A STUDY OF THE INFORMATION SEEKING BEHAVIOR OF UNDERGRADUATE STUDENTS OF MAKERERE UNIVERSITY

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A DISSERTATION SUBMITTED IN PARTIAL FULLFILMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF MASTER OF SCIENCE IN INFORMATION SCIENCE OF MAKERERE UNIVERSITY

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DECLARATION

I, Kakai Miriam, hereby declare to the best of my knowledge that this is my original work and it has never been submitted for any academic award at any School, Institute, College, or University. Where possible, sources have been duly acknowledged.

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ABSTRACT

This study investigated the information needs and seeking behavior of undergraduate students of Makerere University.

A cross-sectional survey was carried out, with samples from first, second, and third year undergraduate students selected from the Department of Bio-Chemistry in the Faculty of Science, and the Department of History in the Faculty of Arts, to represent the disciplines of the Humanities with BA (Arts) and Scientists with B.Sc.

The findings noted that Makerere University undergraduate students follow only five of Ellis' six generic information seeking activities summarized as: starting, browsing, chaining, monitoring and extracting. The study established the major factors that influence the students' information seeking behaviors. The results obtained also indicate what students rely on most as their information sources.

It is suggested that the library would benefit the undergraduate students better if more attention were paid to sensitization and training programs, as well as publicity and promotion of information resources and services. Automating the procedures of use was also recommended for easy and quick information retrieval.

DEDICATION

To my Dear Mother, who has always prayed and wished me success. To my Late Father, whose words always encouraged me to read hard. (He always said "Kakai, Soma Kuuhu"). And to the rest of my family, who have given me all the support to do well, not forgetting the Almighty God who has kept me healthy, both physically and spiritually.

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Last but not least, to my colleagues in the M.Sc. (Inf. Sc.) class, 2001-2003 for their cooperation and lovely discussions that made the course more interesting.

Lastly, I appreciate the patience of my family, most especially my Mother Alice Shilela Wereka for the attention I did not offer to them while I was busy trying to finalize my studies.

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CHAPTER ONE

INTRODUCTION

1.1 Background to the study

Information seeking is a basic activity indulged in by all people including scholars. It is an aspect of scholarly work of most interest to academic librarians because they strive to develop collections, services, and organizational structures that facilitate information seeking (Wiberley, 1989:638). This therefore calls specifically for studies on how scholars identify what they need to read. Mann (1993) notes that most researchers, even with computers, find only a fraction of the sources available to them. He further explains that researchers tend to work within one or another mental framework that limits their basic perception of the universe of knowledge available to them. Students for instance use a subject-disciplinary method, which leads them to a specific list of sources on a particular subject. Mann points out that while this method allows students and researchers to find more specific sources, it is also limiting in that they may not realize that work of interest to their own subject appears within the literature of many other disciplines. It is therefore noted since the 1980's that the information seeking behavior of different categories of scholars have been studied and a number of models developed.

For instance, Wilson in 1981 developed two models. The first one is a general model of information behavior which suggests that: "... information seeking behavior is a consequence of a need perceived by an information

user, who, in order to satisfy that need, makes demands upon information sources / services to find relevant information ..." (Wilson 1999:251). The second model, which is specifically on information seeking behavior, explains two important aspects. One, that an information need is not a primary need but a secondary need and two; that in the effort to discover information to satisfy a need, the inquirer is likely to meet with barriers of different kinds. The second model also includes the search behaviors as defined by Ellis. Ellis in 1993 derived models of the information seeking patterns of academic researchers in the social sciences, sciences and the humanities from which he identified six characteristic information seeking activities generalized as: starting, chaining, browsing, differentiating, monitoring, and extracting. These models form the foundation of the concepts used in this study.

Wilson (1999:252) notes that the models on information seeking behavior are rather more numerous, some of which include: Kuhlthau's (1991) model of the stages of information seeking behavior which she developed as a result of a series of longitudinal studies of high school students. These stages are summarized as initiation, selection, exploration, formulation, collection and search closure/presentation. Eisenberg and Berkowitz (1992) also in their Big Six Skills model propose a general approach to information problem solving through six logical steps/stages. These are identified as task definition, information seeking strategy, location and access, use of information, synthesis, and evaluation. It is worth noting however that Kuhlthau's model and Eisenberg and Berkowitz's model give an approach on the real process of doing research. They explain in stages how research can be done

systematically. Ellis' model describes the information seeking activities that a scholar may indulge in, not categorically as steps, but as a set, taken together to explain the components of information seeking patterns. Wilson in 1996 expanded his 1981 model drawing upon research from a variety of fields other than information science, including decision-making, psychology, innovation, health communication, and consumer research (Wilson 1999:256-257). These make the model a richer source of hypotheses and further research than Wilson's earlier model. It also still contains Ellis' model, which was the basis of establishing the information-seeking behavior of undergraduate students in this study.

In the present day competitive information age, information is provided in varied formats, where a user needs sufficient knowledge on how to access and retrieve information in any format. Atkinson (1997:60) enumerates the circumstances under which it is worthwhile to re-examine issues of user behavior in academic settings. These he notes as the rapid changes in information provision, computerized access, digitization formats in full text, and the plethora of resources on the Internet. All these impact on the access and retrieval capabilities of the users and also on their information-seeking behavior.

Libraries, as essential learning resources in institutions of formal education are places where students need to acquire adequate user knowledge and skills to easily interact with and successfully retrieve information in either manual or automated information systems. It is important today in this

information age for individual students to engage in lifelong information skill initiatives in order to remain competitive in a globalized world. These skills can best be achieved gradually through training and practice. Studies show that faculties tend to assume that students know how to do research, use research tools and believe that research skills are picked along the way (Mellon, 1988; Thomas, 1994). However, this is not always the case and many times students find themselves in puzzling situations with no idea of how to start a search.

Lau (2001) comments on the nature of graduates expected in today's market economy where most organizations are in search of graduates with appropriate skills, value, and knowledge, which need to be obtained during a students' stay at the University. He notes that information skill competencies demand that librarians play a great role in the educational process. Libraries, as formal information delivery systems are intended to serve their clients with satisfaction and therefore need to address this issue appropriately.

A number of studies conducted among undergraduate student's show their inadequacies in using libraries. For instance in a study conducted at the University of Zululand, among first year undergraduate students, Zondi (1992:204) noted that the majority of students showed a very low level of competence in the use of a library and in addition displayed poor information seeking patterns. She notes that the failure of university students to make effective use of the resources in their libraries has for decades been a cause for concern to librarians worldwide. From her study, she concluded that

factors like teaching strategies employed at the university and the inadequate user-education programs could have contributed to the students' poor information seeking patterns and lack of competence in the use of the library.

Considering the situation in Uganda, Makerere University Library is the biggest academic library in the country, and according to Makerere University Prospectus (2000/2001); the library has a stock of approximately 615,000 information materials. These comprise of books, monographs, pamphlets, periodicals, government documents, manuscripts, international organization publications, and serials, with an annual increment of about 4,000 books to support teaching, learning, and research. It operates both open and closed access systems and also offers computing facilities that range from CD-ROM workstations, Internet, and electronic information resources (e-journals); offering photocopying and binding services as well. This collection is big and varied enough to be proud of, however, how it is utilized is what is important.

Much of a students life at university is occupied in studying; attending lectures; holding class discussions, workshops, seminars and conferences; doing assignments and course work; plus general reading. These academic activities require a student to be vigilant and competent at seeking for, accessing and using information resources efficiently. However, previous studies show that this is not the case in Makerere University. In a study conducted at the East African School of Library and Information Science Library, Kamanda (1999:44) observed that the majority of students either locate materials through browsing the shelves or seek assistance from library

staff. They do not make full use of the card catalogue (one of the information retrieval tools), which therefore does not adequately serve its intended purpose in guiding the search for information materials. He concludes that more than half of the students experience problems in locating library information materials. Ssendikadiwa (1996:42) observed that although the catalogue is the most essential library tool in accessing library collections, it is the most avoided and least consulted by undergraduates. This is an indication of how poorly the students utilize the library resources. As Makerere University struggles to maintain its goal of academic excellence, knowledge of the information-seeking behavior of its students is vital for the improvement of the information services provided to them in the library.

1.2 Statement of the problem

Undergraduate students in the course of their studies in Makerere University are expected to maximally utilize the University Library as one of their information sources. However, from observation, the researcher has noted that most of the library resources are not fully utilized until or unless they are guided in searching or the items physically given to them as is done in departmental book banks in faculties. Some of the reasons could be due to technical access problems in using the library, lack of knowledge of the existing resources, lack of awareness, and "the student's poor information seeking behavior", being the cause of attention in this study.

On a general assessment, the wide nature of the collection in the University Library and the closed access system used for the current collections, with

limited browsing could be limiting the undergraduate's retrieval capabilities. Most of them experience a high failure and disappointment rate in using the library system. Coupled with inadequate research skills needed to exploit the library potential, most of the information resources are under utilized. Much as some of these problems are addressed in the first year's user education and orientation program done at the beginning of every academic year, poor information seeking behaviors still persist on. This problem if not adequately addressed affects ones future information literacy levels, leading to poor quality graduates. This therefore calls for a need to address the student's poor information seeking behavior problem.

1.3 Purpose of the study

The purpose of this study was to establish ways of improving the information-seeking behavior of undergraduate students so that library resources are adequately utilized.

1.4 Objectives of the study

The following objectives were stipulated for this study:

1. To establish the undergraduate students' information needs.
2. To determine the undergraduate students' information seeking behavior.
3. To establish the problems that undergraduate students encounter in information seeking.
4. To suggest strategies of improving undergraduate students' information seeking behavior.

1.5 Justification of the study

Understanding the actual needs of information users and how they satisfy them is the first step towards effective service provision. This can best be achieved through formal in-depth studies, which reveal the variations in needs and information seeking habits. Librarians, especially those involved in bibliographic instruction would be interested in how individuals approach the library and the methods they use to search for needed information.

This study will therefore benefit the librarians, as the findings may be utilized by the University Library Management to assist in redesigning strategies intended to improve the provision of library services especially towards information skills development and information resource awareness.

The findings may also trigger off further research on other information users in specific fields.

1.6 Definition of Terms

The terms used in this study include Information needs, Information sources and Information source strategies, Information seeking and Information seeking behavior, Intervening variables / problems. These are defined below as used in this study with detailed elaboration on each.

- **Information needs**

An information need may be defined as any piece of information recorded or unrecorded that a student may need in connection with his / her study or daily

life activities. An information need may be short term (requiring a short immediate answer) or long term (requiring a long period of time searching for bits of information to satisfy the information task).

- **Information sources**

Information sources refer to where the information required is located. They may be verbal through interpersonal contacts or in document form (print or electronic); located in known information institutions. These information sources may be categorized as formal and informal. The formal information sources include information systems like libraries. Within libraries the characteristic resources include journals, textbooks & handbooks, conference proceedings, unpublished reports & theses; databases, abstracts & indexes, bibliographies & catalogues; online resources, CD-ROM databases, audiovisual media and microforms. The other services and activities carried out include current awareness services, selective dissemination of information, publicity services, reference & referral services, and user instruction services. The informal and semi-formal information sources include consulting an information professional (like a lecturer), a friend who is a senior in the field or a peer (done through personal contact or private correspondence) and lastly attending local and foreign conferences, meetings and seminars.

- **Information source strategies**

Information source strategies refer to the options and ways an information seeker ponders on using to achieve the required information need, selecting from the formal and informal information sources.

- **Information seeking**

Information seeking is the process a student undertakes in looking for information.

- **Information seeking behavior**

Information seeking behavior describes the patterns, stages or steps one undertakes in seeking information to satisfy a need.

- **Intervening variables or problems**

Intervening variables refer to the positive and negative factors that affect an individual's information seeking behavior, (associated with the information source used or an individual).

Those associated with the library as a source of information include lack of publicity services that limit awareness, the nature of user instruction provided, technical access problems like how to use library tools (abstracts, indexes, bibliographies and catalogues) and electronic facilities (computers, CD-ROM's, microfilm and audiovisuals). The nature of the stock held and accessibility procedures, credibility in the quality of information provided, and personal interaction problems like the attitude of library specialists consulted are also notable problems.

Those associated with individuals include fear and anxiety, previous library experience, perceptions & biases about the library, training received in a particular discipline and the transaction costs involved like time devotion, distance in between and monetary costs.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

Literature in this chapter is reviewed with reference to the concepts used in this study. These include: - Information needs of students, Information source strategies, Information seeking, Information seeking behavior, Intervening variables / problems, and Information seeking behavior improvement strategies.

2.2 Information needs

It is evident from the present day university curriculum that students are being involved more in learning procedures that are problem oriented, thus involving them in constantly searching for information. Limberg (1999) notes from practical experience in education that on all levels including undergraduate university programs, there is evidence that teaching methods are shifting from a transmission view of learning to problem oriented or problem based learning. This is a good indicator of what drives students into seeking for information. Imposition of assignments by faculty in an academic environment is one of the determinants that directly impacts on the students' motivation to use the library or that influence their information-seeking behavior. In a survey conducted in California State University Long Beach Business Faculty, Littlejohn and Benson-Tally (1990) confirm a high use of the library by students when imposed by the faculty or by class assignments.

However, how the students satisfy their information needs are what is questionable especially in the library.

Wilson (1981) explains that a need is a subjective experience, which occurs only in the mind of the person in need and, consequently, is not directly accessible to an observer. The experience of a need can only be discovered by deduction from behavior or through the reports of the person in need. Given that information needs keep changing and more so in the present information age (Kebede, 2002), it is in order to continue identifying and meeting users' needs. It is also important to be kept informed of their requirements, assessing their use capabilities on a continuous basis and determining the nature of information resources that meet their requirements.

2.3 Information source strategies

With reference to the informal sources, Andersen (2002) notes that in a university, academics usually follow the patterns established by their peers, relying upon mentors in their fields to guide them in graduate school and early professional development. This indicates that students are likely to use informal information sources to achieve their initial information needs (consultations) before any other sources are used.

The formal sources (libraries) offer a variety of resources but how they are selected for use depends on a number of factors, some of which are the students' knowledge, awareness, exposure and skill. Information seeking being a process requires an information seeker to apply personal knowledge

and skills to the problem or task domain (Ikoja-Odongo, 2002:13). Exposure to and awareness of a variety of information resource materials available also affect usability and ones information-seeking patterns. Toggerson (1981) found out that where individuals were exposed to information from more than one source, their information-seeking behavior increased. Kebede (2002) notes that the available information for users' access and use has been argued by many scholars to influence information needs of users in one way or another. Although some point out that contact with potential information sources brings out latent or unrecognized information needs in users (Wilson, 1981), most writers note that the available information sources and services are among factors affecting information needs of users. Knowledge of what facilities and/or materials are available stimulates ones information needs. Rohde (1986) points out that users' needs vary with alternatives available to them. Many more writers also state that the ranges of available information sources are among the factors that influence information needs of users (Devadason and Pratap, 1997).

These arguments indicate that the variety of information resources available, awareness of their existence and exposure / accessibility to those resources play an important role in their use. This study intends to establish the undergraduate students' position in as far as the above arguments are concerned.

2.4 Information seeking

Wright and Guy (1997) define information seeking as any activity an individual undertakes to identify a message that satisfies a perceived need. Thus, according to them, information seeking begins when someone perceives that the current state of possessed knowledge is less than that needed to deal with some issue or problem. This definition concurs with Wilson's (1999) broader concept of information behavior that includes those activities a person may engage in when identifying his or her own needs for information, searching for such information in any way, and using or transferring that information. Ikoja-Odongo (2002:12) notes that information seeking is a conscious, active, and sometimes passive constructive process in which an information seeker takes steps to satisfy a felt information need. Andersen (2002) notes that information-seeking research looks at how individuals go about finding the materials that they need in order to satisfy information needs both professional and recreational.

Thus, because most of the undergraduate students are in the process of gathering and using information from the library, and since the librarians goal is to assist them, the processes they undertake are important to examine in order to establish where help is needed. A number of research-based models (Ellis, 1993; Eisenberg and Berkowitz, 1992; Kuhlthau, 1992) derived from studies of scholars or professionals describe specified systematic information searching procedures, reflecting focused needs as applied in academic environments.

These models have been applied in a number of instances to follow up the patterns used in seeking information or to explain how information can be sought systematically.

2.5 Information seeking behavior

Information seeking behavior refers to the way people search for and utilize information (Fairer-Wessels, 1990:361). Most times students information seeking behavior involves active or purposeful information seeking as a result of the need to complete course assignments, prepare for class discussions, seminars, workshops, conferences, or write final year research papers. These would exhaustively be done if a systematic approach were used in searching for the information.

Littlejohn and Benson-Tally (1990) in a survey conducted in California State University Long Beach Business Faculty assessed the student's skills and behavior and confirmed that they lack the knowledge and skills necessary to make effective use of the library. Fister (1992:168) notes on the overall that undergraduate students are smart people, but find the university library to be a threatening place and find the process of research intimidating and unfortunately do not learn the basic information skills. They end up using trial and error mechanical methods of research that limit their capabilities to satisfy their needs.

Libraries are one of the formal information delivery systems that follow a systematic approach in retrieving information that require adequate skills to

manoeuvre through smoothly. Since research papers (assignments) are part of most students' educational experience, knowing how to gather data and synthesize information are important life and job skills (Kracker, 2000:284).

2.6 Intervening variables / problems

Commenting on the compromising situations that a user finds him/herself in after verbalizing the specific sort of information products that would ideally answer a need, Taylor (1990) notes that after interacting with the information sources, the ideal information product may not tally with the actual information products available. This compromising situation may arise as a result of the following constraints. Either the actual information does not exist in the stock, or what is available is insufficient to answer the need, or because of the cost constraints (time and money), the information exists but the user is unwilling to expend more resources in locating it. Such situations depend on the nature of stock (information materials) available and the users skills.

Also, depending on the users' perceptions and biases, if s/he discovers at one time that an information source is unreliable in the quality and accuracy of the information delivered, then it is likely to be regarded as lacking in credibility. This may affect use of this information source even if the situation changes. In this study, the researcher wanders whether the library's open shelf collection is a deterrent to students because of the age of some of the stock.

Mellon (1986) notes that when undergraduates enter a library, they seem to be actually encountering several barriers. The first barrier can be termed as

library anxiety - a fear where the size of the place and the numerous choices of research overwhelm them. Some just don't understand the library system at all. Some are afraid to ask and this affects their quality of search process. Some are not sure of the procedures that would lead to a logical and effective approach to solving their problems. It is therefore clear that once the basic library skills are not attained, undergraduates always feel lost in the library. They don't optimally utilize their time in the library. Bibliographic instruction appears to be an effective tool in reducing library anxiety and helping students to become more information literate (Mellon, 1986). However, this depends on how the user instruction programs are conducted and perceived by the academic community.

2.7 Information seeking behavior improvement strategies

Contact with students in information institutions is either through reference interviews or bibliographic instruction sessions. This is where students' information seeking behavior improvement strategies can be applied.

Martin and Metcalfe (2001) acknowledge the fact that modes of informing are specific to each persons concern, as are the topics they want to be informed about. They also note that libraries in the past sought to accommodate this need by promoting current awareness services (CAS) and selective dissemination of information (SDI), either through print or electronic means. These are user outreach avenues that can still be optimally utilized in addition to customizing access points in accordance with user interests using internet or the university intranet.

Fister (1992:163-164) in analyzing and comparing the bibliographic instruction research processes taught to students and the approaches that students used in seeking information in comparison to various critics on user instruction programs noted the following. "Leaving students to flounder on their own or simply teaching the skills required to find materials for a single library related assignment is not doing justice to the students or to the educational aims of the institutions". Furthermore, it does not make sense to teach desperate library skills without putting them in the context of the research process. She emphasized that students in the classroom want to see some pattern behind the skills, they want to see how the pieces fit together. This called for a revision in how the user instruction programs are conducted, since they have an impact on how students seek information.

Callison (1997:355) recommends increased efforts to expand instruction beyond the one-time lesson in introducing students to the library. She notes that even though integrated with subject content, such limited introductions are often made without understanding the need for resource counseling roles, which need to be played by both the classroom instructor and the librarian.

Lau (2001) notes that although librarians have assumed the role of user information educators, their work tends to occur in isolation. Teamwork is needed to make library instruction part of the learning process. The publicity services provided in an information institution also play a big role in influencing how its resources are utilized and how the users seek for

information because by publicizing its resources and services, the users get informed and this builds on their awareness and confidence.

2.8 The Research Gap

The number of studies carried out on Makerere University Library Service are many and varied in topic and content, but none has actually considered how users seek information. Understanding the user's information seeking behavior reveals a little more about whether the user knows how to maximally utilize the available resources than just finding out how often certain information resources are used as has been done before. Some of the related studies undertaken for instance include Kamanda (1999) with a case study on library use by University students in EASLIS (a branch library of Makerere University library services). Kasirivu (2000) with a study assessing library user education in Makerere University; and Sendikadiwa (1996) with a study, evaluating library – use instruction programs to first year students in Makerere University (a project report). In assessing all the above arguments, it is evident that there is need to establish the information seeking behavior of undergraduate students of Makerere University in order to establish how they seek information and what could be leading to their inability to maximally utilize the library resources and services.

2.9 Theoretical framework

Wilson's 1981 Model of Information Seeking Behavior that describes characteristic behavior similar to the traditional library instruction process that focus on skills solely related to sources (locating, accessing and using

sources) was used in relation to identifying the processes students undertake in seeking information. This model incorporates Ellis's 1989 behavioral model of information seeking strategies that form the basis of establishing how undergraduate students seek information in Makerere University.

2.10 Hypotheses

It was hypothesized in this study that:

1. Makerere University undergraduate students' search strategies are not the same as Ellis' six characteristic information seeking activities.
2. Makerere University undergraduate students' information seeking problems are not as a result of the procedural set up of the information institution – the library.

2.11 Conceptual framework

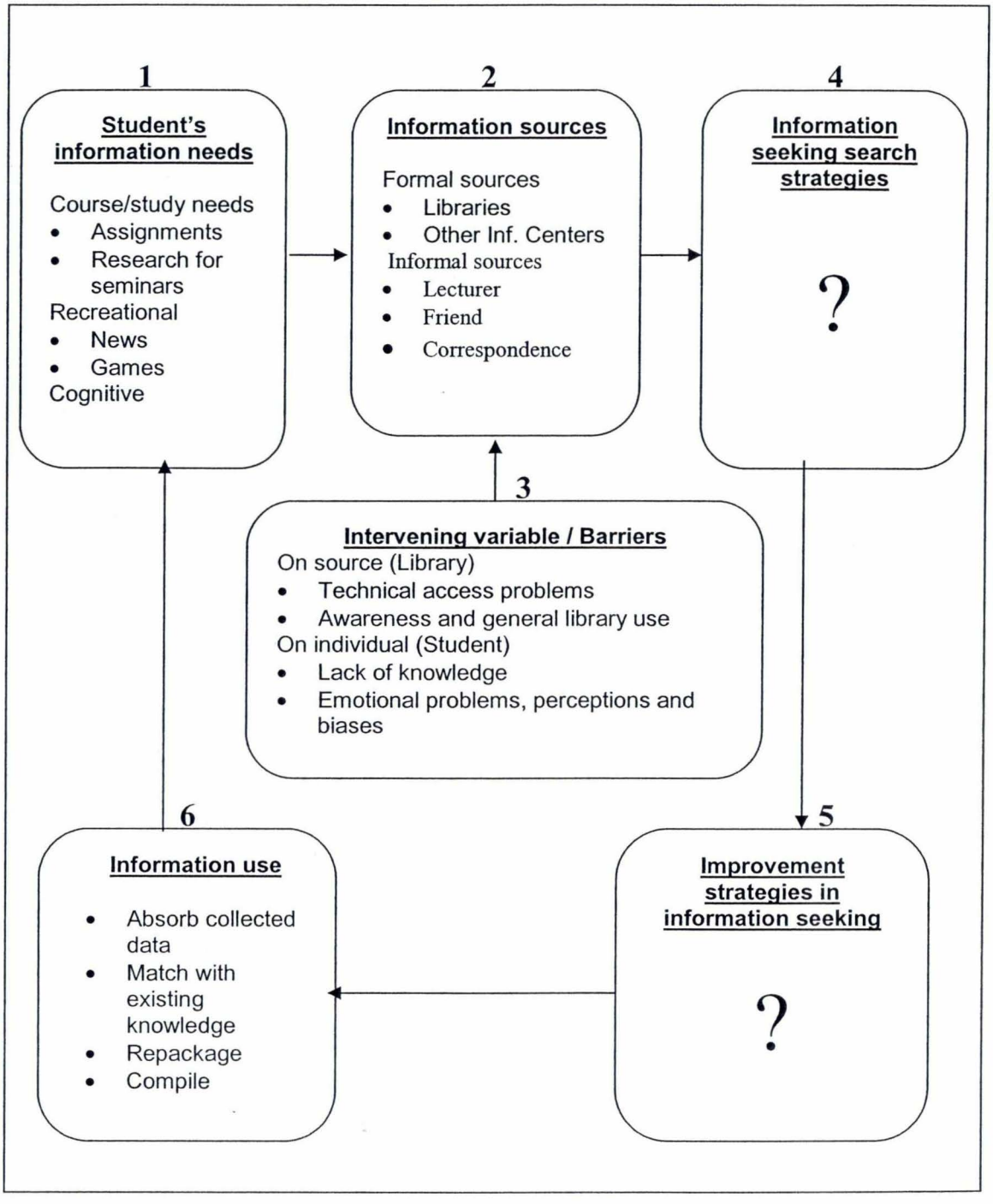
Wilson (1999:251) in his model of information seeking behavior suggests that information seeking behavior arises as a consequence of a need perceived by an information user, who in order to satisfy that need makes demands upon formal or informal information sources. It is therefore presumed that undergraduate students have information needs that probably arise out of their course/study requirements, recreational needs or the need to know (cognitive need). They are therefore driven into thinking of all the possible information sources to use in order to satisfy their information needs. These information sources may be informal or formal. Libraries are one of the formal information systems where resources like journal articles, textbooks, databases, and current awareness materials are obtained. The information

sources may also be other organizational information settings where particular specialized information may be obtained like Government ministries and Non-Governmental organizations (NGO's). Informal information sources may also be used like consulting information professionals, a friend or lecturer, attending conferences or through private correspondence. After identifying the different sources of information, a student then decides on which information sources to use, depending on the nature of the information need. However, in the process of using these information sources, Wilson (1999:252) notes that the information user is likely to meet with barriers of different kinds, which in this study are categorized as intervening variables. These barriers may be associated with the source itself or with the individual students' characteristic search behavior. Some of these barriers include the transaction costs involved like time, distance and money. Those associated directly with the source like in a library include technical access barriers, general library use, lack of awareness, insufficient materials, and credibility especially in quality of information as rated by the student and personal interaction problems like the attitude of specialist consulted. Those associated with the individual student information user include lack of knowledge about the situation at hand, perceptions and biases about certain sources like tight security in some organizations, and emotional problems like verbal and nervousness / fear that lead one into failing to express the information need clearly.

The above are anticipated barriers, without which the student proceeds onto information seeking, applying information search strategies that needed to be

established by this study. Ellis's information search strategies of starting, chaining, browsing, differentiating, monitoring, and extracting were used as the measuring tool of how the undergraduate students gather their information. After collecting sufficient information (it may or may not be exhaustive), the student then compiles the information for use; a process that involves absorbing, matching with that which already exists in ones mind, repackaging and if found compatible, recollected and put to use. The trend may be struck off again when additional information is required or when another information need arises, starting off the information seeking process afresh. After establishing how the students gather their information and the weaknesses therein, the study then intended to lay strategies of how the students' information-seeking behavior could be improved upon. Diagrammatically, the relationships between the concepts are as illustrated on page 23.

Diagram showing the relationship between the concepts



CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter describes the research design; the population used, sample and sampling techniques used to select the respondents and how data was collected, analyzed and presented.

3.2 Research design

This research study was carried out to survey and establish the information-seeking behavior of undergraduate students. The study was largely quantitative, analyzing the data collected in numerical terms. However, to attach meaning to the quantitative data, qualitative aspects were also used. Mann (1990:46) identifies two main reasons for using quantitative measures, besides the need for precise measurement. "One is concerned with development over time, or trends, and the other is concerned with making comparisons." In this study, the quantitative perspective was used to compare how undergraduate students seek information with respect to Ellis' established information search activities. Sturges and Chimseu (1996) acknowledge the fact that qualitative methodologies tend to be complex, time consuming and aimed at generating theory. Since this study involved testing an existing theory (Ellis' Model), a quantitative perspective was considered more appropriate. The chi-square statistic was selected to test the study hypotheses as the most appropriate measure of association between the variables.

The student respondents were issued with self administered questionnaires, and observation done within the confines of the university library; while staff members (librarians and lecturers) were interviewed individually by the researcher, using semi structured interview schedules, probing them for views about the study. This research design was considered appropriate because of its flexibility and objectivity in analysing this phenomenon.

3.3 Study area and scope

The area of study was Makerere University Main Campus where the majority of undergraduate students attend their courses. This study was undertaken on a cross-sectional perspective, considering all the levels of study (First, Second and Third) in two Departments, Bio-Chemistry (in Faculty of Science) and History (in Faculty of Arts) in the year 2002/2003. It was limited to these two sampled Faculties in order to have representation of students from the Sciences (B.Sc.) and the Humanities (BA Arts). The Departments of Bio-Chemistry and History were particularly selected because they had the library physical requirements, with qualified librarians manning them. The period of study was between April and July 2003.

The context of the study was confined to establishing the students' information needs, their information seeking behavior and the problems they encounter in seeking information.

3.4 Study population

Although Makerere University has an undergraduate student population of 30,226 students offering Programs on the Main Campus (Makerere University 2001-2002 Students' Nominal Roll), only representative samples of the two disciplines in Faculty of Arts (BA Arts) and Faculty of Science (B.Sc.) were used in this study. These taken together total to 1,864 undergraduate students as shown in the table 1:

Table 1: Total number of undergraduate students enrolled for the BA (Arts) and B.Sc. programs in the year 2001-2002

	BA (ARTS)	B.Sc.	TOTAL
First years	726	271	997
Second years	256	193	449
Third years	194	224	418
TOTAL	**1176**	**688**	**1864**

Source: Makerere University 2001-2002 Students' Nominal Roll

This being a survey and quantitative study, the whole population of 1,864 undergraduate students would have been appropriate to study, however, because of the qualitative aspects integrated in the study to yield the actual procedures and explanation of problems encountered, it was considered too big and a representative sample size used instead, as explained below.

3.4.1 Sample size

A sample size may be computed using textbook formulae when certain variables are known about the population under study. For instance, the level of non-response expected (taken as the error rate, 'e'), the variability within

the population (taken as the variance, 'σ^2'), and a specified degree of confidence (taken as the desired confidence level, 'z'). According to Walpole (1982:251), the sample size can be estimated using this formula:

$$n = (Z_{\infty/2} \times \sigma) / e$$

Where: n represents the required sample size

$Z_{\infty/2}$ represents the normal distribution value for a stated degree of confidence

e represents the error rate

σ represents the standard deviation .

However, since these values (especially the error and standard deviation of the population) were not known at the beginning of this study, the following procedure was used to arrive at the study sample.

Payne (1990:36) indicates that choosing a sample size is, as Hedges (1978:61) notes, 'almost always a matter more of judgment than calculation'. Payne (1990:36) also notes that choosing a sample size depends on other factors like one's interest in the sub-groups, which make up the population under study, and the sample design to be employed. In this study, the sub-groups were composed of the students' year of study, and the sample design appropriately selected was the non-probabilistic quota sampling technique, where proportions are used to derive the quota in each stratum. Proportions according to each stratum were therefore used to derive the sample size used in this study. The proportion of the population under study to the total undergraduate population was therefore first established as 1,864 : 30,226 (i.e. 6.17%), and this proportion used to derive the representative sample as: (6.17/100) X 1,864 = 115.

This sample size was considered appropriate for this study because, using the chi-square test as the inferential statistic, Busha (1980:305) cautions on the effect of very small and very large sample sizes in rejecting the null hypothesis.

Academic staffs, (Lecturers and Librarians) were purposively selected in addition to the 115 undergraduate students to collect more data in support of the students' field data.

3.4.2 Sampling techniques

Non-probabilistic sampling techniques, and in particular the quota sampling technique were used when selecting the undergraduate student respondents. The purposive sampling technique was used when selecting staff (lecturers and librarians) basing on the duties and responsibilities they render towards the undergraduate students.

In quota sampling according to Mbaga (2000:18-19), the target population is divided into groups or strata according to the important characteristics of the population. In this study, the students' year of study constituted the strata. The number in each stratum, called quota was derived in the same proportions as in the target population after establishing the sample size. Since the sample size had been set at 115 undergraduate students, the quota for each stratum was computed using the formula for computing proportions (Walpole 1982:237), given as:

$$n_i = (N_i / N)\, n$$

Where: n_i represents Quota size,

N_i represents Number of students in each stratum

N represents Total population,

n represents Total sample

The computations for the sample size are shown in the Tables 2 and 3.

Table 2: Computed sample of students by Faculty / Program

	Faculty / Program		
	BA (ARTS)	**B.Sc.**	**TOTAL**
Study Population	1,176	688	1,864
Study Sample	[1176/1864] X 115 = **73**	[688/1864] X 115 = **42**	**115**

Source: Table 1

Table 3: Computed sample of students by year of study

	Faculty / Program		
	BA (ARTS)	**B.Sc.**	**Total**
First year (Population)	726	271	997
First year (Sample)	[726/1176] X 73 = **45**	[271/688] X 42 = **16**	**61**
Second year (Population)	256	193	449
Second year (Sample)	[256/1176] X 73 = **16**	[193/688] X 42 = **12**	**28**
Third year (Population)	194	224	418
Third year (Sample)	[194/1176] X 73 = **12**	[224/688] X 42 = **14**	**26**
TOTAL POPULATION	1176	688	1864
TOTAL SAMPLE	**73**	**42**	**115**

Source: Table 1

3.5 Data collection methods

Quantitative data collection methods were used in this study, and particularly the self-administered questionnaire, which was mainly close-ended with a few open-ended questions to accommodate the qualitative aspect of the data

collection. Semi structured interviews and observation methods were also used.

Weingand, (1993) notes that "Methodologically, information need research in the public domain has equally moved from an early reliance on positivist surveys to the use of diverse methodologies in a mix of quantitative and qualitative research tools; enabling a more holistic view to emerge from the researcher getting 'close to the data', thereby developing the analytical, conceptual and categorical components of explanation from the data itself".

The three methods, (questionnaire, interview and observation) were therefore considered appropriate for this study.

3.5.1 Questionnaire method

Self-administered and hand delivered questionnaires with predetermined questions (both open and closed ended) were distributed to the student respondents. A mixture of response modes was used. This method was appropriate for this category of respondents because of the relatively big sample size covered (115 student respondents) within the short period of one month (May 2003), when the data was collected. The questionnaires' convenience and speed of coverage were the major advantages that led to its being used for this particular sample of respondents.

3.5.2 Interview method

Semi-structured in-depth face-to-face interviews were used to collect data from the key informants purposively selected from staff members who interact with undergraduate students in their information seeking endeavors. These

interviews were appropriate in this case because they gave an allowance of flexibility and concentration on the respondent's area of specialty with clarification of the questions ensured for accurate responses.

3.5.3 Observation method

The researcher, in the University library did direct observation of the students, yielding careful identification and accurate description of the students' information seeking processes. Observation was focused at particular points in the University library where students interact with the library system and staff. Mann (1990:50) notes that any library is a social setting where people's behavior is, for the most part, reasonably open to view. Sampling a few entrants, it was possible to record systematically what the students did first when they got to the library, noting "... whether they seem purposive in their book selection or whether they appear to be browsing rather aimlessly..." as quoted by (Mann, 1990:50).

3.6 Data collection instruments

In order to solicit the required information, three data collection instruments were used. These included a questionnaire, an interview guide, and an observation guide. Line (1971) argues that observation in conjunction with questionnaires and interviews are necessary in order to minimize the serious deficiencies associated with each individually.

Much as Price (1984) argues against the use of questionnaires and interviews because they tend to reveal what the user thinks and not the actualities of

behavior, observation alone could not be used because it can best be carried out with relatively small samples and it is often not possible to produce generalized and analyzable results from observation alone.

The three tools (questionnaire, interview and observation guides) were therefore used, allowing triangulation of data. Thus, the wide range of data collection instruments used helped in building a better informed view of the information needs and seeking behaviors of the undergraduate students; with data collected from a diversified number of respondents (i.e. students, lecturers and librarians).

3.6.1 Questionnaire

This constituted the main research instrument with both open-ended and closed-ended questions. The closed-ended questions consisted of predetermined responses of the researchers perceived ideas about information seeking, while the open-ended questions required the student respondents to give their opinions, justify or describe the situation being asked. This instrument was considered appropriate because of its systematic and brief data collection advantages.

A total of 120 instead of 115 questionnaires were distributed to the undergraduate students, putting into consideration a non-response rate of 5. Out of the 120 questionnaires issued out, 108 were returned. Four, (4) of the returned questionnaires were rejected because they were not satisfactorily filled. Only 104 questionnaires (90.4%) were therefore used for analysis. The

details of the student's responses per faculty and year of study are given in the table below, in comparison to the sampled quotas.

Table 4: Sampled/Planned and Obtained/Actual number of undergraduate student respondents

		Faculty/Program				Total	
		BA (Arts)		B.Sc.			
		Planned	Actual	Planned	Actual	Planned	Actual
Year of study	First Year	45	40	16	15	61	55
	Second Year	16	17	12	10	28	27
	Third Year	12	14	14	8	26	22
Total		73	71	42	33	115	104

Source: Table 3 and the SPSS field analysis results

The actual findings do not deviate so much from the planned samples. Therefore the returned response was satisfactory for analysis. From the Faculty of Arts, a response rate of 97.3% was received and 78.6% from the Faculty of Science. These were both more than three-quarters (75%) and therefore satisfactory for analysis.

3.6.2 Interview Guide

Open-ended semi structured questions were used to assist in the interview process conducted with the academic staff (lecturers and librarians). The purpose was to obtain their views and opinions using their expertise and experience in guiding students in information gathering. This tool helped in obtaining brief but accurate and descriptive information about the undergraduate students' information seeking behavior that strengthened the

information that was obtained from the other tools. The field notes were recorded on the interview schedules used per respondent.

A total of 6 lecturers who lecture at least the three years of study in each of the selected departments were purposively selected and interviewed, (3 from each of the faculties of Arts and Science).

A total of 12 librarians, 10 from the university library and 2 from the Departmental/Faculty libraries (1 from each of the two faculties of Arts and Science) were purposively selected and interviewed. A librarian with established section responsibilities was selected from at least each of the University Library sections/divisions. This was quite possible to establish who does what in respect to students' needs since the research is a librarian in the University library.

3.6.3 Observation Guide

This tool was used to identify the locations and particular activities that students indulge in as they seek information in the University Library. Information gathered through observation was also used to supplement and enrich information collected from the other instruments. Data was recorded using written notes.

The specified locations where observation was done included the catalogue, the issue/reference section, the information desk, the open shelves, and the service windows.

3.7 Data Presentation, Analysis and Interpretation

Data collected was available in the following formats: Questionnaire formats, Notes in response to the interviews, and Notes from observations. All these were first familiarized with then coded and presented both quantitatively and qualitatively and later analyzed and interpreted.

The closed-ended questions, (i.e. questions 1-10, 12, 13a & b, 14-19, 20a, 21a, 22a, 23-25, 27a & b, 28a, 29a & b, 30a & b, 32, 34a, 35a, 36a, 37, 38a & b, 39b, 40a & b, 41a, 42a, 43a, 44a, 45a, 46-48, on Appendix A) generated quantitative data, which was coded and summarized in tabular form using the SPSS computerized data analysis package. According to Busha (1980:192), descriptive statistics consist of methods and procedures for summarizing, simplifying, reducing, and presenting raw data, to communicate the essence of the data. The purpose of such methods is essentially reportorial. The tabulated data was therefore used to present the findings and where necessary for clear comparative purposes, graphs were derived using Microsoft Excel computerised package. Inferential statistics were later derived to test the stated hypotheses using the chi square statistic.

The open-ended questions (i.e. questions 11, 13c, 20b, 21b, 22b, 26, 27c, 28b, 30c, 31, 33, 34b, 35b, 36b, 39a, 40c, 41b, 42b, 43b, 44b & c, 45, 49, 50, on Appendix A; all questions on Appendix B, C, and D) were coded and summarized using Microsoft Word computerized package. The questions were first categorized with each respondent's answer grouped according to the questions, and then coded using the alphabet to arrive at similar

responses, and later presented qualitatively using descriptive sentences. According to Birley (1996:44-45), coding is the process of structuring data into an analyzable form. It enables the identification of important / significant trends present in the data. In this study, data was categorized according to the key concepts and objectives of the study, with meaningful patterns derived and used in interpreting the data.

Patton (1990:375) emphasizes demarcating between description and interpretation. He notes that interpretation involves explaining the findings, answering "why" questions attaching significance to particular results and putting patterns into an analytical framework. Thus, descriptive details of coherent answers to the open-ended questions were categorized before interpretation. Analysis was done on a cross-sectional basis, what Patton (1990:376) regards as cross-case analysis, that is, grouping together answers from different people to common questions or analyzing different perspectives on central issues.

3.8 Quality Control

Epstein (1977:32) notes that the quality of a research report depends to a large degree on the accuracy, reliability, and validity of the measures it employs. He clarifies that measurement accuracy refers to the degree of freedom of error in the measuring process that is achieved in the study. This is concerned with whether or not mistakes were made in the clerical processing and tabulation of the data. In this study, a computerized data analysis package (SPSS version 10) was used for easy and quick processing

of the data and to ensure accuracy. The tabulated chi-square values were also manually computed to confirm accuracy and to also show the procedures followed in the calculations.

Epstein (1977:33) explains reliability as the consistency in response to a given set of measurements and the freedom from bias. In this study, three data collection instruments (questionnaire, interview and observation) were used and in each of these, an effort was made to ensure that the data collected on particular concepts in the study confirmed the general conclusions derived from the responses given from the other. For instance, if the majority students said there was a problem with the filing order of cards in the catalogue, then this was confirmed from personal observation and interviewing the librarians in charge. This yielded sound reliability and less bias in the study. This also ensured triangulation of the instruments.

Validity ensures that the data sets collected or items used are pertinent or relevant to the research (Birley, 1996:27). To this respect, an initial investigation (a pilot study) on 15 undergraduate respondents (5 from each year of study) and 3 lecturers was undertaken from the East African School of Library and Information Science, using the intended data collection instruments to check the authenticity and relevance of the data to be produced. The results were studied and discussed with supervisors for appropriateness before the instruments were used for data collection. The pilot study helped in adjusting the questions that didn't seem clear and adding

the missing aspects. It also set a foundation of how the results would be analyzed, and in brief, the pilot results revealed that:

- Assignments, class discussions and examinations constitute the information needs of the undergraduate students (all with a response rate above 70%).
- It was also found that the respondents hardly used the university library but heavily used the departmental library, book bank, & lecture notes.
- They heavily depended on textbooks with moderate use of Internet resources and minimal use of print journals and CD-ROM's.
- On the information seeking search strategies, it was noted that 60% used the browsing technique, and 55.6% used the chaining technique.
- On the information seeking problems encountered, it was noted that 62.5% were not informed about the few mentioned information services in the University library, 77.8% experienced service-use problems, though more than 70% of them said the library arrangement does not bother them (probably because the piloted group were all librarians in making).
- 90% of the respondents had never attended user education, though 60% supported using workshops to conduct the user instruction / education training programs.
- Some of the lecturers interviewed discouraged giving reading lists so that the students are encouraged to find out and do research with as little help as possible.

These findings were indicative enough of the anticipated study problem.

Validity according to Epstein (1977:33) refers to the extent to which a measure measures what it is supposed to be measuring (i.e. the measurement device should directly be relevant to the concept being measured – specifically referred to as content validity). In this study, two hypotheses were stated and the chi-square test statistic used. This measure was considered appropriate because, only a measure of association of the variables was required in the study.

3.9 Ethical Issues

Approval and permission was first sought to conduct the study in the sampled faculties with introductory letters from the Director of the East African School of Library and Information Science. Respondents' consent was also first sought with a brief introductory letter as part of the questionnaire, with confidentiality of the information to be collected assured. The respondents were assured that this study was meant for only academic purposes and that permission will be sought for future use of the findings. The purpose of the data collection was therefore clearly explained to the respondents to ensure that their responses were not biased but genuine. The respondents' privacy of information was ensured by not disclosing the names of the individuals and every effort made not to exploit the respondents' responses.

3.10 Limitations of the study

The questionnaire was the major data collection tool, however because it was self administered, some responses were shallow, affecting the quality of the research results. This problem to some extent was however minimized by

using a vigilant and responsible research assistant who endeavored to first explain to the respondents what they seemed to doubt and also go through the returned questionnaires to ensure that at least all the questions were responded to.

The data was collected at a busy period in the university semester, (when students were preparing for exams) with most of the respondents giving excuses and therefore returning the questionnaires. However, using lecturers and vigilant students within the faculties studied, a good response rate was at least returned to match the required sample size though not in the actual anticipated proportions.

Much as a pilot study was first carried out to ensure that the tools were as clear and understandable as possible, the student respondents still found some questions hard for them to answer correctly. The response was in some cases therefore mingled up, i.e. instead of giving an opinion about a situation; one would end up describing what happens.

CHAPTER FOUR

PRESENTATION, INTERPRETATION & DISCUSSION OF FINDINGS

4.1 Introduction

This study was mainly intended to establish the undergraduate students' information seeking behavior as the major concern leading to their inability to maximally utilize the University Library information resources. Four objectives and two hypotheses were stated for investigation.

The first objective, "establishing the undergraduate students information needs" was set on the basis that information seeking is as a consequence of an information need that needs to be first highlighted before the purpose of seeking information is justified.

The second objective, "determining the undergraduate students' information seeking behavior" was set to establish the general trend the students use when seeking information, mapping Ellis' Model of information seeking behavior.

The third objective, "establishing the problems that undergraduate students encounter in information seeking" was set to enlighten on the difficulties the students encounter as they seek information.

The fourth objective, "suggesting strategies for improving on how undergraduate students seek information" was set to arrive at remedies for the above problems.

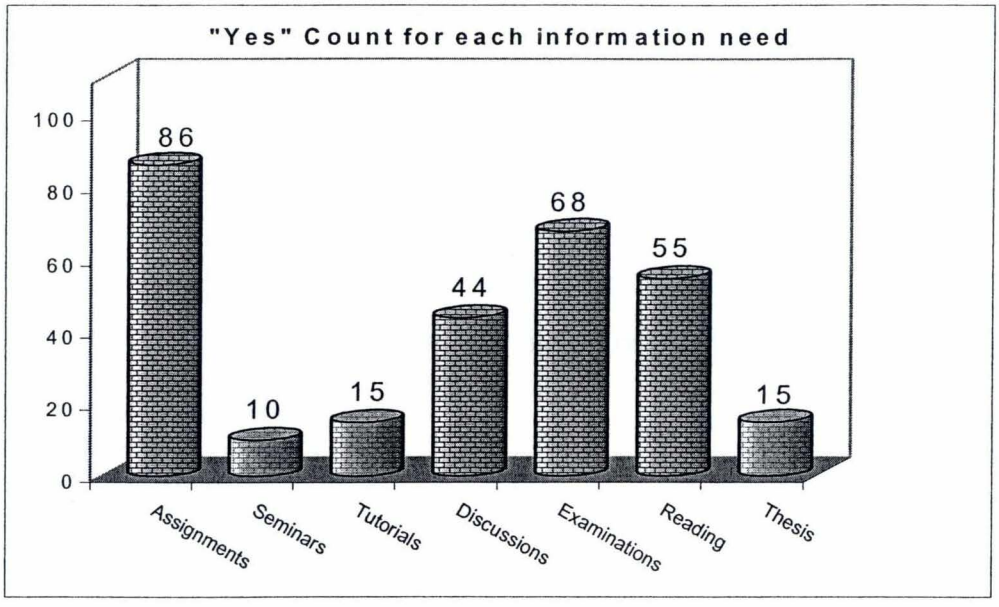
The two hypotheses developed were derived from the second and third objective and data collected for testing. The findings are therefore presented and discussed following the objectives of study as stated above.

4.2 Undergraduate students information needs

To establish the undergraduate students information needs; their main sources of information; the resources commonly used; and the activities that occupied them most in the University library; items 6 to 9 on the students questionnaire (Appendix A) were set to collect this data.

The findings revealed that the main information demands that led undergraduate students into seeking for information (with more than half the students responding to each) include: course works and assignments, preparation for examinations and tests, general reading to enhance lecture notes, and to some extent, class-group discussions. Seminars or preparation for workshops, tutorial presentations and dissertation research all had a lower rating of 'yes' responses (i.e. with 15 and below respondents) because they are not done on a regular basis. Dissertation writing, for instance is normally done by third year students who in the sample of respondents were the least in number (i.e. only 22 third years participated in this study). The undergraduate students' information needs are illustrated in Figure 1.

Fig 1: Bar Graph for the 'Yes' Counts for each Information Need



Source: SPSS field analysis results

In order to establish what sources responded most to the students needs and how much they valued them, they were asked to select and rank each information source identified with a ranking range of 1 to 7. Rank 1 indicated highest preference, while rank 7 indicated least preference. The findings (shown in Table 18 – Appendix E) show that lecture notes and handouts were the most preferred and used, with 54 respondents ranking them first, 17 ranking them second and the distribution of the rank frequencies taking on a positively skewed shape.

Departmental Book-Banks took on the second position with 52 respondents ranking them first, 20 ranking them second, and the distribution of the rank frequencies also taking on a positively skewed shape.

The University Library took the third position among the information sources used by undergraduate students, with 47 respondents ranking it first, though the trend of the distribution of rank frequencies tended to fluctuate.

Consulting and photocopying from colleagues took the fourth position, followed by using Internet sources, while the University Bookshop took the last position (sixth position), with the distribution of the rank frequencies taking on a negatively skewed shape.

It was therefore noted that undergraduate students hardly purchase information resources from the University Bookshop and very few heavily use Internet sources of information for their studies.

Considering the nature and range of information resources in each of the sources used in the findings above, the University Library was noted as a well-established institutional information source with varied information resources. These resources were categorized by type, and the undergraduate students asked to select what they frequently used. The findings, as shown in Table 5 revealed that Textbooks were the most heavily used with a 'yes' response rating of 101 (97.1%) respondents. The rest had 'yes' response frequencies below average (52), with Theses/Dissertations, Reference materials, Newspapers, and the Internet having frequencies between 21 and 30 respondents. CD-ROM's, online databases, Conference Literature Proceedings, and Print Journals were the least used information resources with frequencies ranging between 1 and 15 respondents.

Table 5: Frequency counts for University Library information resource usage

Information resources				
	Frequency			Valid percentage
	Yes	**No**	Total	'Yes' response
Text books	101	3	104	97.1
Theses and dissertations	23	81	104	22.1
Conference proceedings	12	92	104	11.5
Print journals	14	90	104	13.5
Reference materials	29	75	104	27.9
Newspapers	29	75	104	27.9
CD-ROM's	1	103	104	1.0
Online databases	3	101	104	2.9
Internet	22	82	104	21.2

Source: SPSS field analysis results

Because students visit the University Library with different objectives, undergraduate students were asked to identify and rank the activities that occupied them most while using the University Library. (The frequency table for library activities is shown in Table 19 - Appendix E). However, in general, the findings revealed that the majority of the respondents (65) ranked the utilizing library books first, followed by those who use the quiet study space to read their books, then those who borrow library materials and those who seek assistance and do photocopying where necessary.

4.3 Undergraduate students' information seeking behavior

"To determine the undergraduate students' information seeking behavior", a hypothesis was stated and tested as explained in the proceeding section.

The First Research Hypothesis (H_1) and the Null Hypothesis (H_{01}) stated that:

H_1: "Makerere University undergraduate students' search strategies are not the same as Ellis' six characteristic information seeking activities"

H_{01}: "It is statistically significant that Makerere University undergraduate students search strategies are the same as Ellis' six characteristic information seeking activities"

In the null hypothesis, it was assumed that undergraduate students follow Ellis' six characteristic information seeking behaviors as their information search strategies.

The variables identified in this hypothesis were:

1. The "Search strategies", which defined how the students approach their information needs.
2. "Ellis' six characteristic information seeking activities", identified as starting, chaining, browsing, differentiating, monitoring, and extracting.

The purpose of this hypothesis was to establish how undergraduate students seek information. Ellis' six characteristic information seeking activities, established on academic researchers, were the independent variables on which the students search strategies (the dependent variable, measured by the students 'yes' or 'no' response) were observed in this study.

The essence of the relationship was to establish whether the undergraduate students follow Ellis' activities when seeking information. If yes, the null hypothesis was accepted, otherwise it was rejected.

Each of the six characteristic activities: starting, chaining, browsing, monitoring, differentiating, and extracting were tested individually using the chi-square statistic.

Ellis (1989) and Ellis et al (1993) proposed and elaborated a general model of information seeking behaviors based on studies of the information seeking patterns of social scientists, research physicists and chemists (Choo 1998). This study was based on one version of their model, which describes six generic categories of information seeking activities. These activities were used as a comparative measure to establish how Makerere University undergraduate students seek information for their academic work.

Briefly explaining Ellis' information seeking activities, Choo (1998) noted that ***Starting*** comprised those activities that formed the initial search for information, (i.e. identifying sources of interest that could serve as starting points of the search). ***Chaining*** comprised following up links obtained from references and citations of one leading information source to others that are checked up and also used. ***Browsing*** is the activity of semi-directed searching in an area of potential interest. It takes place for instance in a situation where related information has been grouped together according to subject affinity; as when a user scans periodicals or books along the shelves

of a library or bookshop; resulting in awareness of unexpected or new information resources. Chang and Rice (1993:258) regard browsing as a rich and fundamental human information behavior. ***Differentiating*** involved filtering and selecting from among the sources scanned by noticing differences between the nature and quality of information offered. For example, social scientists were found to prioritize sources and type of sources according to the substantive topic, ... (Ellis 1989). The differentiation process may also depend on word of mouth recommendations from personal contacts. ***Monitoring*** is the activity of keeping abreast of developments in an area by regularly following particular sources. The individual monitors by concentrating on a small number of what are perceived to be core sources. For example, social scientists and physicists were found to track developments through core journals, online search updates, newspapers, conferences, magazines, books, catalogues, and so on (Ellis et al 1993). ***Extracting*** is the activity of systematically working through a particular source or sources in order to identify material of interest. As a form of retrospective searching, extracting may be achieved by directly consulting the source, or by indirectly looking through bibliographies, indexes, or online databases.

Choo (1998) noted that although the Ellis model was based on studies of academicians and researchers, the categories of information seeking behavior could be applicable to other groups of users as well, with findings mapped into Ellis' Model. This formed the foundation of this research study. However, establishing how the undergraduate students' seek information was also considered as a way of noting where the students' weaknesses could be,

so that more emphasis could be put in such areas in their training/learning programs.

A number of questions (specifically questions 17, 18, 19, 23, 24, and 27 on the students questionnaire - Appendix A) were set to collect data on these variables; which were tested for majority use ('yes' response) or non-use ('no' response) of each technique. The findings and chi-square computations were summarized, tabulated and discussed as follows:

Table 6: Chi-square values for "Browsing" and "Chaining" techniques

Browsing and Chaining techniques							
	Frequencies				Chi-square test statistics		
	Yes		No		χ^2_{ob}	df	χ^2_{cv} at 0.05 level
	Observed	Expected	Observed	Expected			
Browsing	60	45.0	30	45.0	10.000	1	3.84
Chaining	84	49.0	14	49.0	50.000	1	3.84

Source: SPSS field analysis results

Note: χ^2_{ob} represents the obtained/calculated chi-square value

χ^2_{cv} represents the critical chi-square value obtained from chi-square tables

df. represent the degrees of freedom calculated as:

(n – 1) in an n X 1 contingence table [n = rows or columns]

(R –1) (C – 1) in an n X m contingence table [n = rows (R), m = columns (M)]

χ^2_{ob} is calculated as follows:

$$\chi^2_{ob} = \sum_{i=1}^{n} \frac{(o_i - e_i)^2}{e_i}$$

Where: i = 1, 2, ... n

o_i is the obtained frequency

e_i is the expected frequency calculated as:

e_i = (Total items observed/number of items)

E.g. (Total for 'yes' and 'no' observed/ 2)

With reference to Table 6, an obtained chi-square value is statistically significant if it is greater than or equal to 3.84, at a significance level of 0.05, with 1 degree of freedom

The obtained chi-square statistic for browsing was 10.000, which is greater than 3.84 (i.e. 10.000 > 3.84), indicating a high significance level. The null hypothesis was therefore accepted that browsing is one of the undergraduate students' information search strategies.

The obtained chi-square statistic for chaining was 50.000, which is greater than 3.84 and significant even at the 0.001 probability level. This implied that the deviation of the observed from the expected frequencies was quite big with the 'yes' response being larger. The null hypothesis was therefore accepted that chaining is one of the undergraduate students' information search strategies.

Starting techniques signify where the initial search for the relevant documents is first done after identifying an information need. The various options suggested to the students for selection according to what they used are as explained below and shown in Table 7:

- Using recommended reading lists.
- Searching through the subject catalogue.
- Inquiring directly from lecturers.
- Inquiring from colleagues.

- Searching directly on the shelves.
- Searching through e-resources.
- Searching through the journal contents to identify relevant articles.
- Browsing the Internet.

Table 7: Chi-square values for "Starting" search techniques

Starting techniques							
	Frequencies				Chi-square test statistics		
	Yes		No		χ^2_{ob}	df	χ^2_{cv} at 0.05 level
	Observed	Expected	Observed	Expected			
Reading lists	59	51.5	44	51.5	2.184	1	3.84
Subject catalogue	53	51.5	50	51.5	0.087	1	3.84
Lecturers	65	51.5	38	51.5	7.078	1	3.84
Colleagues	58	51.5	45	51.5	1.641	1	3.84
Shelves	41	51.5	62	51.5	4.282	1	3.84
E-resources	7	51.5	96	51.5	76.903	1	3.84
Journal contents	3	51.0	99	51.0	90.353	1	3.84
Browse internet	16	51.5	87	51.5	48.942	1	3.84

Source: SPSS field analysis results

From Table 7, the chi-square values that were statistically significant at the 0.05 level, with 1 degree of freedom for starting techniques were:

- Lecturers with $7.078 > 3.84$
- Shelves with $4.282 > 3.84$
- E-resources with $76.903 > 3.84$
- Journal contents with $90.353 > 3.84$
- Browsing the Internet with $48.942 > 3.84$

These implied that the deviations between the observed and expected frequencies were high though not on the same side of the 'yes' or 'no' response. The lecturers fall on the 'yes' side while the rest fall on the 'no'

side. Therefore, it was noted that using lecturers was the only statistically significant starting option used by undergraduate students, whereas shelves, e-resources, journal contents and browsing the internet were significantly not used by the students as starting points.

Examining those that were not statistically significant, (i.e. Reading lists with 2.184 < 3.84, Colleagues: 1.641 < 3.84, Subject catalogue: 0.087< 3.84) revealed that the deviations between the observed and the expected frequencies were quite small; and using the eyeball test (visual inspection), the 'yes' response was higher. To some extent therefore, reading lists, colleagues and the subject catalogue were used as starting techniques but not at probabilities high enough to accept the null hypothesis.

To differentiate between the many documents identified by a user and select what is appropriate for use to satisfy an identified need; three options were suggested for the undergraduate students to select what they used. These are described in the statements below:

- By just comparing the **titles** of documents related to a need and selecting.
- By critically looking at **contents** of each document before deciding on which one to use.
- By critically searching the **index** of each document to identify whether what is required is actually in a particular document before it is selected for use.

These were all subjected to a chi-square test, with a probability level of 0.05, and 1 degree of freedom to establish whether the majority of the students used them or not as shown in Table 8.

Table 8: Chi-square values for "Differentiating" search techniques

Differentiating technique							
	Frequencies				Chi-square test statistics		
	Yes		No		χ^2_{ob}	df	χ^2_{cv} at 0.05 level
	Observed	Expected	Observed	Expected			
Titles	42	49.5	57	49.5	2.273	1	3.84
Contents	68	49.5	31	49.5	13.828	1	3.84
Book index	46	49.5	53	49.5	0.495	1	3.84

Source: SPSS field analysis results

From Table 8, an obtained chi-square value is statistically significant if it is greater than or equal to the chi-square critical value of 3.84.

The following were noted:

- For titles, obtained was less than critical chi-square, (i.e. $2.273 < 3.84$)
- For contents, obtained was greater than critical, (i.e. $13.828 > 3.84$)
- For Book Indexes, obtained was less than critical, (i.e. $0.495 < 3.84$)

It was therefore found that inspecting through the contents of information materials is the only statistically significant differentiating technique used by undergraduate students. The rest were not found to be significant and by visual inspection, the majority of the respondents do not use them (i.e. the 'no' response is higher than the 'yes' response).

However, on a general note, the differentiating technique is not practically accepted as an information searching technique because most times students do not find the actual documents that they would have preferred using and end up with any alternative available, provided it is relevant for the specified information need. Secondly, because the most used documents are in the closed access sections, the opportunity of using more than one document to compare the contents is limited. These differentiating techniques are therefore not so dictating for what a student actually uses in the end. On most occasions; students concentrate on using particular materials recommended by either their lecturers (as proved from table 7, page 51-52), or colleagues who have used them before; other than searching to find the most appropriate document to use. The null hypothesis was therefore rejected that differentiating is not one of the major searching strategies used by undergraduate students.

To extract material of interest for specified information needs, undergraduate students either approach the information resource directly on the shelves or they first use the various retrieval tools before selecting what is relevant. Table 9 shows the chi-square values on how undergraduate students utilize the information retrieval tools to extract information.

Considering the obtained chi-square statistics in Table 9, all of them were highly statistically significant except for bibliographies where the computed chi-square value was less than the critical chi-square value at 0.05 significance level, with 1 degree of freedom.

Table 9: Chi-square values for "Extracting" search techniques

Extracting technique							
	Frequencies				Chi-square test statistics		
	Yes		No		χ^2_{ob}	df	χ^2_{cv} at 0.05 level
	Observed	Expected	Observed	Expected			
Card catalogue	83	49.5	16	49.5	45.343	1	3.84
Bibliographies	44	49.5	55	49.5	1.222	1	3.84
Periodical index	24	49.0	74	49.0	25.510	1	3.84
Journal contents	15	49.5	84	49.5	48.091	1	3.84
CD-indexes	5	49.5	94	49.5	80.010	1	3.84
E-Journals	9	49.5	90	49.5	66.273	1	3.84
Internet	20	49.5	79	49.5	35.162	1	3.84

Source: SPSS field analysis results

For the card catalogue, periodical indexes, journal contents, CD-ROM indexes, e-resources and the Internet; the computed chi-square values were all greater than the critical chi-square value of 3.84 at a significant level of 0.05 with 1 degree of freedom. This implied that the deviations between the observed and the expected frequencies were high but with only the card catalogue being significant on the use-side ('yes' response). The rest fall on the non-use side ('no' response). The null hypothesis was therefore only accepted for the card catalogue, as an extracting technique used by undergraduate students.

Monitoring as an information seeking procedure was subjected to a ranking scale of 1 to 7, with 1 as the highest rank and 7 as the lowest rank for each of the options set for the students to select from. The results show very high variations in the students' choice for what they used most and what they used least. The chi-square test statistics showed very high significance levels for all the options, with either rank 1 or rank 7 taking the highest figure for each option, implying that the deviations were inclined at both rank 1 and rank 7.

However, because of the scattered distribution of the frequencies (as shown in Table 20 - Appendix E), the results were re-grouped with the ranks combined to arrive at three groups classed as the highly used (ranks 1-2), moderately used (ranks 3-5), and the least used (ranks 6-7) as shown in Table 10.

Table 10: Chi-square values for "Monitoring" search techniques

Monitoring technique							
		Rank frequencies			Chi-square test statistics		
Ranks →		Ranks 1-2	Ranks 3-5	Ranks 6-7	df	χ^2_{ob}	χ^2_{cv} at 0.05 level
Catalogue	(Observed)	53	15	18	2	31.103	5.99
	(Expected)	28.7	28.7	28.7			
Lists	(Observed)	41	11	27	2	17.136	5.99
	(Expected)	26.3	26.3	26.3			
Displays	(Observed)	27	21	32	2	2.272	5.99
	(Expected)	26.7	26.7	26.7			
Library staff	(Observed)	30	23	29	2	1.050	5.99
	(Expected)	27.3	27.3	27.3			
Lecturers	(Observed)	34	28	21	2	3.057	5.99
	(Expected)	27.7	27.7	27.7			
Colleagues	(Observed)	43	29	12	2	17.214	5.99
	(Expected)	28.0	28.0	28.0			
Workshops	(Observed)	4	10	62	2	80.422	5.99
	(Expected)	25.3	25.3	25.3			

Source: SPSS field analysis results

From Table 10, it was noted that at 0.05 significance level, with 2 degrees of freedom, the computed chi-square values for displays, library staff, and lecturers were less than the critical chi-square value and therefore not statistically significant, i.e.

- Displays ($2.272 < 5.99$)
- Library staff ($1.050 < 5.99$)
- Lecturers ($3.057 < 5.99$)

Implying that the deviations between the observed and the expected frequencies for the three categories of the highly used, moderately used and

least used monitoring technique options were minimal (small). The null hypothesis was therefore rejected and the research hypothesis accepted that displays, library staff and lecturers are not the monitoring technique options used by undergraduate students.

Table 10 also portrays the highly significant monitoring technique options (i.e. those with the computed chi-square value greater than the critical chi-square value) as:

- Catalogues (31.103 > 5.99)
- Lists (17.136 > 5.99)
- Colleagues (17.214 > 5.99)
- Workshops (80.422 > 5.99)

However, they all do not significantly fall on the highly used side (rank 1-2), to be accepted as monitoring techniques. Only the catalogue, lists and colleagues are significant with inclinations towards ranks 1-2. Workshops are inclined more to the 6-7 ranks.

Therefore, the null hypothesis was only accepted for catalogues, lists, and colleagues as the monitoring technique options used by undergraduate students.

On a general note, the null hypothesis was therefore accepted that Makerere University undergraduate students follow only five of Ellis' six generic information seeking activities summarized as: **Starting** (using lecturers and to

some extent reading lists, colleagues and the card catalogue); **Browsing** (especially on the open shelves); **Chaining** (using references at the back of consulted books); **Monitoring** (using the card catalogues, lists on library notice boards, and colleagues); and **Extracting** (using the card catalogue).

4.4 Undergraduate students' information seeking problems

"To establish the problems that undergraduate students encountered in information seeking", a hypothesis was stated and analyzed as explained in the proceeding section. The Second Research hypothesis (H_2) and the Null Hypothesis (H_{02}) stated that:

H_2: "Makerere University undergraduate students' information seeking problems are not as a result of the procedural set up of the information institution – the library"

H_{02}: "It is statistically significant that Makerere University undergraduate students' information seeking problems are as a result of the procedures of use in the Library"

It was therefore assumed in the null hypothesis that undergraduate students' information seeking problems are inclined to the library's procedures of use other than as a result of the students own difficulties of not knowing what to do or any other factors.

The variables identified in this hypothesis were:

1. The "Library's procedures of use"
2. The "Information seeking difficulties" encountered by students

The purpose of this hypothesis was to establish the major problems that undergraduate students encountered while seeking information and on which side (the library or individual ignorance) they fell most in order to lay strategies on how they could be minimized.

A number of questions on the student's questionnaire (Appendix A) were set to collect data on the two identified sides – the "Library" and "Individual ignorance" (here after referred to as "Institutional" and "Personal"). On the "Institutional side", the findings and Chi-square computations revealed the following:

Table 11: Chi-square value for borrowing library materials

Borrowing library materials					
	Frequencies		Chi-square test statistics		
	Observed	Expected	χ^2_{ob}	df	χ^2_{cv} at 0.05 level
No	51	52	0.038	1	3.84
Yes	53	52			
Total	104				

Source: SPSS field analysis results

Lending information materials to students for use outside the University library is an institutional service rendered to those in need of borrowing. In Makerere University library, the information materials lent out are those that are on the open shelves, while all those in the closed sections are only used within the confines of the library. Analyzing the respondents' trend of responses to

borrowing library materials using the chi-square test in Table 11 revealed no significant difference between those who borrow and those who do not borrow. That is, the obtained chi-square value was less than the critical chi-square value at the 0.05 significance level, with 1 degree of freedom, ($0.038 < 3.84$). By visual inspection, it was found that those who borrow are almost equal to those who do not borrow. Thus, having a high rate of none borrowers implied there are some problems with the institutional procedures of operation. The students' reasons for not borrowing were therefore further assessed and the following registered as the major causes:

- The undergraduate students' arguments were that the closed access system does not give them chances to use textbooks outside the library and the books are too few for all the students to use.
- The procedures used are time consuming and to a worse extent too restrictive on how long a textbook should be used even within the library.
- It was also noted that, for fear of losing the library materials and later pay lots of money, undergraduate students preferred using the library materials within the library.

Since most of the respondents' reasons hinted on the closed access system, the question as to whether the closed access system prohibited them from accessing library materials was subjected to a chi-square test to establish its significance to the students responses. The findings are shown in Table 12.

Table 12: Chi-square value for whether the closed access system prohibits the use of library materials by students

Closed Access Prohibiting?					
	Frequencies		Chi-square test statistics		
	Observed	Expected	χ^2_{ob}	df	χ^2_{cv} at 0.05 level
No	23	36.5	9.986	1	3.84
Yes	50	36.5			
Total	73				

Source: SPSS field analysis results

From Table 12, the obtained chi-square value was noted to be greater than the critical chi-square value at 1 degree of freedom, at the 0.05 significance level, (i.e. 9.986 > 3.84). It was therefore found to be statistically significant that the closed access system in the main library is one of the prohibiting factors limiting the students' maximum utilization of library resources.

Table 13: Frequencies for how current the University Library Information materials used are.

How current are the information materials you often use?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	**Very current**	3	2.9	2.9	2.9
	Current	39	37.5	37.9	40.8
	Old	54	51.9	52.4	93.2
	Very old	7	6.7	6.8	100.0
	Total	103	99.0	100.0	
Missing in system		1	1.0		
Grand Total		104	100.0		

Source: SPSS field analysis results

Note: "Percent" column is computed using the Grand Total, i.e. (Frequency / Grand Total)

"Valid percent" column is computed using only the valid total, i.e. (Frequency / Total)

To investigate further on the factors that were assumed to be limiting the student's maximum utilization of the University Library, undergraduate students were also asked to comment on how current the information resources they often used in the university library were. The students' responses are as presented in Table 13.

It was noted from Table 13 that the information resources that the students used were either current (with 37.5%) or old (with 52.4%). Very few students acknowledge using the very current information resources (probably because they are too few; or the users are not aware of their existence; or they have not been referred to them by their lecturers; or the students are just not adventurous in discovering what could be new in the library). The very old information resources were also less utilized (probably because they are not relevant; or the lecturers do not refer the students to use them; or they are over shadowed by the current information resources).

Since the majority of the students acknowledged having access to mainly old information resources, this was also considered a substantial problem hindering the students from utilizing the library resources, thinking that the resources that are available are only old materials that may not be helpful.

There are instances where the library has played its part to ensure that library users are knowledgeable and capable of utilizing its resources independently. Some of the endeavors include conducting user education, ensuring that library staffs are available for consultation and that the access tools are

available for use. It also conducts some computer workshops to ensure that the students know how to access the e-resources though at a very low coverage. On the "Personal side" therefore, a number of questions were put forward to the undergraduate students to assess whether they utilized the training opportunities availed by the University Library to be able to maximally use the library resources, or whether there were any other factors that hindered them from attending these sessions.

Undergraduate students were therefore asked whether they attended the user education workshops conducted during each of the students first year orientation week (beginning of semester one) and 54.4% of the respondents said they had never attended any of these workshops, with the dominating reasons being: -

- That the notification of these workshops is not adequately done, and that sometimes they are conducted concurrently with other programs or during lecture times. One of the respondents said the workshops were not clear to them. But considering the student's response to whether user education was sufficient, 74.7% of them said it was sufficient enough.

For the few who had ever attended the user education sessions (45.6%), and felt it needed some improvement, the following were recommended.

- That more frequent and short-term training workshops should be organized with few students so that all understand.
- That user knowledge provision should be changed from being general to being particular and practical.

- That the training sessions should be broken into sections so that not every thing is taught at once.
- That other delivery methods should be used such that those who miss can obtain handouts and brochures or pocket books.

However, the undergraduate students poor attendance in the user education workshops (only 45.6% attended) indicated that there was quite a big proportion of the students who missed the only sessions meant to ensure that they are informed and conversant with the library system and its resources. Considering the students' complaints, what needs to be done to ensure that all students' benefit from the training workshops is an "institutional issue" and therefore, for this case, the null hypothesis was accepted.

The undergraduate students were also asked whether they do consult library staff when stranded with any information problem in the library. All the student's (104) responded to this question with 78 respondents acknowledging seeking assistance from library staff, while 26 respondents said they do not consult librarians at all. Inquiring on how often they sought help from library staff, the majority (41.4%) said they seek help only 'sometimes', followed by those who seek help 'most times' (20.2%), then 14.1% who 'rarely' seek help, and just a few who 'always' seek help. The rest of the students (18.2%) do not seek any help at all. Seeking help is an initiative that originates from the information user though to some extent, the environment that the user encounters has an effect on whether the user takes the courage to ask or not. Assessing the case of those who did not seek help

at all was therefore not so conclusive because there was need to establish why they did not consider seeking help at all; or it would be concluded that they are always sure and confident whenever seeking information.

Besides seeking help in the library, the students were also asked a number of questions in relation to using library facilities that are often clarified during the user education sessions. These included whether they experienced any difficulties while using library information retrieval tools in general, and the subject catalogue in particular, service/resource awareness and use-problems, and whether the library system arrangement bothered them when seeking information. The findings are reported as follows:

For tool-use difficulties, slightly more than half of the respondents (53.1%) experienced problems or difficulties when using library information retrieval tools. Table 14 shows the chi-square computation for tool-use difficulties.

Table 14: Chi-square value for "tool-use" difficulties

Tool-use difficulties					
	Frequencies		Chi-square test statistics		
	Observed	Expected	χ^2_{ob}	df	χ^2_{cv} at 0.05 level
No	46	49	0.367	1	3.84
Yes	52	49			
Total	98				

Source: SPSS field analysis results

From Table 14, the obtained chi-square value was less than the critical chi-square value (i.e. 0.367 < 3.84). It was therefore not statistically significant at the 0.05 significance level, with 1 degree of freedom that tool-use difficulties were one of the factors that limited the students' maximum utilization of library

resources, because the deviations between the obtained and the observed frequencies were rather small. However, assessing the explanations given (in question 27(c)) as to why some of the undergraduate students found difficulties in using library information retrieval tools, it was found that most of them were as a result of the institutional problems than personal. Out of the 52 respondents who found difficulties in using library retrieval tools, 48 gave explanations of where the difficulties lay. 23 of these were personal use problems while 25 where based on the institutional procedures of use. A summary of these are given below:

On the "**institutional side**" the students felt the facilities were either inadequate or time consuming. Quoting some of their statements, they complained of:

- Scarcity of computers to browse e-resources and use the Internet and the limited time allocated to the use of computers.
- Lack of clear-cut directions in the catalogue, which sections to directly go to, in order to get the books.
- Too few catalogue-access points leading to over-crowding at the catalogues.
- The cards are too many and sometimes mixed up for one to go through to reach what is required, thus time wasting.
- The presence of cards in the catalogue, but with missing books on the shelves (i.e. the cards appear in the catalogue but the books cannot be found at the service counters by the staff).

- Going to the library with the hope of getting the required document and there is no card in the catalogue - (un-processed books).
- The public relations of staff at service counters are sometimes very poor (i.e. rude and high tempered).

On the "**personal side**" the following were noted:

- The student's computer illiteracy levels limit them from using the Internet and the e-resources. One of the respondents put it that "Browsing e-journal publications on the Internet requires a lot of intellectual ability".
- They also do not understand the index to periodicals.
- Poor catalogue searching skills limit them from using the subject catalogue. Most of them actually avoid using it or only know how to use the Author / Title catalogue. Subject catalogues are not clear to them. For instance one of the respondents put it that "the cards for geography writers are so many that one can not easily find where to get the necessary ones". This implied that one goes in for a search without properly conceiving the particular area of interest. Some do not know how to access a call number of a document from the catalogue. One of the respondents clearly put it that: "I do not know their operation very well".

Concluding on the above analysis, it was clear that more problems were experienced as a result of the institutional procedures of use than personal. For this case therefore, the null hypothesis was accepted.

A question was also particularly asked on any access problems when using the subject card catalogue as shown in Table 15.

Table 15: Frequencies for catalogue access problems

Catalogue access problems					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	**No**	57	54.8	58.8	58.8
	Yes	40	38.5	41.2	100.0
	Total	97	93.3	100.0	
Missing in system		7	6.7		
Grand Total		104	100.0		

Source: SPSS field analysis results

It was noted that a high proportion of the respondents (41.2%) found difficulties using the subject catalogue, and quoting some of their statements, the following were noted:

- The subject catalogue has many different textbooks whereby one fails to choose what is needed.
- That the subject catalogue is complicated and they do not know the correct procedures of using them.
- That the cards are too many to the extent that sometimes they fail to see what they want, and because the subject catalogue is overloaded, going through each and every card wastes their time to research (i.e. it is therefore rather laborious searching for the required book).
- That the subject catalogues are not well organized, causing a lot of delays and disturbances in information searching".

Considering these summarized explanations, it was noted that the problems lay more on the "institutional side" than "personal side". That is, much as some of the problems were due to the student's own ignorance of use, the Library needs to adopt using modern technology such that access is simplified. Thus, the null hypothesis was accepted that tool-use and subject catalogue access problems are as a result of the procedures of use in the library.

Kebede (2002) noted that knowledge of what facilities and/or materials available in information institutions stimulates ones information needs. Devadason and Pratap (1997) also pointed out that the ranges of available information sources are among the factors that influence information needs of users. With respect to these statements, undergraduate students were asked whether they were well informed about the range of services / resources in the University Library as shown in Table 16.

Table 16: Frequencies for whether undergraduate students are informed about University Library services and resources

Informed of University Library services / resources					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	**No**	52	50.0	51.0	51.0
	Yes	50	48.1	49.0	100.0
	Total	102	98.1	100.0	
Missing in system		2	1.9		
Grand Total		104	100.0		

Source: SPSS field analysis results

From Table 16, it was noted that slightly more than half of the respondents (51%), were not aware of what took place in the University Library. This indicated that the proportion of undergraduate students ill-informed of the Library services and resources was quite sizable. In addition to these findings, another question, focused particularly on services that are rare, new, or most commonly used were asked. The findings are as shown in Table 17.

Table 17: Frequency counts for the awareness of particular services

Awareness of particular services				
	Frequency			Valid percentage
	Yes	**No**	Total	'No' response percentage
E-Journals	37	63	100	63
Inter-Library Loan	10	89	99	89.9
Microfilms	13	86	99	86.9
Reserves	33	66	99	66.7

Source: SPSS field analysis results

Table 17 shows that only a few of the respondents were aware of these services (i.e. the frequency counts are less than 40 for each of the services), and from question 21(b) – (Appendix A), only 26 of the respondents acknowledged using some of these services (mainly the reserve and e-journal services). The majority of the respondents (as shown by the percentage column in Table 17) were completely not aware of these services. This shows a challenge to the library because it has to improve on the publicity of its information resources. It was therefore concluded that publicity of library services and resources is quite limited and therefore among one of the factors limiting the utilization of library resources. The undergraduate students were

asked to give suggestions on the appropriate methods of informing them and some of these are given in section 4.5 of this chapter.

The respondents were however also asked whether they had any problems using any of the services in Table 17, and 86 students responded to this question, 47 of whom said they had problems, most of which were because they were not aware of these services. Quoting some of their responses, they complained saying that:

- They do not know of their existence and the library staff does not up-date users about the presence of these services. Some confessed that they actually never new that any of these services were available, and that there was insufficient sensitization by the library officials/personnel to users about library services and resources.

The majority responses therefore called for more sensitization of the library services and resources. These problems therefore lay more on the "Institutional side" and therefore the null hypothesis was accepted.

Conclusively, considering all the arguments in this section, the null hypothesis was generally accepted that the library's procedures of use are the major causes of the many problems that undergraduate students face when seeking information.

4.5 Information seeking improvement strategies

In order to "Suggest strategies of improving on how undergraduate students seek information", a number of questions were put forward to the respondents to solicit for their ideas and opinions on this issue. Particularly, questions 11, 20(b), 26, 39(a), 45(b), 48, 49, 50, on the students' questionnaire - Appendix A; Question 7 on the lecturers interview guide - Appendix B; and Questions 5, 8, 11, on the librarians interview guide - Appendix C), were used. A summary of some of the suggestions are as given below.

A total of eighty-two (82) students gave in their opinions as to what they thought should be done to appropriately guide them in seeking information. Sixteen (16) of these shared the majority view that the students information seeking behaviors could be enhanced through training courses, seminars, workshops, sensitization programs or user education programs, done on a regular basis than just once or twice, and conducted for all years of study.

Thirteen (13) of the student respondents were of the view that handouts, guides, and instruction booklets would go a long way in helping the students know what to do since they can easily be distributed to all or whoever needs special knowledge about certain things in the library.

More thirteen (13) of the student respondents were also of the view that availing staff at various points for students to inquire from and get guidance would also help those who get stranded on what to do once in a while.

Nine (9) of the student respondents suggested using notice boards as the main information dissemination tool in all faculties and halls of residence so that the majority students are reached other than using only the library notice boards.

The rest of the students also had very good ideas though they were independent of each other; or shared between two to three students.
These included:

- Completely opting for only open shelf systems so that the students freely browse through the collections and make their selections of information materials or properly label the sections with simple directions and self-explanatory instructions about what goes on in each section.
- Always availing each student with the necessary information about the library training sessions in advance (say as part of their admission packaged information) such that they are all aware other than depending on notices that can easily be missed especially by freshers.
- Using instruction guide boards within, and at the entrance of the University Library
- Computerizing access, providing service & resource publicity online, and encouraging students to use the Internet and always visit the library web page.
- Re-organizing the card catalogues and shelves; and keeping them orderly at all times such that the materials are in their right places for proper access.

- Use book displays for new entries or always display lists of new materials that are not yet in the catalogue such that they can be accessed.
- Encouraging students to seek help or provide a conducive library environment for the students to easily get help when stranded.

The other additional services that the students felt would be helpful to them as they seek information included either allowing them to use reading materials outside the library without restrictions as to whether they are from the closed sections or open sections. The other option was to decentralize the vital books to the relevant departmental libraries, which can lend them out to the students for proper use.

4.6 Discussions of findings

It was established from the findings that the leading information needs included coursework/assignments, tests/examinations, and general research to enhance lecture notes. This agrees with earlier researchers like Littlejohn and Benson-Tally (1990); though when it comes to the major sources of information relied on heavily, lecture notes and handouts come first, then followed by research using the departmental book-banks and the University Library. This to some extent implies that the undergraduate students of Makerere University are still reliant on the transmission view of learning other than problem oriented learning as found out by Limberg (1999). All the lecturers interviewed confirmed that the students prefer having lecture notes.

The undergraduate students were also found to rely mainly on textbooks, with very little use of other information resources like journals (both print and electronic) and CD-ROM's. This could be as a result of not knowing their value and how to use them or not knowing of their existence. This therefore sets a challenge to the information resource providers (the librarians) to play their role in educating and sensitising the users about other useful information resources other than textbooks

It was established that undergraduate students use the following search strategies when seeking information: Starting (using lecturers), browsing (on the shelves), chaining (using references at the end of books), monitoring (using the card catalogue, library notice board display lists, and colleagues), and extracting (using the card catalogue). The strategies are appropriate but the options used in each strategy are inadequate for the students to exhaustively achieve their goals. The information seeking behavior of the undergraduate students are quite limited. From their descriptions of the steps they undertook when completing assignments, very little was said, implying they practically follow only the easiest possible ways of getting some information (not exhaustively) to satisfy the given need. Critically analysing some of steps they took, the most detailed student described them as: "To complete an assignment, the problem at hand is first read through, internalised, and then the related topics and titles are looked for specifically from the IDA section catalogue for references". Otherwise, the general trend of describing the steps followed was, reading through the lecture notes given, doing research using textbooks in the library or book bank with reference to

reading lists and finally asking friends or holding group discussions to finalize the assignment.

It was therefore noted that a lot is still desired in the way the students seek information, through exposure to more information resources and individual vigilance in exhaustively looking for the required information (with consultations from librarians where necessary). It was also noted that the monitoring options that the students are exposed to in the university library are so limited. More attention needs to be focused here, using Current Awareness Services, Selective Dissemination of Information to target faculties and customizing the information on MakNET (the University electronic network) or on the library web page.

Interviews with the lecturers showed that much as an effort is made to give reading lists with a variety of information resources (i.e. textbooks and journals in print, online databases), the students still have a preference for textbooks. The lecturers suggested the following remedies:

- A change in the teaching methods, so that students are encouraged to research and enhance their interest in independently looking for information. One lecturer noted that dependence on lecture notes and handouts undermines independent building of knowledge.
- Train students to seek information using a variety of sources and share information between themselves. However, it was also noted that, lecturers also need to be exposed to online resources and other databases in order to be better off and able to guide the students. In other

words, the lecturers need to do research on the available new literature from the different sources available.

The following were noted as the major factor limiting the students' appropriate utilization of the University Library:

- Limited borrowing of the most relevant books in the closed access section
- Insufficient copies of the relevant information materials (books)
- Out-dated (Old) information materials dominating the stock
- User education not appropriately conducted for all to benefit
- Information retrieval tool problems because of the manual procedures used, which lead to poor filing (mixed up cards) and slow retrieval
- Limited sensitization of the library information resources and services

To minimize most of these problems, it was highly emphasized by the students, librarians and lecturers that training and sensitisation be used as the main tools to ensure that the students are well equipped and informed of the information resources and services in the University Library.

To ensure appropriate sensitization, the University Library should actually use a variety of marketing tools, including using notice boards in Faculties and Halls of residence; handouts, guides, and instruction booklets to ensure that users are always informed of what to do when in the library. Automating all the library's access procedures would also minimize the problems of using manual information retrieval systems that cause a lot of delays.

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

Information seeking being a secondary need, as noted by Wilson (1999:251), and purposefully done by undergraduate students, needs to be properly internalised, with the major themes of the problem under investigation outlined to broaden the search and exhaustively get the required information. In the discussions, conclusions and recommendations in this chapter, this aspect is emphasized.

5.2 Conclusions

Students should properly be initiated into being good information resource users such that they do not depend mainly on attending and taking notes from their lecturers to accomplish their knowledge goals. Reading and research should be the dominating activity of which information literacy is the foundation.

The librarian's part therefore should be to ensure that the students are appropriately informed. Thomas Mann, an experienced reference librarian in Library of Congress in 1993 produced a book on library research models that are very helpful to librarians. Mann (1993) examines several alternative mental models that people use to approach the task of research, and demonstrates new and more effective ways of finding information. He shows the full range of search options possible, the inevitable tradeoffs and losses of

access that occur when researchers limit themselves to a specific method. These models if appropriately studied can be very fruitful in reaching out to the library users, and in this case, the students.

5.3 Recommendations

The University Library faces a number of challenges in its user-instruction programs, as elaborated in the findings, yet it is through user education that the librarians work is made easy and the students efforts quickened while retrieving and utilizing the library's information resources.

It was therefore noted that the current library user instruction program needed to be enhanced to empower students to benefit from using information resources in all formats (i.e. in print, electronic and microform), and be proficient in library use.

It was therefore recommended that, for information resources to have a direct impact on the students learning processes, the library needs to liaise with the teaching faculties, to develop the appropriate collections, and provide a number of new digital information services that can be accessed by many users at a time.

The library should also integrate physical expansion of collections and buildings as well as propose a well planned user instruction and information skills program (i.e. Lobby for funds to increase the print collections; electronic collections; including serials and reference databases; expand on the access

points – probably electronically; and increase the number of librarians serving the ever growing population of students in the University).

All these should be done while addressing the information demand such that the resources are appropriately utilized, (i.e. emphasis should also be put on user instruction programs to train the students to access, retrieve, evaluate and use information)

Since Makerere University Library is in the automation process, the following user education strategies could be tried out:

Create a set of two hour workshops to teach students how to:

1. Use the OPAC catalogue
2. Use Online databases
3. Use CD-ROM resources
4. Carry out internet navigation
5. Use selected web sites

With the focus of each session and type of resource used different (as applicable) for each category of students.

A program with the scheduled sessions for the semester can then be distributed ahead of time to students and faculty so that the lecturers/students can book the workshops relevant for their classes.

Organize the user education program in an up-to-date technology environment (electronic class) with at least 50 personal computers, with

Internet access, networked CD-ROMs, access to the Online Public Access Catalogue (OPAC), and all the audiovisual gadgets needed for a hands-on information search experience.

Meanwhile manuals should accompany the programs with documented instructions for exercises, a quick general library tour (physically or on video). The program should have practical homework based on the subject of the students or faculty choice and have provisions for evaluating the workshops for future improvements.

For first year undergraduate students, the program could be used as a pre-requisite course, providing basic training with 75 percent of the time devoted to hands-on practice. The quality of homework assignments graded by the instructors (librarians) and results submitted to the departments where the students belong. This could be a requirement for all first years to register for their second semester.

This would then imply having a special academic unit set up and staffed in the University Library to manage the program. The units staff could organize for the first year students to sign-in for the user-instruction course during normal university registration such that they each choose the week and time convenient for them to attend the workshops. As a reminder, the library should use banners hung around the university urging the students to take the course. For it to be effective, it should be declared compulsory by the

University Academic Senate so that it is made part of the general University curricula.

Introduce networked information services (Probably on MakNET) for all to share such that libraries off-campus or located away from the Main Library can conduct the same services within their localities.

However, the program instructors (the librarians) also need to be taken through refresher courses on how to prepare the instructional materials, classroom communications and coursework evaluation, among other teaching techniques.

For publicity of the libraries resources and services, the following could be done:

- Use attractive posters in each section of the library describing the services and scope of collections
- Issue out pamphlets about the library services and workshops. The user instruction workshops should be marketed using flyers and pamphlets, promoting the collections, services and library regulations in general.
- Always provide current editions of video coverage that includes new developments in the library to be used to introduce fresh students to the library and its services.
- Be creative and produce posters and postcards depicting library topics. (This could turn out to be a money-generating venture).

- Library personnel should publish articles, news releases and short communications for the university news publications to increase on the sensitisation mechanisms or use the library web page for publicity.

5.4 Areas for further research

This study was carried out in a manual information retrieval environment. Since Makerere University is automating most of its services, a study could be undertaken in an automated environment and a comparison established.

The information seeking behavior of students in other institutions of learning could also be carried out and a comparison established.

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APPENDIX A

QUESTIONNAIRE FOR UNDERGRADUATE STUDENTS

Dear respondent,

I am currently involved in **"a research study on the information seeking behaviour of undergraduate students of Makerere University"** in which you have been selected to participate.

This study seeks to establish how undergraduate students gather and satisfy their information needs with the purpose of proposing appropriate information provision services in the library. Your co-operation in providing the required information by answering the following questions will be highly appreciated. Maximum confidentiality is guaranteed and your answers will solely be used for the purpose of this research.

Thank you.

Miriam Kakai
Msc. Inf. Sc. Candidate.

Instructions: Follow the instructions appended to each question.

Personal information

(Fill in or tick in the space provided where appropriate)

1. Your Faculty: Faculty of Arts [ ] Faculty of Science [ ]
2. Department: .....
3. Year of study: First year [ ] Second year [ ] Third year [ ]
4. Program enrolled in: Day [ ] Evening [ ] External [ ]
5. Gender: Male [ ] Female [ ]

Undergraduate students information needs

6. What mainly leads you into seeking for information?
(Tick against the appropriate options)

[ ] Course work/ Assignments
[ ] Seminar / workshop papers
[ ] Tutorial presentations
[ ] Class discussions
[ ] Preparation for exams / tests
[ ] General reading to enhance lecture notes
[ ] Dissertation research

7. Using a scale of 1 to 7 (where 1 = most used source and 7 = least used source), identify the information sources that you depend on most for your studies.

(Please circle one number for each category)

The University Library	1	2	3	4	5	6	7
Departmental book-bank	1	2	3	4	5	6	7

Lecture notes and handouts	1	2	3	4	5	6	7
Photocopies from colleagues	1	2	3	4	5	6	7
The University bookshop	1	2	3	4	5	6	7
Internet sources	1	2	3	4	5	6	7

8. What information resources do you frequently use in the University library?
(Tick against the appropriate options)

[ ] Textbooks
[ ] Dissertations / theses
[ ] Conference literature proceedings
[ ] Journals
[ ] Reference material like encyclopedia
[ ] Newspapers
[ ] CD-ROM's
[ ] Online databases
[ ] Internet
[ ] Others (Specify) .....

9. On a scale of 1 to 7 (where 1 = most done activity and 7 = least done activity), identify the activities that occupy your time most in the University Library.

(Please circle one number for each category)

Using library books	1	2	3	4	5	6	7
Using study space to read own books	1	2	3	4	5	6	7
Using the computer laboratory	1	2	3	4	5	6	7
Making photocopies of library materials	1	2	3	4	5	6	7
Borrowing and returning books	1	2	3	4	5	6	7
Using the journal collection	1	2	3	4	5	6	7
Using newspapers	1	2	3	4	5	6	7
Seeking assistance	1	2	3	4	5	6	7
Other (specify)	1	2	3	4	5	6	7

10. Do you adequately get the answers you need from the reading materials in the University library? ***(Tick one option)***

Always [ ] Most times [ ] Sometimes [ ] Rarely [ ] Not at all [ ]

11. Give your opinion about the procedure of accessing the University library information materials .....

.....

.....

<u>Undergraduate students information seeking behaviour</u>

12. Approximately how often do you use the University Library?
(Tick one option and indicate the number of days where necessary)

[ ] Daily
[ ] Once a week
[ ] Once a fortnight
[ ] Once a month
[ ] Never

13. (a) Do you borrow reading materials for use outside the University library?
[ ] Yes [ ] No

(b) If yes how often?
(Tick one option and indicate the number of days where necessary)

[ ] Daily
[ ] Once a week
[ ] Once a fortnight
[ ] Once a month
[ ] Never

(c) If no, why? .....

14. How frequently do you use Internet services?
(Tick one option and indicate the number of days where necessary)

[ ] Daily
[ ] Once a week
[ ] Once a fortnight
[ ] Once a month
[ ] Never

15. Specify the purpose for which you use the Internet
(Tick against the appropriate options)

[ ] Doing assignments
[ ] Reading news updates
[ ] General browsing
[ ] E-mailing
[ ] Others (Specify) .....

16. What searching options would you prefer in using the library?
(Tick one & defend your choice)

[ ] Browsing the shelves [ ] Using retrieval tools

.....

17. Do you use browsing as an information seeking technique?
[ ] Yes [ ] No

18. Do you sometimes use references in the books consulted to generate other useful sources of information to your information problem?
[ ] Yes [ ] No

19. On a scale of 1 to 7 (where 1 = most used and 7 = least used avenue), identify the avenues you use to ensure that you are aware of and monitoring on the information resources in the library? ***(Please circle one number for each category)***

Through the catalogue	1	2	3	4	5	6	7
Library notice boards lists of new arrivals	1	2	3	4	5	6	7
Check the display of new documents	1	2	3	4	5	6	7
Inquire from library staff	1	2	3	4	5	6	7
Inquire from lecturers	1	2	3	4	5	6	7
Inquire from colleagues	1	2	3	4	5	6	7
Through library training workshops	1	2	3	4	5	6	7
Others (specify)	1	2	3	4	5	6	7

20. (a) Are you well informed of the services and resources available in the University Library? [ ] Yes [ ] No

(b) If no, what methods would be appropriate to inform students of new developments in the services and resources available in the library?

.....

21. (a) Are you aware of some of these services in the University Library?

E-journals	[ ] Yes	[ ] No
Inter-Library-Loan services	[ ] Yes	[ ] No
Photographic and Microfilm services	[ ] Yes	[ ] No
Reserve services	[ ] Yes	[ ] No

(b) If yes, which ones do you use? .....

.....

22. (a) Do you have problems using any of the services in 21 above?
[ ] Yes [ ] No

(b) If yes, identify and explain .....

.....

23. How do you often identify your information resource needs?
(Tick against the appropriate options)

[ ] Using reading lists
[ ] Using the catalogue by subject
[ ] Using lecturers
[ ] Recommendations from colleagues
[ ] Browsing the shelves
[ ] Browsing e-resources
[ ] Browsing journal contents in print
[ ] Browsing the Internet

24. How do you decide on a particular document from the variety you identify as relevant to your work? ***(Tick the appropriate options)***

[ ] By comparing titles in the catalogue
[ ] By checking the contents of each document selected
[ ] By going through the index and cross checking the text of each document selected
[ ] Others (Please specify what you do) .....

25. How do you often extract the information you need for your academic work?

(Tick the appropriate options)

[ ] Make hand written notes
[ ] Photocopy
[ ] Borrow
[ ] Reserve
[ ] Request under the Document Delivery Service
[ ] Others (Please specify what you do) .....

26. What facilities would you like to use but are lacking in the University Library?

.....

27. (a) Which of the following information retrieval tools do you use in the University Library to get the information you want?

(Tick against the appropriate options)

[ ] Card catalogue
[ ] Bibliographies
[ ] Indexes to periodicals and journals
[ ] Contents of journals
[ ] Indexes / abstracts on CD-ROM
[ ] Browsing e-journal publications on the Internet
[ ] Searching for information using the Internet

(b) Do you face any difficulty in using the above tools?

[ ] Yes [ ] No

(c) If yes, identify those that give you problems and explain .....

.....

28. (a) Do you consult your lecturers when faced with an academic information problem?

[ ] Yes [ ] No

(b) If yes, describe the kind of academic help you seek from them

.....

29. (a) Do you consult librarians for help? [ ] Yes [ ] No

(b) If yes, how often do you consult librarians when stranded with an academic information problem? ***(Tick one option)***

[ ] Always [ ] Most times [ ] Sometimes [ ] Rarely [ ] Not at all

30. (a) Do you refer to other libraries or information centers for more reading materials?

[ ] Yes [ ] No

(b) If yes, what information centers or libraries do you use?
(Tick and write the name of the Centre against category)

[ ] Special Libraries .....
[ ] Information centers .....
[ ] Resource centers .....
[ ] Documentation centers .....
[ ] Internet cafes .....
[ ] Archives .....

(b) How did you get to know about them? .....

.....

31. Summarise the steps you follow to complete an academic information problem like an assignment. .....

.....

.....

Problems encountered in information seeking by undergraduate students

32. How do you rate your knowledge of how to use a library before coming to Makerere University? ***(Select one option)***

[ ] Very good
[ ] Good
[ ] Fair
[ ] Poor
[ ] Very poor

33. After joining Makerere University, how did you get acquainted with the library and its facilities? Explain .....

34. (a) Does the library system arrangement bother you in searching for information? [ ] Yes [ ] No

(b) If yes, elaborate .....

.....

35. (a) Do you experience any access problems especially in using the subject catalogue?

[ ] Yes [ ] No

(b) If yes, explain your problem .....

.....

36. (a) In using the University Library do you get access to the retrieval tools like the catalogue whenever you want to use them?

(Tick one option)

[ ] Always [ ] Sometimes [ ] Rarely [ ] Not at all

(b) If "Not at all", why? .....

.....

37. Does your failure to use the library affect your academic performance in any way?

[ ] Very much [ ] Much [ ] Slightly [ ] Not at all

38. (a) How current are the available reading materials that you often use in the University Library?

[ ] Very current [ ] Current [ ] Old [ ] Very old

(b) Does this affect the quality of work you produce? [ ] Yes [ ] No

39. (a) Comment on the closed access system of the University Library? .....

.....

(b) Does the closed access system prohibit you from accessing library documents in any way? [ ] Yes [ ] No

40. (a) Do you get difficulties in finding the information you require?

[ ] Yes [ ] No

(b) What sort of difficulties do you get? ***(Tick the appropriate options)***

[ ] Inability to get the required information
[ ] Not knowing where to get the information needed
[ ] Takes time to get the information
[ ] Get information but not reliable
[ ] Others (specify) .....

(c) How do you go about solving these problems? .....

.....

41. Are you comfortable using information in any format? (e.g. Digitised formats, Microfilm formats, Print formats) [ ] Yes [ ] No

If no, identify the format that gives you problems and explain

.....

42. (a) Does the nature of your academic program have any effect on the time you have to seek information for your academic work?

[ ] Yes [ ] No

(b) If yes, what do you do about it? .....

.....

43. (a) Does the distance from your residence affect your library usage?

[ ] Yes [ ] No

(b) If yes, in your opinion what should be done? .....

.....

Information seeking improvement strategies

44. (a) Have you ever attended any user education program in Makerere University Library?

[ ] Yes [ ] No

(b) If yes, how effective is the program? .....

.....

(c) If no, why haven't you ever attended any? .....

.....

45. (a) Is the user knowledge and skill provided in the library during user education programs sufficient for you to access and retrieve the information you need?

[ ] Yes [ ] No

(b) If no, what improvement should be done? .....

.....

46. What method of library user instruction would you opt for among the following?

(Tick one option)

[ ] Self-explanatory handouts and guides
[ ] Self-paced computer instruction
[ ] Course oriented library workshops with assignments
[ ] Others (specify according to your needs) .....

47. Are the research skills you learn during the course of your study sufficient for you to competently utilise information resources?

[ ] Yes [ ] No

48. What additional services would you like the University Library to introduce?

(Tick against the appropriate options)

[ ] Referral services available in print
[ ] Training in information access workshops
[ ] Publicity of services and resources online
[ ] Others (specify) .....
.....

49. In your opinion, what do you think should be done to appropriately guide students in seeking information in the University Library? .....
.....
.....
.....
.....
.....

50. Give a general view on your perceptions about the University Library as an information source .....
.....
.....
.....
.....
.....
.....

Thank you very much for your valuable contribution.

APPENDIX B
INTERVIEW GUIDE FOR ACADEMIC STAFF (LECTURERS)

Dear respondent,

I am currently involved in **"a research study on the information-seeking behavior of undergraduate students of Makerere University"** as a requirement for the award of a Master of Science Degree in Information Science of Makerere University.

You have been selected to participate in this study that seeks to establish how undergraduate students gather and satisfy their information needs with the purpose of proposing appropriate information provision services in the library. Your co-operation in providing the required information by answering the following questions will be highly appreciated. Maximum confidentiality is guaranteed and your answers will solely be used for the purpose of this research.

Yours faithfully

Miriam Kakai
Msc. Inf. Sc. Candidate.

Personal information

Faculty .....

Department .....

Designation .....

Subject area .....

The years you lecture First [ ] Second [ ] Third [ ]

Gender Male [ ] Female [ ]

Questions on the information seeking behaviour of undergraduate students

1. (a) Besides your formal class interactions with students, do they in person approach you with academic information problems?[ ] Yes [ ] No

   (b) If yes, what students normally seek help? (Identify by year of study)

.....

2. According to your assessment, how do you rate the students' general information seeking behavior?

	Very Good	Good	Fair	Poor	Very Poor
First years					
Second years					
Third years					

3. What do they prefer: lecture notes or problem oriented studying? .....

4. (a)Do lecturers offer recommended reference information materials (**reading lists**) that the students should use? [ ] Yes [ ] No

(b) If no, how do the students know the information materials that are relevant for their studies? .....

.....

.....

.....

.....

(c) If yes, what categories of materials are recommended? (Textbooks, Journals, Online databases, etc) .....

.....

5. Are the relevant information materials that undergraduate students depend on available in the University Library? [ ] Yes [ ] No

6. (a) Does the faculty library have most of the information materials that the students use? [ ] Yes [ ] No

(b) If no, what alternative sources do they use? .....

.....

.....

.....

.....

7. In your opinion, what do you think should be done to appropriately guide students in seeking information? .....

.....

.....

.....

.....

Thank you very much for your valuable contribution.

APPENDIX C
INTERVIEW GUIDE FOR LIBRARY STAFF

Dear respondent,

I am currently involved in **"a research study on the information-seeking behavior of undergraduate students of Makerere University"** as a requirement for the award of a Master of Science Degree in Information Science of Makerere University.

You have been selected to participate in this study that seeks to establish how undergraduate students gather and satisfy their information needs with the purpose of proposing appropriate information provision services in the library. Your co-operation in providing the required information by answering the following questions will be highly appreciated. Maximum confidentiality is guaranteed and your answers will solely be used for the purpose of this research.

Yours faithfully

Miriam Kakai
Msc. Inf. Sc. Candidate.

Personal information

Faculty .....

Department / Section .....

Designation .....

Gender Male [ ] Female [ ]

Questions on the information seeking behaviour of undergraduate students

8. (a) Do undergraduate students approach you for help when stranded in seeking for information? [ ] Yes [ ] No

(b) If no, why do you think they do not seek help? .....

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(c) If yes, what kind of information do undergraduate students ask for regularly?

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(d) How do you offer the assistance? ***(Tick the appropriate options)***

[ ] Orally
[ ] Physically help in searching
[ ] Selective Dissemination of Information
[ ] Others (specify) .....

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9. (a) In case the library doesn't have the required information, do you offer referral services? [ ] Yes [ ] No

(b) If yes, list some of the referral information centers / libraries

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10. What problems do you encounter in helping students (e.g. clarity of their information problems) .....

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11. What constraints do you see as affecting information provision to students?.....

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12. Give your suggestions on how to improve information provision to students.....

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13. Do you think students are competent in using the retrieval tools at their disposal? [ ] Yes [ ] No

14. From your observation, do you think undergraduate students are aware of all the information resources at their disposal? [ ] Yes [ ] No

15. What in your opinion would be the best ways of informing undergraduate students about the information resources and facilities available in the University Library?

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16. According to your observation, what information resources do the undergraduate students utilize most? .....

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17. According to your judgment, how effective is the user instruction offered to students in the University library?

[ ] Very effective [ ] Just enough [ ] Insufficient

18. In your opinion, what do you think should be done to appropriately guide students in seeking information? .....

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19. What future plans does the library have towards publicity of information services and resources?

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Thank you very much for your valuable contribution.

APPENDIX D
PARTICIPATIVE OBSERVATION GUIDE

Procedure: The researcher will observe undergraduate students in specified locations in the University library as follows:

1. At the Information Desk: **(Date of observation .....)**

    - The category of students who seek help
    - The nature of inquiries they ask
    - The nature of problems they encounter at the catalogue

2. At the Caged Service Points (Service Windows)
   (Date of observation: .....)

    - Do students have a number of alternatives of the books they request for?
    - Do staffs help in giving the alternative information materials when what is requested for is not available?
    - Note the students complaints at the service windows

3. At the Circulation Desk (Issue and Reserve Desk)
   (Date of observation: .....)

    - Category of students who borrow books
    - Rate of borrowing in a day
    - Category of students who make reservations
    - Rate of book reservations in a day

4. In the Computer Laboratory **(Date of observation .....)**

    - The nature of information sought by undergraduate students (e.g. journal information, news, institutions for study, etc)
    - How the searches are done (e.g. using search engines, using URL's, etc)

APPENDIX E

TABULATED FINDINGS

Table 18: Frequency counts and percentages for information sources

Information sources										
	Ranks							Total	Missing	Grand Total
	R1	R2	R3	R4	R5	R6	R7			
University Library	47	9	15	2	4	2	19	98	6	104
	48.0%	9.2%	15.3%	2.0%	4.1%	2.0%	19.4%	100.0%		
Book-Bank	52	20	5	3	2	2	11	95	9	104
	54.7%	21.1%	5.3%	3.2%	2.1%	2.1%	11.6%	100.0%		
Lecture notes	54	17	8	5	2	1	5	92	12	104
	58.7%	18.5%	8.7%	5.4%	2.2%	1.1%	5.4%	100.0%		
Colleagues	14	9	9	10	11	10	20	83	21	104
	16.9%	10.8%	10.8%	12.0%	13.3%	12.0%	24.1%	100.0%		
Bookshop	4	1	2	1	4	6	55	73	31	104
	5.5%	1.4%	2.7%	1.4%	5.5%	8.2%	75.3%	100.0%		
Internet	6	6	9	6	7	8	35	77	27	104
	7.8%	7.8%	11.7%	7.8%	9.1%	10.4%	45.5%	100.0%		

Source: SPSS field analysis results

Table 19: Frequency counts and percentages for Library activities

Library activities										
	Rank frequency							Total	Missing	Grand Total
	R1	R2	R3	R4	R5	R6	R7			
Books	65	10	4	6	2	3	6	96	8	104
	67.7%	10.4%	4.2%	6.3%	2.1%	3.1%	6.3%	100%		
Space	44	8	9	3	4	3	12	83	21	104
	53.0%	9.6%	10.8%	3.6%	4.8%	3.6%	14.5%	100%		
Laboratory	4	3	5	6	6	7	36	67	37	104
	6.0%	4.5%	7.5%	9.0%	9.0%	10.4%	53.7%	100%		
Photocopy	10	8	7	5	6	5	33	74	30	104
	13.5%	10.8%	9.5%	6.8%	8.1%	6.8%	44.6%	100%		
Borrowing	28	7	7	9	4	4	21	80	24	104
	35.0%	8.8%	8.8%	11.3%	5.0%	5.0%	26.3%	100%		
Journals	5	1	3	3	2	8	41	63	41	104
	7.9%	1.6%	4.8%	4.8%	3.2%	12.7%	65.1%	100%		
Newspapers	10	9	4	7	7	6	28	71	33	104
	14.1%	12.7%	5.6%	9.9%	9.9%	8.5%	39.4%	100%		
Assistance	13	11	4	4	66	5	24	67	37	104
	19.4%	16.4%	6.0%	6.0%	9.0%	7.5%	35.8%	100%		
Others	3	2	1	-	-	-	-	6	98	104

Source: SPSS field analysis results

Table 20: Chi-square values for monitoring techniques

Monitoring technique											
		Rank frequencies							Chi-square test statistics		
Ranks →		**1**	**2**	**3**	**4**	**5**	**6**	**7**	df	χ^2_{ob}	χ^2_{cv} at 0.05 level
Catalogue	O	46	7	7	3	5	2	16	6	118.140	12.59
	E	12.3	12.3	12.3	12.3	12.3	12.3	12.3			
Lists	O	26	15	3	5	3	4	23	6	52.937	12.59
	E	11.3	11.3	11.3	11.3	11.3	11.3	11.3			
Displays	O	14	13	7	8	6	6	26	6	27.275	12.59
	E	11.4	11.4	11.4	11.4	11.4	11.4	11.4			
Library staff	O	19	11	8	6	9	3	26	6	33.073	12.59
	E	11.7	11.7	11.7	11.7	11.7	11.7	11.7			
Lecturers	O	28	6	14	5	9	7	14	6	32.289	12.59
	E	11.9	11.9	11.9	11.9	11.9	11.9	11.9			
Colleagues	O	32	11	13	9	7	4	8	6	43.000	12.59
	E	12.0	12.0	12.0	12.0	12.0	12.0	12.0			
Workshops	O	1	3	3	3	-	7	55	5	186.500	11.07
	E	12.0	12.0	12.0	12.0		12.0	12.0			

Source: SPSS field analysis results

APPENDIX F

CALCULATIONS TO THE CHI-SQUARE TABLES

The following calculations show how the figures in the tables were derived.

The obtained chi-square value is computed from the observed frequencies in the findings and the formula is given as:

$$\chi^2_{ob} = \sum_{i=1}^{n} \frac{(o_i - e_i)^2}{e_i} \quad \text{where i = 1, 2, ... n.}$$

Where: o_i is the observed frequency

e_i is the expected frequency calculated as:
(Total obtained frequency/number of items)

Calculations for Table 6: Chi-square values for browsing and chaining techniques.

For Browsing:

Frequency	Observed (o_i)	Expected (e_i)
Yes	60	(90/2) = 45
No	30	(90/2) = 45
Total	90	

$$\chi^2_{ob} = \sum_{i=1}^{n} \frac{(o_i - e_i)^2}{e_i} \quad \text{where i = 1, 2.}$$

$$= (60 - 45)^2 / 45 + (30 - 45)^2 / 45$$

$$= (15)^2 / 45 + (-15)^2 / 45$$

$$= 225 / 45 + 225 / 45$$

$$= 450 / 45$$

$$= 10$$

For Chaining:

Frequency	Observed (o_i)	Expected (e_i)
Yes	84	(98/2) = 49
No	14	(98/2) = 49
Total	98	

$$\chi^2_{ob} = \sum_{i=1}^{n} \frac{(o_i - e_i)^2}{e_i} \quad \text{where i = 1, 2.}$$

$= (84 - 49)^2 / 49 + (14 - 49)^2 / 49$

$= (35)^2 / 49 + (-35)^2 / 49$

$= 1225 / 49 + 1225 / 49$

$= 2450 / 49$

$= 50$

Calculations for Table 7: Chi-square values for starting search techniques.

For Reading lists:

Frequency	Observed (o_i)	Expected (e_i)
Yes	59	(103/2) = 51.5
No	44	(103/2) = 51.5
Total	103	

$$\chi^2_{ob} = \sum_{i=1}^{n} \frac{(o_i - e_i)^2}{e_i} \quad \text{where i = 1, 2.}$$

$= (59 - 51.5)^2 / 51.5 + (44 - 51.5)^2 / 51.5$

$= (7.5)^2 / 51.5 + (-7.5)^2 / 51.5$

$= 56.25 / 51.5 + 56.25 / 51.5$

$= 112.5 / 51.5$

$= 2.184466$

≈ 2.184

For Subject catalogue:

Frequency	Observed (o_i)	Expected (e_i)
Yes	53	(103/2) = 51.5
No	50	(103/2) = 51.5
Total	103	

$$\chi^2_{ob} = \sum_{i=1}^{n} \frac{(o_i - e_i)^2}{e_i} \quad \text{where i = 1, 2.}$$

$= (53 - 51.5)^2 / 51.5 + (50 - 51.5)^2 / 51.5$

$= (1.5)^2 / 51.5 + (-1.5)^2 / 51.5$

$= 2.25 / 51.5 + 2.25 / 51.5$

$= 4.5 / 51.5$

$= 0.0873786$

≈ 0.087

For Lecturers:

Frequency	Observed (o_i)	Expected (e_i)
Yes	65	(103/2) = 51.5
No	38	(103/2) = 51.5
Total	103	

$$\chi^2_{ob} = \sum_{i=1}^{n} \frac{(o_i - e_i)^2}{e_i} \quad \text{where i = 1, 2.}$$

$$= (65 - 51.5)^2 / 51.5 + (38 - 51.5)^2 / 51.5$$
$$= (13.5)^2 / 51.5 + (-13.5)^2 / 51.5$$
$$= 182.25 / 51.5 + 182.25 / 51.5$$
$$= 364.5 / 51.5$$
$$= 7.0776699$$
$$\approx 7.078$$

For Colleagues:

Frequency	Observed (o_i)	Expected (e_i)
Yes	58	(103/2) = 51.5
No	45	(103/2) = 51.5
Total	103	

$$\chi^2_{ob} = \sum_{i=1}^{n} \frac{(o_i - e_i)^2}{e_i} \quad \text{where i = 1, 2.}$$

$$= (58 - 51.5)^2 / 51.5 + (45 - 51.5)^2 / 51.5$$
$$= (6.5)^2 / 51.5 + (-6.5)^2 / 51.5$$
$$= 42.25 / 51.5 + 42.25 / 51.5$$
$$= 84.5 / 51.5$$
$$= 1.6407767$$
$$\approx 1.641$$

For Shelves:

Frequency	Observed (o_i)	Expected (e_i)
Yes	41	(103/2) = 51.5
No	62	(103/2) = 51.5
Total	103	

$$\chi^2_{ob} = \sum_{i=1}^{n} \frac{(o_i - e_i)^2}{e_i} \quad \text{where i = 1, 2.}$$

$= \quad (41 - 51.5)^2 / 51.5 \quad + \quad (62 - 51.5)^2 / 51.5$

$= \quad (-10.5)^2 / 51.5 \quad + \quad (10.5)^2 / 51.5$

$= \quad 110.25 / 51.5 \quad + \quad 110.25 / 51.5$

$= \quad 220.5 / 51.5$

$= \quad 4.2815534$

$\approx \quad 4.282$

For E-resources:

Frequency	Observed (o_i)	Expected (e_i)
Yes	7	(103/2) = 51.5
No	96	(103/2) = 51.5
Total	103	

$$\chi^2_{ob} = \sum_{i=1}^{n} \frac{(o_i - e_i)^2}{e_i} \quad \text{where i = 1, 2.}$$

$= \quad (7 - 51.5)^2 / 51.5 \quad + \quad (96 - 51.5)^2 / 51.5$

$= \quad (-44.5)^2 / 51.5 \quad + \quad (44.5)^2 / 51.5$

$= \quad 1980.25 / 51.5 \quad + \quad 1980.25 / 51.5$

$= \quad 3960.5 / 51.5$

$= \quad 76.902913$

$\approx \quad 76.903$

For Journal contents:

Frequency	Observed (o_i)	Expected (e_i)
Yes	3	(102/2) = 51
No	99	(102/2) = 51
Total	102	

$$\chi^2_{ob} = \sum_{i=1}^{n} \frac{(o_i - e_i)^2}{e_i} \quad \text{where i = 1, 2.}$$

$= \quad (3 - 51)^2 / 51 \quad + \quad (99 - 51)^2 / 51$

$= \quad (-48)^2 / 51 \quad + \quad (48)^2 / 51$

$= \quad 2304 / 51 \quad + \quad 2304 / 51$

$= \quad 4608 / 51$

$= \quad 90.352941$

$\approx \quad 90.353$

For Browsing the Internet:

Frequency	Observed (o_i)	Expected (e_i)
Yes	16	(103/2) = 51.5
No	87	(103/2) = 51.5
Total	103	

$$\chi^2_{ob} = \sum_{i=1}^{n} \frac{(o_i - e_i)^2}{e_i} \quad \text{where i = 1, 2.}$$

$$= (16 - 51.5)^2 / 51.5 + (87 - 51.5)^2 / 51.5$$
$$= (-35.5)^2 / 51.5 + (35.5)^2 / 51.5$$
$$= 1260.25 / 51.5 + 1260.25 / 51.5$$
$$= 2520.5 / 51.5$$
$$= 48.941748$$
$$\approx 48.942$$

Calculations for Table 8: Chi-square values for differentiating search techniques.

For Titles:

Frequency	Observed (o_i)	Expected (e_i)
Yes	42	(99/2) = 49.5
No	57	(99/2) = 49.5
Total	99	

$$\chi^2_{ob} = \sum_{i=1}^{n} \frac{(o_i - e_i)^2}{e_i} \quad \text{where i = 1, 2.}$$

$$= (42 - 49.5)^2 / 49.5 + (57 - 49.5)^2 / 49.5$$
$$= (-7.5)^2 / 49.5 + (7.5)^2 / 49.5$$
$$= 56.25 / 49.5 + 56.25 / 49.5$$
$$= 112.5 / 49.5$$
$$= 2.2727273$$
$$\approx 2.273$$

For Contents:

Frequency	Observed (o_i)	Expected (e_i)
Yes	68	(99/2) = 49.5
No	31	(99/2) = 49.5
Total	99	

$$\chi^2_{ob} = \sum_{i=1}^{n} \frac{(o_i - e_i)^2}{e_i} \quad \text{where i = 1, 2.}$$

$= (68 - 49.5)^2 / 49.5 + (31 - 49.5)^2 / 49.5$

$= (18.5)^2 / 49.5 + (-18.5)^2 / 49.5$

$= 342.25 / 49.5 + 342.25 / 49.5$

$= 684.5 / 49.5$

$= 13.8282823$

≈ 13.828

For Book Index:

Frequency	Observed (o_i)	Expected (e_i)
Yes	46	(99/2) = 49.5
No	53	(99/2) = 49.5
Total	99	

$$\chi^2_{ob} = \sum_{i=1}^{n} \frac{(o_i - e_i)^2}{e_i} \quad \text{where i = 1, 2.}$$

$= (46 - 49.5)^2 / 49.5 + (53 - 49.5)^2 / 49.5$

$= (-3.5)^2 / 49.5 + (3.5)^2 / 49.5$

$= 12.25 / 49.5 + 12.25 / 49.5$

$= 24.5 / 49.5$

$= 0.4949495$

≈ 0.495

Calculations for Table 9: Chi-square values for extracting search techniques.

For Card catalogue:

Frequency	Observed (o_i)	Expected (e_i)
Yes	83	(99/2) = 49.5
No	16	(99/2) = 49.5
Total	99	

$$\chi^2_{ob} = \sum_{i=1}^{n} \frac{(o_i - e_i)^2}{e_i} \quad \text{where i = 1, 2.}$$

$= (83 - 49.5)^2 / 49.5 + (16 - 49.5)^2 / 49.5$

$= (33.5)^2 / 49.5 + (-33.5)^2 / 49.5$

$= 1122.25 / 49.5 + 1122.25 / 49.5$

$= 2244.5 / 49.5$

$= 45.343434$

≈ 45.343

For Bibliographies:

Frequency	Observed (o_i)	Expected (e_i)
Yes	44	(99/2) = 49.5
No	55	(99/2) = 49.5
Total	99	

$$\chi^2_{ob} = \sum_{i=1}^{n} \frac{(o_i - e_i)^2}{e_i} \quad \text{where i = 1, 2.}$$

$$= (44 - 49.5)^2 / 49.5 + (55 - 49.5)^2 / 49.5$$
$$= (-5.5)^2 / 49.5 + (5.5)^2 / 49.5$$
$$= 30.25 / 49.5 + 30.25 / 49.5$$
$$= 60.5 / 49.5$$
$$= 1.2222222$$
$$\approx 1.222$$

For Periodical index:

Frequency	Observed (o_i)	Expected (e_i)
Yes	24	(98/2) = 49
No	74	(98/2) = 49
Total	98	

$$\chi^2_{ob} = \sum_{i=1}^{n} \frac{(o_i - e_i)^2}{e_i} \quad \text{where i = 1, 2.}$$

$$= (24 - 49)^2 / 49 + (74 - 49)^2 / 49$$
$$= (-25)^2 / 49 + (25)^2 / 49$$
$$= 625 / 49 + 625 / 49$$
$$= 1250 / 49$$
$$= 25.510204$$
$$\approx 25.510$$

For Journal contents:

Frequency	Observed (o_i)	Expected (e_i)
Yes	15	(99/2) = 49.5
No	84	(99/2) = 49.5
Total	99	

$$\chi^2_{ob} = \sum_{i=1}^{n} \frac{(o_i - e_i)^2}{e_i} \quad \text{where i = 1, 2.}$$

$= (15 - 49.5)^2 / 49.5 + (84 - 49.5)^2 / 49.5$

$= (-34.5)^2 / 49.5 + (34.5)^2 / 49.5$

$= 1190.25 / 49.5 + 1190.25 / 49.5$

$= 2380.5 / 49.5$

$= 48.090909$

≈ 48.091

For CD - Indexes:

Frequency	Observed (o_i)	Expected (e_i)
Yes	5	(99/2) = 49.5
No	94	(99/2) = 49.5
Total	99	

$\chi^2_{ob} = \sum_{i=1}^{n} \frac{(o_i - e_i)^2}{e_i}$ where i = 1, 2.

$= (5 - 49.5)^2 / 49.5 + (94 - 49.5)^2 / 49.5$

$= (-44.5)^2 / 49.5 + (44.5)^2 / 49.5$

$= 1980.25 / 49.5 + 1980.25 / 49.5$

$= 3960.5 / 49.5$

$= 80.010101$

≈ 80.010

For E-Journals:

Frequency	Observed (o_i)	Expected (e_i)
Yes	9	(99/2) = 49.5
No	90	(99/2) = 49.5
Total	99	

$\chi^2_{ob} = \sum_{i=1}^{n} \frac{(o_i - e_i)^2}{e_i}$ where i = 1, 2.

$= (9 - 49.5)^2 / 49.5 + (90 - 49.5)^2 / 49.5$

$= (-40.5)^2 / 49.5 + (40.5)^2 / 49.5$

$= 1640.25 / 49.5 + 1640.25 / 49.5$

$= 3280.5 / 49.5$

$= 66.272727$

≈ 66.273

For the Internet:

Frequency	Observed (o_i)	Expected (e_i)
Yes	20	(99/2) = 49.5
No	79	(99/2) = 49.5
Total	99	

$$\chi^2_{ob} = \sum_{i=1}^{n} \frac{(o_i - e_i)^2}{e_i} \quad \text{where i = 1, 2.}$$

$$= (20 - 49.5)^2 / 49.5 + (79 - 49.5)^2 / 49.5$$
$$= (-29.5)^2 / 49.5 + (29.5)^2 / 49.5$$
$$= 870.25 / 49.5 + 870.25 / 49.5$$
$$= 1740.5 / 49.5$$
$$= 35.161616$$
$$\approx 35.162$$

Calculations for Table 10: **Chi-square values for monitoring search techniques.**

For the Catalogue:

Frequency	Observed (o_i)	Expected (e_i)
Rank 1-2	53	(86/3) = 28.7
Rank 3-5	15	(86/3) = 28.7
Rank 6-7	18	(86/3) = 28.7
Total	86	

$$\chi^2_{ob} = \sum_{i=1}^{n} \frac{(o_i - e_i)^2}{e_i} \quad \text{where i = 1, 2, 3.}$$

$$= (53 - 28.7)^2 / 28.7 + (15 - 28.7)^2 / 28.7 + (18 - 28.7)^2 / 28.7$$
$$= (24.3)^2 / 28.7 + (-13.7)^2 / 28.7 + (-10.7)^2 / 28.7$$
$$= 590.49 / 28.7 + 187.69 / 28.7 + (114.49 / 28.7)$$
$$= 892.67 / 28.7$$
$$= 31.103484 \approx 31.103$$

For Lists:

Frequency	Observed (o_i)	Expected (e_i)
Rank 1-2	41	(79/3) = 26.3
Rank 3-5	11	(79/3) = 26.3
Rank 6-7	27	(79/3) = 26.3
Total	79	

$\chi^2_{ob} = \sum_{i=1}^{n} \frac{(o_i - e_i)^2}{e_i}$ where i = 1, 2, 3.

$= (41 - 26.3)^2 / 26.3 + (11 - 26.3)^2 / 26.3 + (27 - 26.3)^2 / 26.3$

$= (14.7)^2 / 26.3 + (-15.3)^2 / 26.3 + (0.7)^2 / 26.3$

$= 216.09 / 26.3 + 234.09 / 26.3 + 0.49 / 26.3$

$= 450.67 / 26.3$

$= 17.135741$

≈ 17.136

For Displays:

Frequency	Observed (o_i)	Expected (e_i)
Rank 1-2	27	(80/3) = 26.7
Rank 3-5	21	(80/3) = 26.7
Rank 6-7	32	(80/3) = 26.7
Total	80	

$\chi^2_{ob} = \sum_{i=1}^{n} \frac{(o_i - e_i)^2}{e_i}$ where i = 1, 2, 3.

$= (27 - 26.7)^2 / 26.7 + (21 - 26.7)^2 / 26.7 + (32 - 26.7)^2 / 26.7$

$= (0.3)^2 / 26.7 + (-5.7)^2 / 26.7 + (5.3)^2 / 26.7$

$= 0.09 / 26.7 + 32.49 / 26.7 + 28.09 / 26.7$

$= 60.67 / 26.7$

$= 2.2722846$

≈ 2.272

For Library staff:

Frequency	Observed (o_i)	Expected (e_i)
Rank 1-2	30	(82/3) = 27.3
Rank 3-5	23	(82/3) = 27.3
Rank 6-7	29	(82/3) = 27.3
Total	82	

$\chi^2_{ob} = \sum_{i=1}^{n} \frac{(o_i - e_i)^2}{e_i}$ where i = 1, 2, 3.

$= (30 - 27.3)^2 / 27.3 + (23 - 27.3)^2 / 27.3 + (29 - 27.3)^2 / 27.3$

$= (2.7)^2 / 27.3 + (-4.3)^2 / 27.3 + (1.7)^2 / 27.3$

$= 7.29 / 27.3 + 18.49 / 27.3 + 2.89 / 27.3$

$= 28.67 / 27.3$

$= 1.0501832$

≈ 1.050

For Lecturers:

Frequency	Observed (o_i)	Expected (e_i)
Rank 1-2	34	(83/3) = 27.7
Rank 3-5	28	(83/3) = 27.7
Rank 6-7	21	(83/3) = 27.7
Total	83	

$$\chi^2_{ob} = \sum_{i=1}^{n} \frac{(o_i - e_i)^2}{e_i} \quad \text{where i = 1, 2, 3.}$$

$$= (34 - 27.7)^2 / 27.7 + (28 - 26.7)^2 / 27.7 + (21 - 27.7)^2 / 27.7$$
$$= (6.3)^2 / 27.7 + (0.7)^2 / 27.7 + (-6.7)^2 / 27.7$$
$$= 39.69 / 27.7 + 0.09 / 27.7 + 44.89 / 27.7$$
$$= 84.67 / 27.7$$
$$= 3.0566787$$
$$\approx 3.057$$

For Colleagues:

Frequency	Observed (o_i)	Expected (e_i)
Rank 1-2	43	(84/3) = 28
Rank 3-5	29	(84/3) = 28
Rank 6-7	12	(84/3) = 28
Total	84	

$$\chi^2_{ob} = \sum_{i=1}^{n} \frac{(o_i - e_i)^2}{e_i} \quad \text{where i = 1, 2, 3.}$$

$$= (43 - 28)^2 / 28 + (29 - 28)^2 / 28 + (12 - 28)^2 / 28$$
$$= (15)^2 / 28 + (1)^2 / 28 + (-16)^2 / 28$$
$$= 225 / 28 + 1 / 28 + 256 / 28$$
$$= 482 / 28$$
$$= 17.214286$$
$$\approx 17.214$$

For Workshops:

Frequency	Observed (o_i)	Expected (e_i)
Rank 1-2	4	(76/3) = 25.3
Rank 3-5	10	(76/3) = 25.3
Rank 6-7	62	(76/3) = 25.3
Total	76	

$$\chi^2_{ob} = \sum_{i=1}^{n} \frac{(o_i - e_i)^2}{e_i} \quad \text{where i = 1, 2, 3.}$$

$= (4 - 25.3)^2 / 25.3 + (10 - 25.3)^2 / 25.3 + (62 - 25.3)^2 / 25.3$

$= (-21.3)^2 / 25.3 + (-15.3)^2 / 25.3 + (36.7)^2 / 25.3$

$= 453.69 / 25.3 + 234.09 / 25.3 + 1346.89 / 25.3$

$= 2034.67 / 25.3$

$= 80.421739$

≈ 80.422

Calculations for Table 11: **Chi-square values for borrowing library materials.**

Frequency	Observed (o_i)	Expected (e_i)
Yes	53	(104/2) = 52
No	51	(104/2) = 52
Total	104	

$\chi^2_{ob} = \sum_{i=1}^{n} \frac{(o_i - e_i)^2}{e_i}$ where i = 1, 2.

$= (53 - 52)^2 / 52 + (51 - 52)^2 / 52$

$= (1)^2 / 52 + (-1)^2 / 52$

$= 1 / 52 + 1 / 52$

$= 2 / 52$

$= 0.0384615$

≈ 0.038

Calculations for Table 12: **Chi-square values for whether the closed access system prohibits the use of library materials by students.**

Frequency	Observed (o_i)	Expected (e_i)
Yes	50	(73/2) = 36.5
No	23	(73/2) = 36.5
Total	73	

$\chi^2_{ob} = \sum_{i=1}^{n} \frac{(o_i - e_i)^2}{e_i}$ where i = 1, 2.

$= (50 - 36.5)^2 / 36.5 + (23 - 36.5)^2 / 36.5$

$= (13.5)^2 / 36.5 + (-13.5)^2 / 36.5$

$=$ 182.25 / 36.5 + 182.25 / 36.5

$=$ 364.5 / 36.5

$=$ 9.9863014

$\approx$ 9.986

Calculations for Table 14: Chi-square values for tool-use difficulties.

Frequency	Observed (o_i)	Expected (e_i)
Yes	52	(98/2) = 49
No	46	(98/2) = 49
Total	98	

$\chi^2_{ob} = \sum_{i=1}^{n} \frac{(o_i - e_i)^2}{e_i}$ where i = 1, 2.

$=$ $(52 - 49)^2 / 49$ + $(46 - 49)^2 / 49$

$=$ $(3)^2 / 49$ + $(-3)^2 / 49$

$=$ 9 / 49 + 9 / 52

$=$ 18 / 49

$=$ 0.3673469

$\approx$ 0.367

APPENDIX G

INTRODUCTORY LETTERS

MAKERERE UNIVERSITY

P. O. Box 7062 Kampala
Uganda
Telegrams: "MAKUNIKA"

Tel: +256 -41- 531530
Fax: 531275/530134
E-mail: direct@easlis.mak.ac.ug

EAST AFRICAN SCHOOL OF LIBRARY
AND INFORMATION SCIENCE

Your Ref:

Our Ref:

13th May, 2003.

The Dean Faculty of Arts and Faculty of Science
Makerere University
Kampala

RE: **INTRODUCTION LETTER: Ms. KAKAI Miriam- 2001/HD05/204U**

This is to introduce to you the above named student who is our student at this School offering a Msc. in Library and Information Science.

As part of the degree course, She is required to carry out a research entitled: **" A study on the Information seeking behaviour of undergraduate students of Makerere University"**
The purpose of this letter is therefore to request you to allow her carry out research in your organisation.

All the information given will be for academic purposes only.

Yours faithfully,

Assoc. Prof. I M N Kigongo-Bukenya (DIP. LIB, MLS, MLIB, Ph.D.)
DIRECTOR

IMNKB/sa