students at the University of Zambia. The aim was to establish and suggest factors that would improve students' access and utilisation of these resources made available by the Medical Library. The researcher started with reviewing the literature related to the topic of study in order to determine prior studies that have been done on this subject. This also enabled the researcher to avoid duplication and to refine the research questions and research topic into a researchable and manageable one. In trying to place this work in perspective of other studies such as Njobvu (2002), Makondo (2002) and Akakandelwa (2000), this study intended to contribute to this subject by promoting more awareness of the need to address the problem of less utilisation of EIRs by students at UNZA Library.

The study combined both quantitative and qualitative types of designs in that it aimed at getting numerical information as well as description of people's feelings, perspectives, opinions, attitudes and experiences. A survey method of research was adopted based on the consideration of positive aspects of a survey. The points on the advantages of using a survey research are covered in more detail in section five of the literature review chapter. These include the fact that surveys are relatively cheap and easy to conduct; allow large coverage and can easily accommodate open-ended questions to allow flexibility on standardised responses so that pre-selected uniform responses can be chosen from the given options (Colorado State University, 1993). These reasons fitted in well with the adoption of the survey method.

On the other hand, the reliance of surveys on standardisation of questions general enough to be minimally appropriate for all the respondents could cause respondents with unique characteristics inability to bring out required information (Colorado State University, 1993). This limitation was however, addressed by the use of focus group discussions (FGDs).

FGDs helped in getting in-depth information, capturing the information which could not have been collected through questionnaires and for the purpose of triangulating the results.

Questionnaires captured both qualitative and quantitative data while the FGDs specifically captured qualitative data which gave additional value to the research findings. It was particularly felt that the findings from FGDs would help add more value to the findings of the questionnaires because it involved quality interaction between the researcher and the respondents. In this regard, Fontana and Frey (2000) observes that FGDs have the ability to elicit detailed information about personal feelings, perceptions and opinions because they allow more detailed questions to be asked through probing. They further revealed that because FDGs allow ambiguities to be clarified and precise wording to be tailored to specific respondents, they make possible the discovery of attitudes and opinions from respondents that could not have been revealed in a survey questionnaire. This therefore leads to the production of a lot of information far more quickly and at less cost.

3.3 Population

Population, also referred to as target population is the total number of people, groups or workplaces which might benefit from the research findings and its implementation. The target population of this study was all undergraduate medical students at the School of Medicine. The total population was 936. The School of Medicine has thirteen departments and offers seven undergraduate degree programmes. These study programmes include Bachelor of Medicine and Bachelor of Surgery, Bachelor of Human Biology, Bachelor of Science in Physiotherapy, Bachelor of Pharmacy, Bachelor of Biomedical Sciences, Bachelor of Science in Environment and Health, and the Bachelor of Science in Nursing.

3.4 Study Sample

The study sample includes those people, groups or workplaces chosen from the sampling frame to be used in the study. It is a subset or subgroup of the sampling frame, which in turn is a sub-group of the target population. It is important that the study sample is representative in order to make the generalisation of the findings easy and possible.

For this research, a sample size of 127 medical students (14% of the total population of 936 medical students) was studied using questionnaires. The sample was drawn by proportional stratified random sampling from the school registers. This was in consideration of the fact that each of the seven programmes the School of Medicine is offering had a different number of students. The sampling was done by firstly stratifying students according to their study programmes; secondly the sample sizes drawn from each programme were worked out proportionally; and finally the required number of students were randomly selected from each stratum adding up to the needed sample size of 127 respondents. This was with the hoped that this way, the researcher would get representative views from all the students in School of Medicine. Gender was also taken as an important variable in order to remove all biases related to sex. Therefore, to take this variable into consideration, the researcher worked out the ratio of females to males in each study programme before drawing the sample.

In addition to the 127 respondents drawn for the purpose of answering the questionnaires, five FGDs were conducted. Each FGD comprised students from different programmes. Three FGDs comprised five discussants while two comprised four participants each, bringing the total number of discussants to 23. The two FGDs comprised four participants because the other selected discussants did not come for the interview and it was difficult to have the interview rescheduled. The discussants were randomly selected from different study programmes for each FGD, except there were no students from Environment and Health programme because they were all away the time

the FGDs were being conducted. The discussants for FGDs were drawn from the population of students who did not participate in the questionnaire survey.

3.5 Data collection Instruments

Research instruments are tools used for data collection from the field. For the purpose of this study, two data collection instruments namely questionnaires and focus group discussions commonly referred to as FGDs were used to collect data from the respondents. The data collection exercise for questionnaires was done in the last three weeks of August 2009 while that of FGDs was conducted from August to September 2009.

3.5.1 Structured self-administered questionnaires

Questionnaires included both open-ended and standardised questions in order to collect both qualitative and quantitative data. These were administered to all the respondents by the researcher in person and with the help of student-research assistants. Among the reasons for choosing questionnaires were because questionnaires allow responses to be gathered in a standardised way; they are relatively fast in collecting data and easy to analyse data using the SPSS, which the researcher used for data analysis (Fontana and Frey, 2000). In addition, questionnaires allow collection of information from a large portion of a group, making them more suitable for the coverage of a large sample.

Before the actual data collection was embarked on, questionnaires were pilot-tested and peer reviewed. For the pilot study, the instruments were administered to twenty-five students at the Great East Road campus in the Schools of Veterinary Medicine, Agriculture, Library and Information Science, Humanities and Social Sciences and Engineering. The reason for not doing the pilot study with the School of Medicine was to avoid monotony of having the same people for the pilot as well as for the actual study. However, in piloting the questionnaires, the schools used were part of the University of Zambia and had similar characteristics with the targeted population. During this

exercise, some questions were designed to suit the information needs of the students under study. These questions were later on changed to suit the medical students in the final questionnaires. For peer-reviewing, the corrected questionnaire from the pilot study was distributed to five lecturers/researchers. These included three lecturers from the school of education and two researchers from the Library (One from the main Library and the other from the Medical Library). The purpose of the two exercises on the data collection instruments was to ascertain the feasibility of the study, validity of data collected in relation to the study objectives, logical sequence and appropriateness of the questions and wording within questions. Following the two activities, changes were realised such as dropping of certain questions and sections, which were not relevant; and the addition, rephrasing and rearranging of some questions in some sections. Objective number four was also modified to clearly include the training component while objective number five was introduced. This process made the instruments more suitable for the actual research in order to bring out the required information from the respondents to meet the set objectives.

3.5.2 Focus group discussions

A FGD essentially is a data gathering technique that involves a group of people brought together in a formal or informal setting to participate in the discussion of an area of interest. It relies on the systematic questioning of the respondents simultaneously from a predesigned interview schedule. The interview schedule for this study's FGDs included specific questions the researcher thought would help elicit in-depth information and insights the questionnaire could not have captured. It was also for the purpose of triangulating its findings with those from the questionnaires.

The advantages of using FGDs are that they can elicit detailed information about personal feelings, perceptions and opinions because they allow more detailed questions to be asked through probing; ambiguities can be clarified and precise wording can be tailored to respondents; their flexibility in questioning makes possible the discovery of

attitudes and opinions that might not be revealed in a survey questionnaire; they produce a lot of information far more quickly and at less cost (Fontana & Frey, 2000). These positive qualities of both questionnaires and FGDs made these instruments more suitable for use in this research.

For the purpose this study, each focus group discussion conducted comprised participants pursuing different study programmes in the School of Medicine. The responses were recorded manually in a small notebook by the researcher for further data analysis. For the purpose of checks and balances with what was written down, a phone was used to record the responses using a voice recorder facility within the device. Care was taken to ensure that respondents to questionnaires did not participate in focus group discussions. This was done by ensuring that only a compiled list of names of students that did not participate in the questionnaire survey was used to select FGD discussants from. The aim for this was to get different and balanced views from different students in the school.

However, it was very difficult to organise FGDs as most of the students were on recess and were involved in different projects at different times during the time of focus group discussions. This made it really difficulty for the researcher to find the most suitable time for all the participating students in each discussion. As a result the exercise lasted about four weeks instead of the scheduled one and half weeks. This explains why two FGDs ended up having four discussants each. Despite this problem, all the scheduled FGDs went on well.

3.6 Data Analysis

Data analysis is a process of making meaningful and useful conclusions from bulky and jumbled pieces of information obtained during the course of one's investigation of the problem. For the purpose of this study and considering the nature of the study (covering both quantitative and qualitative), data from questionnaires was analysed using SPSS while data from FGDs was analysed manually. SPSS was used to summarise

observations or data in a way that would provide answers to research questions. It helped in the generation of tables and graphs of frequencies and percentages and hypotheses testing. After data was collected, it was edited, grouped according to related subjects, coded and then entered into SPSS data editor. During data entry, great care was taken to achieve uniformity and accuracy in respondents' answers and recording for analysis and tabulation. For example, responses from open-ended questions were classified under headings and then coded. The analysed observations were mostly presented in form of tables and graphs indicating frequencies and percentages. Meanwhile data from FGDs was sorted and the emerging issues were categorised into various themes or sub-headings. These sub-headings were later used as sections and sub-sections during report writing.

The findings from the analysis helped establish relationships between and among variables; and to determine the extent to which each variable contributed towards the less usage of EIRs in the University. Quantitative analysis provided facts and figures for easy verification and evidence, while qualitative analysis provided knowledge and understanding of the problem of less usage of EIRs.

3.7 Limitations of the study

It was very difficult to organise FGDs because most of the students were on recess and involved in different projects at different times making it difficult to find a suitable time for all the participants. This delayed the completion of the exercise

It was also not possible to have representatives from the Environment and Health programme in focus group discussions because they were all away in the field during the time of the research. Moreover, the Environment and Health programme had just been introduced and had very few students from which some students participated in answering questionnaires earlier on. Therefore, not having representatives for FGDs would not affect the overall findings.