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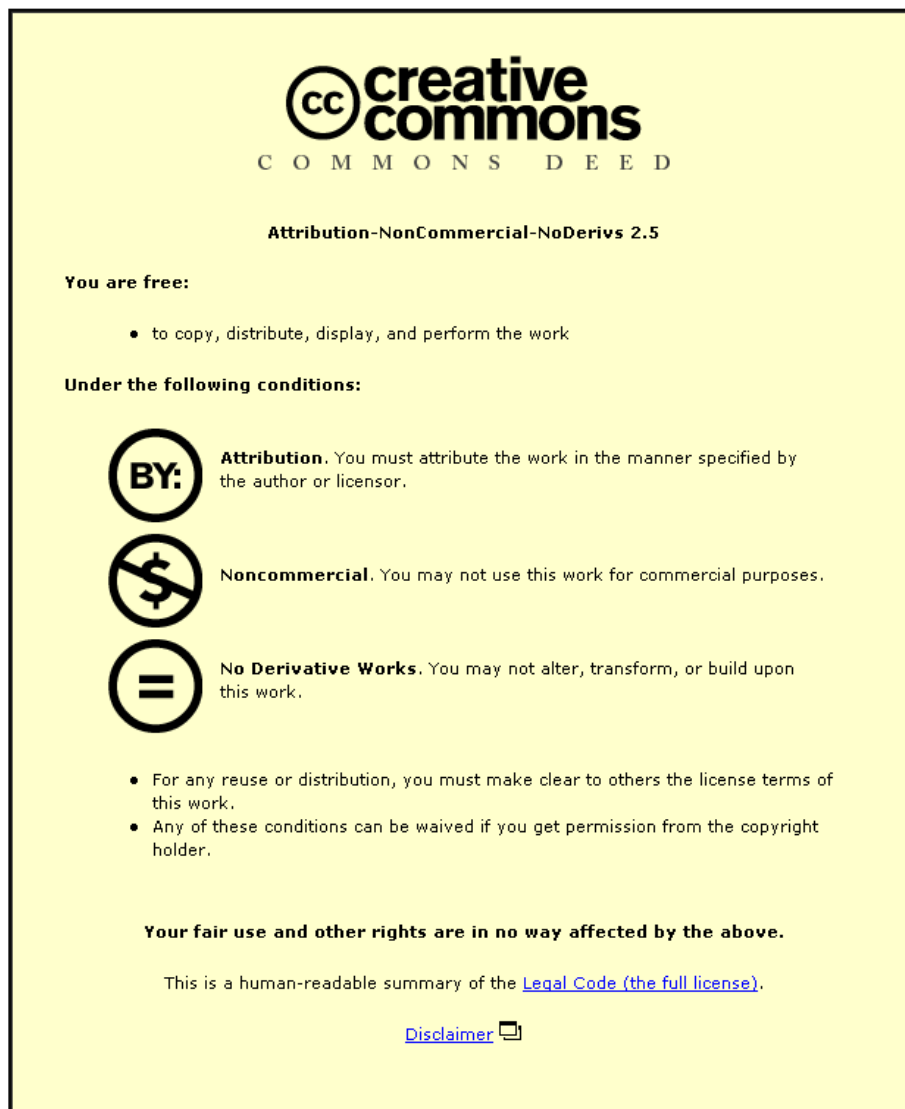
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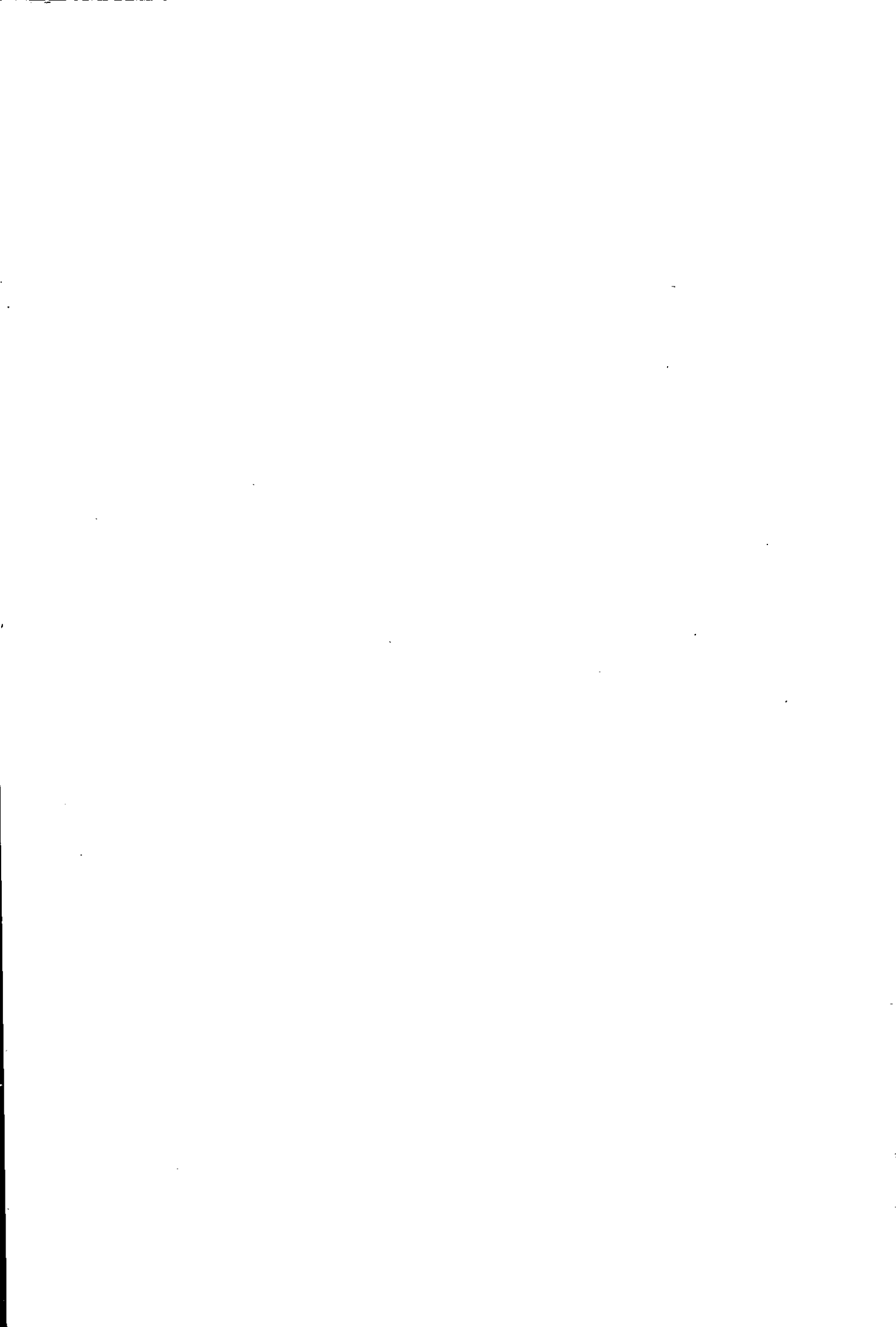
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Developing Information Literacy Programmes for Public  
University Libraries in Tanzania: a case study of the University  
of Dar es Salaam

by

Evans F. Wema

Submitted in partial fulfilment of the  
requirements for the Award of Doctor of  
Philosophy of Loughborough University

September 2006

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## **Abstract**

The aim of the research was to develop a training course that inculcated information literacy that could be implemented by staff at the University of Dar es Salaam library (Tanzania), in order to provide students with appropriate information literacy skills to meet their educational goals. The course was developed from an integration of knowledge from information behaviour research and educational theory with current perspectives of information literacy from Information and Library Science (ILS). The ultimate goal of the research was to create a framework that would be used by public university libraries in Tanzania to teach information literacy courses. The study was carried out in two parts. In the first implementation "pilot" programme, the course was tested by involving librarians who took the entire course, in order to see whether the same course structure could be used to implement to the Masters of Education students. Following adaptations made on the first course, a second course programme was implemented to Masters of Education students by two librarians who attended the first implementation "pilot" programme. Therefore, the success of the course was partly judged on whether it effectively enabled knowledge transfer from the librarians to students.

Data collection methods were predominantly qualitative, although quantitative methods in terms of diagnostic tests were also used. The tests were used to evaluate trainees' knowledge of information literacy before and after the course to provide an indication of changes in knowledge. Qualitative methods used included semi-structured interviews with librarians and academic staff at the University of Dar es Salaam in Tanzania in order to make sure that assumptions made about students' knowledge of information literacy and the kind of problems experienced by students were correct. Other methods included quizzes, exercises, group reflection and presentations that related to each stage in the course. These methods served to indicate trainees' understanding of what was taught, reflections on the learning process and provided feedback for improvements on the course.

The major findings showed that there was a recognized need for information literacy and that problems such as unfamiliarity with categories of information sources, analysis, synthesis, evaluation and use, were experienced in Tanzania as was the case in other "Western" countries. In addition, librarians were able to

transfer skills learned to students, who in turn used the same course materials to teach fellow students who did not participate in the course. Furthermore, the design of the course was facilitated by the integration of Information and library science (ILS) approaches to information literacy with the knowledge of information behaviour and pedagogic theory. The thesis provides recommendations for the library and information curricula to introduce information literacy, teaching information literacy in a holistic way and with librarians participating in teaching and research. In addition, the study recommended that librarians should facilitate the development of information literacy in primary and secondary schools.

**Keywords:** Information literacy; information seeking behaviour; information literacy models; information behaviour research; problem-based learning; information literacy culture; thinking skills; peer-to-peer shared learning; scaffolding.

## **Acknowledgements**

I would like to thank Dr. Mark Hepworth and Professor Cliff McKnight for their guidance, support and good humour over the last three years. They made me realize I could accomplish what I put in my mind despite all the difficulties I went through. Thank you both for your efforts.

Professor John Feather, my Director of Research, for providing advice and guidance. Commonwealth Scholarship Commission in the UK for providing me with a scholarship. The Department of Information Science staff, and my fellow research students for their advice and support.

I am grateful to Dr. D. Bawden, my external examiner, and Dr. D. Stephens, internal examiner

I would also like to thank Mrs Christine Hayes, International Students Welfare Advisor, the British Council Manchester and Mr. Martin Mathew, Loughborough University Student Advisor for their advice and encouragement.

This study would not have been made possible without the enthusiasm, kindness and involvement of library staff of University of Dar es Salaam, and in particular Prof. E. Kiondo, Prof. J. Nawe, Mr. J. Kilemile, Mr. L. Malongo, Mr. E. Nyari, Mr. D. Itambu, Mr. D. Magige, Ms. E. Nkonoki, Ms. Z. Ramadhani and Mrs. K. Katunzi-Mollel

Special thanks to my wife Ruth and children, Frank and Dorica for their love, prayers, encouragement and support. And especially to Dad and Mum, Frank and Grace Wema, my sisters Elizabeth, Mariam, Anjelina, Catherine, Tumaini, Martha and Monica, for instilling in me a desire to learn, to reach higher and achieve my best. My friends Maxwell Mwakitalu, Dr. William Anangisye, Mr. Tim Ndezi, Dr. Sahm Nikoi, Mr. Peter Gatiti, Mr. Fred Ngolemasango, Dr. Wasmiya Dalhem, Dr. Balasubramanian Kandasubramanian and Miss Narumol Ruenwai for their moral and spiritual support. Above all, my God, Almighty, for making everything possible.

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## **1.0. CHAPTER ONE: INTRODUCTION TO RESEARCH PROBLEM**

The effectiveness of information literacy training courses in tertiary institutions is highly dependent on a proper course design. Recent developments due to information explosion has made it necessary for users to possess the right information seeking skills to effectively identify, search, retrieve and use information. In addition, library and information services worldwide incur a lot of expenses due to increased use of online resources and supporting ICT facilities, which require users to make maximum use of these resources profitably. These conditions require an information literacy programme which is designed in a way that equips learners with lifelong learning skills. These skills could be acquired through learning approaches that encourage critical thinking and independent learning.

### **1.1. Background to the problem**

Many studies have been carried out in the information seeking and behaviour field, for different categories of users, such as academicians, scientists, lawyers, engineers and many others (Majid & Tan, 2002). Studies that were conducted in the above mentioned categories of users dealt with different problems. These included the improvements of the information systems and information retrieval systems, and some studies developed models to assist authorities in the information science field to meet the above requirements. The models developed out of various studies conducted, reflect similar behavioural features with varying aspects of information needs and seeking aspects. One basic characteristic of most studies and the resulting models is that they tend to draw attention to the context in which they were carried out. For example researchers and authors who originate from electronic resources such as Marchionini (1995) pay much attention to behaviour features demonstrated by users with electronic information resources. On the other hand, those who specialize in information retrieval background such as Spink (1997) focus on the way users interact with the information systems. The same applied to those who were inclined to librarianship or information science fields. Very few non-librarians in Africa have carried out information seeking behaviour studies to study specific information user groups in the African context.

There is abundant literature on information literacy worldwide. Various initiatives and research projects on the same have been carried out in Europe (Johnston & Webber, 2003; Andretta, 2005; Smith & Hepworth, 2005); Australia (Bruce & Candy, 2000; Bruce, 2001; Council of Australian University Librarians (CAUL), 2001; Bundy, 2004), America (Doyle, 1994; Breivik, 1998; Spitzer, *et al.*, 1998; Seaman, 2001; McCartin & Feid, 2001). Most of the literature outlined above did not conduct studies that indicated how to design information literacy courses based on the the integration of various theories of information behaviour with education theories and academic Information and Library Science (ILS) perspectives of information literacy. Various studies conducted in the areas of information seeking behaviour and information literacy (such as Cheuk, 1999; Case-Smith & Powell, 2003; Limberg, 1998 and others), could have highlighted the implications of their findings for information literacy programs by showing how they could be implemented or improved, but do not. One exception is where students' information behaviour has been studied by Kuhlthau (1993) with a resulting model being used in several information skills programmes. The model by Kuhlthau advocates problem-solving skills, however it does not provide a clear indication of how to apply various pedagogical practices such as reflective learning and key thinking skills associated with independent learning and creative thinking to enable students acquire the skills. Few studies have attempted to identify searching behaviour to discover differences in search experiences (Fitzgerald & Galloway, 2001). Others have attempted to demonstrate how reflective learning could aid effective searching on the Internet (Edwards & Bruce, 2002), hence emphasizing the importance of bringing together learner centered experiential and reflective approaches to the information literacy education process. Edwards & Bruce (2002) realized the need to utilize numerous approaches to teaching and learning information literacy (such as face to face teaching) and using models for teaching and learning information literacy in action-based approach. Even studies which have attempted to demonstrate practical approaches to effective use of various teaching and learning methods (such as tests and quizzes) and integration of library and information science concepts of information literacy, with pedagogical practices which encourage higher order thinking skills (such as Andretta, 2005), have not encompassed knowledge from information behaviour research.

Various standards and models of information literacy have been developed and widely used by higher education institutions to support teaching and learning information skills. With the launch of problem-based and project-based learning as the principal study methods, student-focused and group based learning, experiential and reflective approaches to the information literacy education process have been employed by various higher education institutions in Europe, Australia and USA (Oliver & McLaughlin, 1999; Edward & Bruce, 2002, Denis, 2001, Skov & Skærbak, 2003). These and various other approaches to teaching and learning information literacy courses have resulted in positive changes in student performance on objective measures of information-literacy skills and there has been a significant increase in the levels of confidence of the student in performing those skills. However, the challenge that most developers of information literacy courses face today is “*to provide proof that the skills make a difference to short and long term learning outcomes*” (Bundy, 1998, 9).

There is quite a number of research studies carried out in the field of librarianship and information seeking behaviour in academic environment in Africa. These include studies by Fidzani (1998): Ocholla (1996), Adeibu & Adio (1997) and Badu (1991). In these studies, much emphasis has been on information sources (books, journals, research reports and other printed sources) and channels (libraries, colleagues) and very few such studies dealt with electronic resources. Some of these studies such as Badu and Fidzani showed a need to provide instructions to users in locating library resources, and integrating library user education into university curricula. There have been few studies that have attempted to highlight information literacy initiatives in Africa (Karelse, 2000; Underwood, 2002). These and other similar studies have so far indicated challenges associated with the rote and authoritarian teaching/learning styles of information literacy in promoting independent and life long learning (Karelse, 2000). Apart from these, there has not been any study carried out in Tanzania and perhaps very few in Africa, on designing and implementing information literacy programmes on the basis of knowledge from information behaviour research and educational theory with current Information and Library Science perspectives of information literacy.

### **1.1.1. The structure of information literacy programmes in African academic institutions**

Many developing countries in Africa do not enjoy the advantages brought about by current information technology as is the case with developed countries. Being too few and not professionally strong enough, teacher-librarians in developing countries are not in a position to use their information literacy knowledge and skills to develop meaningful information literacy programs and projects that would lead towards optimal exploitation of the available information resources (Pejova, 2002). Due to lack of finance, poor information resources and lack of possibilities for needed continuous upgrading of the professional knowledge and skills, many information literacy programmes are being run with difficulty. The availability of both physical and intellectual resources is an important factor in developing information literacy programmes. Resources can be used to create learning activities that facilitate critical interaction with, and understanding of, the information environment.

Despite the above shortfalls, information literacy programmes are a necessary tool to prepare students to become independent and life long learners. There is still a need to find ways to meet information literacy needs of developing countries. Gorman (2003) argues that the main emphasis should be to teach information literacy in the way that people can be able to utilize the information they access locally, regardless of the format in which the information is presented. This argument is further stressed by Oberg (2001, 4) as follows: *“There is no one best model or approach to education for media and information literacy. Each school’s approach will be shaped by the school’s curriculum, the needs of the students and the resources available for its implementation”*.

A few initiatives have been carried out in Africa to develop information literacy programmes in academic institutions. In South Africa the creation of life long learning was seen to be an effective measure to transform the educational system from passive learning to student centered learning. The Cape Library Co-operative (CALICO) project which combined the libraries of Western Cape tertiary institutions was established in 1992, with a view to developing a regional network

of information services (Sayed & Jager, 1997). This project was established as a way to facilitate the utilization of limited resources available in member institutions and weaknesses noted in access and information management. The result of this framework gave birth to INFOLIT, an information literacy project whose purpose was to benefit the co-operative's information resources and maximise the gains of networking. In his report which emphasized a need to establish the INFOLIT project, Breivic et al (1992, 22) pointed out that “...*only access to a rich base of information resources in many formats can allow a move away from the traditional lecture/textbook/short loan/reserve teaching approach that currently characterizes the great majority of course delivery styles. A rich base of information resources is necessary to design assessments that develop students' information accessing and evaluative skills . . .*” INFOLIT was thus launched in 1995 in order to promote information literacy in the Western Province tertiary institutions (Karelse, 2000). The primary objectives of this project included (Underwood, 2002, 5):

- “promoting the concept, value and importance of information literacy in the context of globalization and redress to key players in the region”;
- “launching a series of pilot projects which explore and establish various means of spreading information literacy education in the region”;
- “investigating information literacy models, programmes and initiatives in other countries that could be adapted to local conditions”.

The impact of this project has been felt in a number of activities carried out within the five institutions. INFOLIT assisted to create awareness of the information literacy programmes amongst librarians through holding workshops around the region that involved faculty and library staff. In the workshops, issues such as educational transformation, redress and the impact of Information and Communication Technologies (ICTs) were discussed. Also faculty and library staff have been working on the principal method of capacity development under the belief that development of the curriculum is best undertaken with the specific needs of each discipline in mind. In recognition of the importance of information literacy, the University of Cape Town established the Centre for Information Literacy, being part of its Centre for Higher Education Development (Underwood, 2002).

As a result of the INFOLIT project, a set of pilot projects undertaken by academics in the five institutions were funded. The projects were aimed at improving undergraduate teaching and learning with an implied design requirement of generating cooperation between institutions. Activities under individual projects included the following (Underwood, 2002):

**Access course to promote visual literacy (Cape Technikon):** This pilot was developed to promote visual literacy at the Cape Technikon. In this respect, a peer counselling approach was established, whose aim was to integrate the learning of information literacy skills into the course.

**Accessing the INSPEC database to improve information literacy (University of Cape Town):** this project dealt with access to the INSPEC database at each of the five institutions. A computer system with a CD-ROM drive, which also included the INSPEC database at all institutions, was put in place to enhance access to the information base for students. This resource was incorporated into courses and was geared towards enhancing students' information skills in various fields.

**Arts information literacy package (University of the Western Cape):** This was focused on students of the Faculty of Arts but it was initially intended to be of use to students of the humanities across the five institutions. The project involved the development of a set of information literacy materials which were integrated into the curriculum. Lecturers, the Bibliographic Instruction Unit and Academic Development Centre staff at UWC participated in information literacy activities. Sets of materials included lesson plans designed for lecturers and tutors, and materials to be given directly to students, such as handouts or worksheets. The materials consisted of a combination of video and print materials.

**Building Web-based resources to improve biological information literacy:** This project paid attention to meeting the needs of teachers and students of biology for suitable information literacy learning materials and also the promotion of the use of the Web for distribution and use of information on biology. The aim of this project was to support meaningful learning of both discipline-specific material and information skills needed to access such material. An information base was developed in order to be used at both secondary and tertiary levels to ensure that IT

was used in a way which developed effective learning. The project was located in the Biochemistry and Botany departments at UWC and worked in partnership with the Computer Science Department to produce the interactive information bases.

**Development of Africa: 1300 AD (University of Cape Town):** this project was carried out by the Research Unit for the Archaeology of Cape Town (RESUNACT) in a joint venture with the Mayibuye Centre of the University of the Western Cape and the African Studies Library of the University of Cape Town. It was based on a multi-media education whose aim was to teach all students in South African universities about African information about Africa. The outcome of this project was a multi-media presentation on CD-ROM with an accompanying set of booklets.

**Development of an information laboratory for Electrical Engineering (Peninsula Technikon):** the intention was to come up with a Web-based information source for students, using multi-media facilities. It helped students in information handling in electrical engineering at Peninsula Technikon.

**INFOLEX: an undergraduate law information literacy course (University of Stellenbosch):** This course aimed to incorporate information literacy training into a modified undergraduate law course offered to students, in order to develop a best practice model which could be copied and used by other institutions. An Information Literacy Work Group that included the library service, the Law Faculty, IT personnel, the Department of Library Science and representatives from the student body was established to run the project.

**Information society: tools and skills course (University of Cape Town):** this project aimed to develop a single-semester course for first year students in the Social Sciences, to equip them with transferable learning and information skills. It also investigated how information literacy impacted on student learning by pre- and post-testing students who took the courses. Aspects covered in this course included an introduction to the information age and its impact upon society. A Web-based version of this course was also developed and used in association with the University of the Western Cape.

**Integrated academic literacy programme (Peninsula Technikon):** The purpose of this programme was to integrate information literacy education with an introductory exposition on engineering. The course examined various ways of developing information literacy among students having a special subject focus.

**Search engines of the Internet (University of the Western Cape):** The project aimed to develop a number of hypermedia modules to acquaint and assist students as well as academic staff to utilize the Internet facility within specific subject areas. The project also intended to make the course available on the Web. A set of hypermedia courseware simulations to familiarise students with the critical use of search engines was developed.

Another achievement through INFOLIT was the establishment of Yenza, a Subject Based Information Gateway (SBIG) for the Centre for Science Development. This interface was developed by a group of academic staff from the University of Cape Town and Peninsula (Yenza, 2000). Yenza is an attempt at creating a combination of activities, aimed at developing young researchers as information literate persons.

Also, as part of its regional venture, the INFOLIT Project sponsored the development of a Web-based information literacy course. The site teaches students how to find, evaluate, use and communicate information. It is available at all five of the tertiary institutions in the Western Cape Province. The main topics covered in this course include:

- Starting out
- Finding information (information finding tools/systems and information sources)
- Evaluating information
- Legal use of information (plagiarism and copyright)
- Communicating the information.

The details of the contents of this course are available through the following link:  
<<http://www.lib.uct.ac.za/infolit/>> [accessed 03/01/2006]

In spite of the above activities that show some degree of achievement, a study that was carried out in 2001 to determine measurable competencies in information



literacy of students in tertiary education in South Africa discovered a number of short falls. One was that the provision of courses or modules in information literacy in tertiary education in South Africa was not regular. Also various educational institutions in South Africa did not recognize the importance of this initiative and therefore did not include it in their mission statements and strategic plans. It was also realized that lack of funds to run information literacy programmes played a big role in stagnating all programmes (Underwood, 2002).

A few other African academic institutions have implemented some forms of information literacy programmes. Yet very little has been written on recent development of information literacy programmes in many African countries. Below are a few examples of countries that developed some forms of information literacy programmes.

The University of Malawi Chancellor College library has been carrying out library user training programmes to introduce first year students to the facilities available in the library (Matenje, 1995). Other college and university libraries that carry out such programmes in Southern Africa include Zambia, Botswana, Lesotho, Swaziland, Namibia and Zimbabwe. These institutions face similar problems such as inadequate number of professional staff to conduct user education training, limited time allocated for the programme, lack of support from the teaching staff and also user education training has not been compulsory in most institutions (Fidzani, 1998).

In Kenya, public university information literacy programmes have included library orientation (mandatory), library instruction courses, individual instruction on reference services, and use of library manuals and guides. These programmes are nevertheless hampered by lack of financial and human resources and inadequate support by parent organisations in terms of both policy and material. Failure by librarians in these universities to push to the fore information literacy as being a function of the university library is another major snag. Also lack of financial and human resources hinder their ability to develop computer skills. With an absence of institutional policies as far as information technology is concerned, libraries find it hard to mount effective training in the use of information sources for their users

(Kavulya, 2003). In Ghana, library user education at University of Cape Coast (UCC) library promoted and facilitated effective use of recorded information in all formats by users (Korsah 1994). In Nigeria, many universities conducted library instruction to patrons as part of library services. Yet while many libraries in the USA are reporting innovative instruction programmes incorporating learning styles, strategy and new technologies, library use instruction programmes in countries such as Nigeria are in their infancy (Iroka, 1990).

The above analysis of the structure of information literacy programmes in Africa indicates that most programmes focus on the resources available in libraries. However, with the advancement of science and technology through the availability of ICTs, most of such programmes in African university and college libraries must be further developed to prepare students to become independent and life long learners by focusing on current needs, available resources and future trends in information services.

## **1.2. Overview of information literacy programmes in public university libraries in Tanzania**

The overview below is based on research findings carried out by the International Network for the Availability of Scientific Publications (INASP, 2004) and Manda (2005) to assess the development of information literacy programmes in academic institutions in Tanzania, since no other kind of study similar to this has been carried out in the country.

The development of information literacy programmes in public university libraries in Tanzania is a result of library user training programmes that were conducted before electronic information services came into existence. Each library organized library user training programmes for various target groups of users. During the programmes students were introduced to the variety of user services. These include traditional bibliographic instructions, access to various library collections, reference services and others facilities such as printing, photocopy and photographic services.

With the advent of electronic information services, the situation has changed in most of these institutions. In 1999, the INASP assisted research partners and

librarians in Africa, Latin America and Asia in the design and implementation of a programme of complementary activities to support information production, access and dissemination utilizing information and communication technologies (ICTs). This initiative gave birth to the Programme for the Enhancement of Research Information (PERI). Its main objectives were:

- To facilitate the acquisition of international information and knowledge;
- To improve access to research through the promotion of national and regional journals;
- To provide awareness or training in the use, evaluation and management of electronic information and communication technologies (ICTs);
- To enhance skills in the preparation, production and management of journals (Ballantyne, 2004).

A full programme began in 2002 and the above objectives are being fulfilled by a number of interlinked activities. Among them is enhancing ICT skills in which a number of workshops are being organized and run by participating universities, concentrating on the following areas:

- Introduction to using the Internet
- Electronic Journals and Electronic Resources Library Management
- Accessing Information in Developing Countries
- Electronic Information Resources for Health Workers
- Web Page Design and Authoring
- PC Troubleshooting for Library Personnel
- Introducing the Internet for Public Libraries in Africa

In Tanzania the PERI programme was introduced into several academic and research institutions. Among the academic institutions that benefited from this programme included University of Dar es Salaam (UDSM), Mzumbe University (MU), Sokoine University of Agriculture (SUA) Muhimbili University College of Health Sciences (MUCHS) and the University College of Lands and Architectural Studies (UCLAS). The Universities of Dar es Salaam, Sokoine and Mzumbe are the main public universities in Tanzania while MUCHS and UCLAS are constituent colleges of the University of Dar es Salaam. All libraries in these institutions (except UCLAS) provide training to end users in the use of electronic resources as

part of the PERI programme. The universities of Dar es Salaam and Sokoine adapted the PERI programme workshop modules and teaching materials into their ongoing information literacy programmes, focusing on introduction to using the Internet, access to electronic journals and resources and searching skills for electronic resources. The main emphasis is on the access, evaluation and using electronic information resources. These training programmes are run hand in hand with those which are not associated with electronic resources (for example how to locate resources in various library collections, using reference and special collections and services). The end user training is mainly conducted through short seminars, workshops or informally when users come to the library. In some libraries students and staff are requested to register for the training on a voluntary basis. In some specific cases faculty members request the library to organise special training to groups of students in particular subject disciplines (Manda, 2005).

The training conducted by the library in the use of electronic resources in most of the institutions mentioned above is done by ICT staff in the institution (where there is no ICT section in the library) in collaboration with library staff or ICT section in the library where such units exist. The common training structure of end-users is a short presentation followed by longer sessions of hands on experience and some form of assignments. The end-users are normally divided into groups and by degree programmes. The training of end-users is often conducted in the libraries or computer labs depending on the local situation. At UDSM Main Campus and SUA end-user training is conducted during orientation and term time. At the two libraries the focus of end-user training has been the graduate students and the teaching staff.

The course modules are divided into several categories, depending on the type of electronic resource users are trained to use. These include the use of library OPAC, Internet, access to CD-ROM databases and online resources such as journals, abstracts and current awareness services. Most library staff have received some training in the use of electronic resources. At UDSM Library all library staff with diploma and above level of professional qualifications have been trained in the use of electronic resources. At UCLAS not all library staff have been trained in the use of electronic resources. The training in the use of electronic resources in these libraries is being undertaken by a variety of agencies. The agencies included

computing centres in the institutions; facilitators from outside the country; organizations conducting short courses; library staff through in-house training programmes; overseas institutions and visiting scholars or researchers to institutions. In some institutions individuals who have attended these workshops or courses have been able to transfer to their colleagues the skills they have learnt. However, there were no reports to indicate whether individuals from other institutions have been able to transfer the skills they acquired from these courses.

Access to and availability of PCs has an influence on the use of electronic resources. There are high levels of access to PCs connected to the Internet among teaching staff in most of the institutions (with the exception of MU). The ratio is almost 1:1 and the PCs are often located in the offices of individual staff member so that they are conveniently available for use. Also there is a relatively good availability of PCs for students in some of the institutions. However, access to the PCs for students is often limited by the restricted opening hours and in some cases computer usage charges. The hours of operation are from around 8.00 am in the morning to around 4 or 6 pm for most of the institutions. Only MU and University of Dar es Salaam Computing Centre (UCC) have liberal hours of operation which are from around 8.00 am to 10.00 pm. The restrictions on opening hours have been due to staff shortage and security problems. Although the availability of PCs within the institutions is fairly good, the numbers of computers that are available to users in the libraries are on the whole not satisfactory. Additionally, the free access to PCs in some of the libraries at times means that users can only use the PCs for a limited time. For example, at UDSM Main Library users can use the computers for half an hour at a time, although this can be extended if there are no other users queuing for the service. Plans are underway in most institutions for improving PC-student ratios.

### **1.2.1. Challenges to information literacy programmes in public university libraries in Tanzania**

As pointed out in the above section, a short survey was carried out by INASP in public university libraries (and other participating academic institutions into PERI programme) in Tanzania to assess PERI related activities. Although the survey was not primarily intended for information literacy programmes, a number of issues that were raised portrayed a clear picture of main features of these programmes, which

were referred to as weaknesses of end-user training programmes in the institutions mentioned above. One of them was that most training programmes were not based on the curriculum needs. These programmes put much focus on IT use and information retrieval techniques with less emphasis on critical thinking skills. Aspects covered include the ability to use a computer, elementary familiarity with information technology, basic knowledge about the Web's search tools, information search skills in electronic resources such as online journals, index and abstracts on CD-ROM databases and the ability to find certain publications in a computerized library catalogue. Less emphasis was put on other techniques such as adaptation of an appropriate investigative method for observing phenomena or utilization of technologies such as statistical software or simulators to create artificial conditions in order to observe and analyse the interaction of phenomena. These approaches are crucial when dealing with a specific group of students such as mathematicians, archaeologists, social scientists and many more.

The use of different approaches in information literacy programmes is important since students need to have chances for seeking, evaluating, and managing information gathered from multiple sources and discipline-specific research methods (ACRL, 2000). The importance of linking information literacy programmes to institutional curriculum needs has been acknowledged by ACRL (2000, 3) that *"achieving competency in information literacy requires an understanding that this cluster of abilities is not extraneous to the curriculum but is woven into the curriculum's content, structure, and sequence."* Moreover, there has not been any evaluative programme to assess these programmes to see whether or not they meet curriculum needs. In the above situation, it becomes difficult for trainers to recognize information needs of particular library users, which is a necessary factor to consider when teaching them how to get the needed information.

In addition to the above problems, most institutions experienced the lack of a programme for the entire community. Training focuses on particular groups such as graduate students whom the library staff thinks need the training most. However, without a comprehensive programme the most appropriate period for the training of end-users was not taken into consideration. For example, when UDSM library conducted a series of training workshops at the end of the second semester for

graduate students who were embarking on writing their dissertation proposals after completing their course work, the major complaint from participants was that the training should have been done during the first semester. Most of the seminars run for few hours in duration and participants kept on complaining that time was not adequate (Manda, 2005).

The survey also discovered that several faculty members complained that despite attending these programmes, students were unable to use the skills gained to be able to search, evaluate and use resources in the libraries. They still relied on their lecturers to dispense information. The same problem had been noted by librarians who attended to users' needs in the libraries.

### **1.3. Statement of the Problem**

The Tanzania National Higher Education Policy (MSTHE, 1999, 3) states that: *"universities, as the highest level of institutions dedicated to the professional and intellectual development of mankind and society in general, are expected to concentrate on research, teaching and public service or consultancy"* One way of reaching the above expectations is satisfying information needs of faculty and students who are involved in teaching, learning and research. This can be ensured if students acquire information literacy skills that will enable them *"to recognize that accurate and complete information is the basis for intelligent decision-making, recognize the need for information, formulate questions based on information needs, identify potential sources of information, develop successful search strategies, access sources of information, evaluate information, organize information, integrate new information into an existing body of knowledge, and use information in critical thinking and problem solving"* (Doyle, 1992, 2). Although public university libraries in Tanzania organize and conduct information literacy education with students, the training does not efficiently meet the goals stated above by Doyle. Most courses organized lack coherent structure and do not focus on any particular pedagogic practice such as reflective learning and thinking skills associated with independent learning and creative thinking. They are neither problem-based nor subject-focused and their impact has not been clearly demonstrated. One of the reasons for such weaknesses could be attributed to the failure by the libraries to

design programmes that specifically assist students to meet their learning objectives. There is therefore a need to investigate students' information literacy requirements and problems associated with information literacy skills and their study. This should assist in designing an information literacy course programmes that will enable students to meet their learning objectives and equip them with relevant skills for independent life long learning. It is due to the weaknesses highlighted above, that this study attempted to find out whether a combination of various teaching/learning methods, together with the integration of information and library science concepts of information literacy, educational theories and information behaviour research would assist the design, teaching and learning information literacy at the University of Dar es Salaam, Tanzania.

#### **1.4. Aim and objectives of the study**

This study aimed to develop a training course that inculcated information literacy that could be implemented by staff in the library in order to provide students with appropriate information literacy skills to meet their educational goals.

#### **1.5. Specific Objectives**

- (i). To solicit views from librarians and lecturers on students' information literacy skills.
- (ii). To identify gaps in the literature that would give reasons for the need to design a suitable information literacy programme.
- (iii). To define a model of information literacy to aid the design and teaching of information literacy programmes.
- (iv). To develop an information literacy programme based on a revised model.
- (v). To assess the impact of the information literacy course designed.
- (vi). To recommend ways by which information literacy programmes could be more successful.

#### **1.6. Research questions**

- (i). What is the nature of the ongoing information literacy skills programme at the University of Dar es Salaam?
- (ii). What are the problems associated with students' information literacy skills?



- (iii). What are the gaps in the literature that give reasons for the need to design a suitable information literacy programme?
- (iv). What should an information literacy programme teaching model consist of?
- (v). Which information literacy skills should be included in the course programme?
- (vi). How should the information literacy course programme be implemented?
- (vii). What should be covered in an information literacy programme?
- (viii). What are the appropriate methods of teaching information literacy?
- (ix). To what extent has the designed information literacy course programme enhanced students' information literacy skills?
- (x). What would facilitate the teaching and learning of information literacy in Tanzanian public universities?
- (xi). How should public universities in Tanzania organize information literacy courses?

### **1.7. Significance of the study**

The current literature on information literacy programmes in developing countries, particularly Africa, reveal few studies that highlight current activities undertaken by universities in running information literacy programmes. There is a lot on library user studies, user instructions or library orientation programmes. These programmes are geared towards making users access information sources and services available in libraries independently, effectively and more efficiently (Fidzani, 1998). However, information literacy should go beyond that. Wooliscorft (1997, 8) argues that *"library skills do not generally cover the broader contextual elements and the higher-level analytical skills required to effectively extract and exploit information in a way that will withstand appropriate scrutiny"*. Literature further indicates that there have been numerous studies indicating tremendous increase in information skills in academic institutions in other parts of the world, mostly Europe, America and Australia. Information literacy skills, according to various studies, have been designed and implemented using various delivery methods, face to face, online tutorials and other courseware (Oliver & Omari, 2001; Brown & Krumholz, 2002; Johnston & Webber, 2003; Andretta, 2005). These studies indicate also the usage of various information literacy models and frameworks for course design. Most of the above studies have been carried out within a recognised growing challenge of how

to effectively deliver information literacy skills to meet long term learning goals of learners. However, these studies indicate a need to further carry out research to find more effective ways of teaching and learning information literacy through employing various approaches to course designs.

This study investigated ways by which information literacy programmes in public university libraries could be designed, implemented and evaluated. The investigation of students' information literacy knowledge helped to customize generic course material to reflect local context. The design of the integrated course considered the use of various teaching and learning methods such as quizzes, diagnostic tests, group presentations and reflective sessions. These methods helped to evaluate the course in terms of its short and long term effectiveness in facilitating students' information literacy skills.

The relevance of this study lies in how to design, implement and evaluate aspects of information literacy courses for academic institutions in Africa. It was intended to help identify ways by which a course design, through integrating theoretical aspects in information behaviour research, concepts of information literacy and educational theories would facilitate teaching and learning information literacy. It provided various approaches as to how an information literacy course could be implemented and evaluated. It further helped to demonstrate practical aspects of employing numerous methods of teaching and learning information literacy through reflections and communication among learners.

### **1.8. Research methods**

This was predominantly qualitative research which investigated *why*, *what* and *how* type of questions (although quantitative methods in terms of diagnostic tests were also used). It took action based research and case study approaches. Action research, according to Hult & Lennung (1980, 245)

*“... simultaneously assists in practical problem-solving and expands scientific knowledge, as well as enhances the competencies of the respective actors, being performed collaboratively in an immediate situation using data feedback in a cyclical process aiming at an increased understanding of a given social situation, primarily*

*applicable for the understanding of change processes in social systems and undertaken within a mutually acceptable ethical framework”.*

According to Yin (1994), a case study is an empirical enquiry that investigates contemporary phenomena within its real-life context, when the boundaries between phenomena are not clearly evident and of which multiple sources of evidence are used. This study used interviews, diagnostic tests, quizzes, reflective exercises, group work and reflections as main data collection tools. Further discussion on methods is presented in the research design section (chapter four).

### **1.9. Scope and limitation of the study**

This study limited itself to designing, implementing and evaluating an information literacy course based on integrating Information and Library Science conceptions of information literacy, educational theory and information behaviour research at the University of Dar es Salaam - Tanzania. Detailed elaborations on the rationale for the above choice of study population are discussed in chapter four under 4.7.

## **2.0 CHAPTER TWO: LITERATURE REVIEW**

### **2.1 Introduction**

This chapter reviews the literature on aspects of information behaviour, particularly related to academic environments, theories and practices of information literacy and learning theories.

The review provides an overview of user studies in library and information science and its relationship with information literacy and information behaviour. Various information behaviour studies, both general and particularly within academic environments are discussed. In addition, the review covers various aspects of information literacy in which various studies on the applications of approaches to information literacy have been explained. Different aspects of information behaviour, information literacy and education theories have been reviewed by discussing various models and associated frameworks and how they have been applied in various situations. This chapter also highlights gaps in the literature which have posed challenges associated with user studies and information seeking behaviour research, teaching and learning information literacy. Furthermore, the relationship between aspects of information behaviour, theories and practices of information literacy and education theories has been demonstrated through the integration of various elements from the three aspects. These elements have been used to indicate how an information literacy teaching and learning framework could be developed.

### **2.2 Overview of user studies in library and information science**

A user study is quite a broad term that covers a very wide range of issues in Library and Information Science. It includes, for example, how users select books from shelves in a university library, how they respond to on-line search results, and covers the detailed examination of the primary needs that result in information-seeking (Wilson & Allen, 2000). This fact can be drawn from evidence in different studies carried out in the area of Library and Information Science in the past four decades. User studies have shifted in terms of research design and concepts. Research in user studies has changed from macro approaches, i.e. carrying out

studies of larger groups by using questionnaires and structured interviews to micro approaches, in which studies have been carried out by studying smaller groups with the use of unstructured interview methods (Dervin and Nilan, 1986). According to Wilson (1994), the term user studies together with information needs and information seeking behaviour are associated with wide ranges of problem areas such as studies concerned with improving an information system, user education, information retrieval and design, and many more. This section will highlight a few issues associated with user studies, which include the user and information needs, information seeking and searching, information seeking and retrieval, information use, information system, to mention but a few. The above aspects are associated with a range of information seeking processes that most information literacy models and frameworks attempt to delineate. The relationship between user studies and the aspects outlined above is further explained below.

Information Science has been concerned with information users. Wilson (2000) classifies the user context in information science research as follows:

- The user as *communicator*, in this case users draws upon personal or organizational information resources in communicating with organizational colleagues or fellows in society;
- The user as an *information seeker*, both from the interpersonal communication to seeking information from an information system, such as a library for abstracting journal, primary journal or bibliographic services;
- The user as a *recipient* of information services such as the Selective Dissemination of Information (SDI), current awareness services and other media services such as radio and television;
- The user as a *user* of information, in which case the final product of information sought is to be put to use.

In the above analysis, the common elements of user include communicating, seeking, receiving and using the information. However, the context of user depends on many factors such as the nature of services offered, type and usage of a particular system. For example Eason et al (2000) classify a variety of user behaviour with electronic journals (for the Super-Journal project) into a typology of eight categories of users as follows:

- the *searchers*: these are a type of non frequent users whose dominant mode of using electronic journals was only for searching;
- the *enthusiastic users* are a category of those who use electronic journals very frequently and view a large number of journals;
- the *focused regular users* use small number of journals but return to use them regularly and use half of their time for current awareness and the other half for retrieving articles;
- the *specialized occasional users* use electronic journals with focused interest but only occasionally;
- *restricted users* use the journals infrequently, they use a small number of journals and retrieve full text articles in small proportions of time;
- the *lost users* are non-repeat users who used electronic journals like enthusiastic users, but they do so only once;
- the *exploratory users* only explore a small number of journals in a single session;
- the *tourist* are a category of users who only visited the application but never used any journal.

On the other hand, Davis & Olson (1984) describe users based on their interaction with a computerized Management Information Systems (MIS) in organizations. These include three categories, direct, autonomous and indirect users:

*Direct users*: interface directly with the computer-based information systems, they work with one or more systems, largely designed, implemented, and maintained by the MIS/Data Processing (DP) department or received periodic computer reports.

*Autonomous users*: develop and use simple systems and/or application programs that they need, either individually or in small groups of users. They possess some amount of computing skills and makes use of a variety of tools such as general purpose, commercial software, user-friendly operating systems, personal computers (PCs), workstations and higher level programming languages.

*Indirect users*: are managers in the higher levels of the organizational hierarchy whose interface with the computer is mediated by staff analysts or assistants.

From the above examples, it is very evident that the concept of a user relates to the way they behave when searching and using information and the way they interact with the information system. User studies have therefore concentrated on both, the user and the system. Following the analysis of a user according to Wilson (2000) and Eason et al (2000) above, information literacy is aimed to equip users with the skills to seek, browse, search, access (receive), communicate, use information and apply the knowledge acquired in lifelong independent learning process. Hence, information literacy deals with users.

### **2.2.1 Information need**

Information need is one of the central themes in user studies. Wilson (1981, 8) defines information need as “...*the individual's conception of what information he needs to satisfy a more basic need of his, in order to achieve his goal*”. Needs arise when an individual discovers that there is lack of knowledge in his/her state of mind and therefore works to fill that gap. The concept of information need has been a very difficult one for many information scientists since the term *information* is being defined differently to suit varying purposes. According to Wilson, the term 'information' is used by researchers in user studies research, “*to denote a physical entity or phenomenon (as in the case of questions relating to the number of books read in a period of time, the number of journals subscribed to, etc.), the channel of communication through which messages are transferred (as when we speak of the incidence of oral versus written information), or the factual data, empirically determined and presented in a document or transmitted orally*”. Further confusion arises from the term need due to the fact that the distinction between basic needs and other human needs may not be very clear. Examples of such other needs are those described in Maslow's Hierarchy of Needs (Maslow, 1987) which include affective or emotional needs (such as the need for attainment, for security, for domination, etc.); physiological needs (such as the need for food, water, shelter etc.); and cognitive needs, such as the need to plan, to learn a skill, etc.

The above needs relate to each other. For instance issues that relate to the satisfaction of cognitive needs e.g. failure to satisfy needs, or fear of disclosing needs may result in affective needs, for example, for reassurance. Information plays

a role in satisfying the above mentioned needs. For instance, the factual data of an issue in a book or journal article may satisfy cognitive needs of a user in a library. Human needs become motivational factors for users to seek for information that would suit them in different roles they play in a society. However, it is not obvious that the drive to seek for information can take place if users are not capable of interacting with the information system. Users may be unaware of what their information needs are, what information is available and how to search for it (dormant needs). Also barriers and constraints to information is another factor for users not being able to meet their needs (unexpressed needs).

Wilson (1994) identifies three types of information need: the need for new information; the need to elucidate the information held; and need to confirm information held. Also when carrying out a search, the mode of questioning also identifies underlying information needs. For example, when an individual is driven to seek information as a result of needing to know, three modes of questioning behaviour are exhibited: questions to discover what is happening (called orientation); questions to check that the person is on the right track (called reorientation), and questions to form an opinion or solve a problem (also known as construction) (Chew, 1994).

In reflecting the analysis of information needs above, information literacy aims at meeting the information needs of users. As was pointed out in the previous paragraphs, information needs prompt a user to look for information. The awareness of information needs is one of the main attributes of an information literate person. This is supported by various definitions of information literate person such as Doyle (1992, 2) who argues that an information literate person “...*recognises the need for information, formulates questions based on information needs, identifies potential sources of information, develops successful search strategies, accesses sources of information, evaluates information, organizes information, integrates new information into an existing body of knowledge, and uses information in critical thinking and problem solving*”. This is also emphasized by Johnston & Webber (2003, 336) who define information literacy as “...*the adoption of appropriate information behaviour to obtain, through whatever channel or medium, information*



*well fitted to information needs...*". Through the acquisition of information literacy skills, a user's information needs can be met. Todd (1995) acknowledges the fact that information skills are important in enabling students to identify various strategies of information handling in order to solve their information needs. Hence, information literacy skills plays an important role in enabling users to recognize their information needs and carry out necessary steps towards finding information to meet those needs.

### **2.2.2 Information seeking, searching and use**

This is a central aspect in human activities for problem solving, decision making and also for manipulating an information system. Kari (1999, 4) defines information seeking as "*...a purposeful process in which the individual attempts to find information through information sources in order to satisfy his information need*". Marchionini (1995, 4) defines information seeking as "*...a process in which humans purposefully engage in order to change their state of knowledge*". Users embark into information seeking when information needs arise and perform various activities towards seeking for the required information (Beaulieu, 2000). These information seeking activities or characteristics have given rise to different studies that resulted in designing models for the understanding of users' information behaviours (Attfield & Dowell, 2003). For example a study by Kuhlthau (1991) when adopting Kelly's concept of 'personal construct', formed the hypothesis that information seeking is a process of construction that begins with uncertainty and anxiety. Kuhlthau (1991) describes uncertainty as a cognitive state which often causes affective symptoms of anxiety and lack of self-assurance. From the above hypothesis, Kuhlthau found that the information seeking process of library patrons occurred in six stages related to the cognitive, affective states and search activities of the users. The stages are task initiation, topic selection, pre-focus exploration, focus formulation, information collection, and search closure. Krikelas' (1983) model of information seeking behaviour gives an indication that information seeking starts when a person perceives that the current state of knowledge she/he has is less than that what is needed to deal with some issue (or problem). This process comes to an end when that perception no longer exists. Ingwersen (1996) argues that information seeking is an action which is undertaken to resolve doubts

or uncertainties that cannot be resolved by thinking alone. In the sense-making theory (Dervin, 1998), gap-bridging stands for the constructive process where an individual draws on cognitive and affective resources in order to cross the gap being faced in a problematic situation.

The relationship between information seeking and information searching is highlighted by Wilson's (1999) Information seeking and searching models. According to him, information seeking is a set of activities geared towards discovering and gaining access to information resources. On the other hand, information searching is a subset of information seeking that is an interaction between the user and information system. Information seeking reflects behaviours which are triggered by information needs and focuses on factors that lead to information seeking and type of activities carried out in the information seeking process. Information searching is more concerned with behaviours and activities that are carried out in a computerized information retrieval system. Wilson (1997, 562) identifies the following types of searches:

- **Passive attention:** such as listening to the radio or watching TV programmes: in this situation, there could not be any act of information-seeking, but information acquisition may still take place.
- **Passive search:** this implies situations when one type of search (or behaviour) results in the acquisition of information, which may seem to be relevant to the individual;
- **Active search:** this is the type of search that is very popularly related to numerous works in Information Science studies, in which an individual actively seeks out information.
- **Ongoing search:** in this situation, the active searching is responsible for establishing the basic framework of ideas, beliefs, values, and the like, but in which case the ongoing search is carried out to update or expand an individual's framework.

Information use refers to how the individual makes use of the acquired information to solve a particular problem. The acquired information is a result of a gap (or information need) as noted by users in their state of mind. Halpern & Nilan (1988)

describe the concept gap as an aspect of a condition that a person feels the need to elucidate in order to continue taking a direction that the individual considers to be helpful or desirable. This is what is also termed a gap-bridging process. According to sense-making theory (Savolainen, 1999, 78), gap-bridging means *“a process whereby an individual adapts resources that are associated with cognition and affective states in the process of crossing the gap being faced in a problematic situation. The results of the gap-bridging process results into what is described as uses, helps or hurts”*. Savolainen (1999) observes that despite several studies being carried out to develop analytical frameworks for information use, a lot of work lies ahead of it. Irrespective of the theoretical position adopted, the phenomena associated with information use are hard to conceptualize because the concept information use is abstract in nature.

Research reveals that the aspects of information seeking and use form a basis for teaching information literacy based on critical thinking and evaluation of information (Limberg, 1998). The above is true due to the fact that information seeking and use is associated with users' ability to understand or experience the content of information, hence a need to equip them with the skills of analyzing, synthesizing, evaluating and making judgments of information use. Research also reveals that the aspect of information seeking is important in studying information literacy of certain groups of users. For instance, various studies have been carried out to explore information literacy of certain categories of users such as students, for the purpose of providing suggestions for programmes that would maximize students' information seeking abilities (Brown, 1999). The above analysis of information seeking, searching and use shows therefore that there is a relationship between these concepts and information literacy. It is also noted from literature that research on information seeking and use has utilized theories and models from various disciplines such as communication, sociology and cognitive sciences (Limberg, 1998).

### **2.2.3 Information retrieval**

Baeza-Yates & Ribeiro-Neto (1999, 4) define information retrieval (IR) as *“part of computer science which studies the retrieval of information (not data) from a collection of written documents. The retrieved documents aim at satisfying a user*

*information need usually expressed in natural language*” In a computer language, information retrieval is concerned with the transfer of knowledge from the storage system to the user of the information system. Generally, information retrieval is the action of retrieving information by extracting documents or parts of documents from big quantities of documents with the help of a computer, auxiliary structures and mathematical methods. Karamuftuoglu (1999) argues that information retrieval has a potential for knowledge production, not only the transfer of knowledge from the storage system. According to him, knowledge production is an important aspect of information retrieval relevant in the context of current developments in innovation and industrial information based development. Modern information retrieval research considers users as part of the system, which has developed from the traditional model in which the information retrieval function concentrated only on the queries and the set of documents the system keeps. This has been so due to the fact that queries are raised by users and are based on their set of information needs which arise from their cognitive state (Beaulieu, 2000).

Reflecting on the above analysis, information literacy is concerned with equipping learners with relevant information retrieval skills. Users need to acquire a set of information retrieval skills to be able to locate information in the respective subject discipline (Asher, 2003). In addition, the importance of information retrieval research into user studies is seen from the point of view of the information seeking and retrieval process. When an information need arises, the user has to find answers that will meet the information needs. The user has to formulate queries and follow up a plan of searches by contacting the information retrieval system. The answers are then evaluated, and put forward for further action. Therefore the design of such systems should reflect users' anticipated needs and flexibility in use, which include provision of navigational routes, provision of Boolean search strategies, the ability for users to link their research interests with others, etc. The information retrieval system should be designed in such a way that it reduces the risk of failures by the users and increases their sense of self efficacy. The above is true considering different models on information seeking behaviour such as Wilson's (1999 ) and Ellis's (1989).

Many studies indicate that there is a closer relationship between information seeking and information retrieval. Lancaster & Warner (1993) felt that information retrieval was synonymous with literature searching; *“it is a process of searching some collection of documents to identify those that deal with a particular subject. Any system that is designed to facilitate this literature searching activity may legitimately be called an information retrieval system”*. Saracevic (1996) identifies three models: the traditional model, which represents information retrieval as set of system and user, of elements and processes converging on comparison or matching; cognitive model which concentrates on identifying processes of cognition which may occur in all the information processing elements involved; and episode model, which considers user interaction with an information retrieval system as a sequence of differing interactions in an episode of information seeking. Saracevic (1996) proposes a ‘stratified interaction model’ developed within an overall framework of an ‘acquisition-cognition-application’ model of information use. This model has three layers: ‘surface’, or the level of interaction between the user and the system interface; ‘cognition’, or the level of interaction with the texts or their representation; and the ‘situation’, or the context that provides the initial problem at the time of search. In other words, this system consists of a problem in a given situation that prompts a user to seek information in a given format by interaction with the retrieval system.

However, general differences between information seeking and retrieval are summarized by Turnbull (2000) as follows:

#### Information Retrieval:

- historically, concentrated on the system
- focuses on planning the use of information sources and systems
- implies that the information must have been already known
- relies on the concrete definition of query terms
- involves subsequent query reformulations
- centres on the examination of results and their accuracy.

#### Information Seeking:

- historically, concentrated on the user

- focuses on understanding the heuristic and dynamic nature of browsing through information resources
- implies that the information is sought to increase knowledge
- follows a more opportunistic, unplanned search strategy
- involves recognizing relevant information
- centres on an interactive approach to make browsing easy.

According to Turnbull, the primary difference between information retrieval and information seeking is searching vs. browsing. Searching is a purposeful way of trying to find some object or information, sometimes with the help of a search system or search engine, sometimes using an information retrieval system, sometimes by submitting a formal query, often following some search strategy or plan. Browsing on the other hand is a way of exploring a body of information, based on the organization of the collections or scanning lists, rather than by direct searching. It is a method of searching for information by moving from one information resource to another via logical hierarchies or links. Saracevic (1996) states that "*interaction became the most important feature of information retrieval as the access to information retrieval systems has become more dynamic*". Therefore, an information system with interactivity features will support information finding if it possesses browsing-like capabilities.

#### **2.2.4 Information systems**

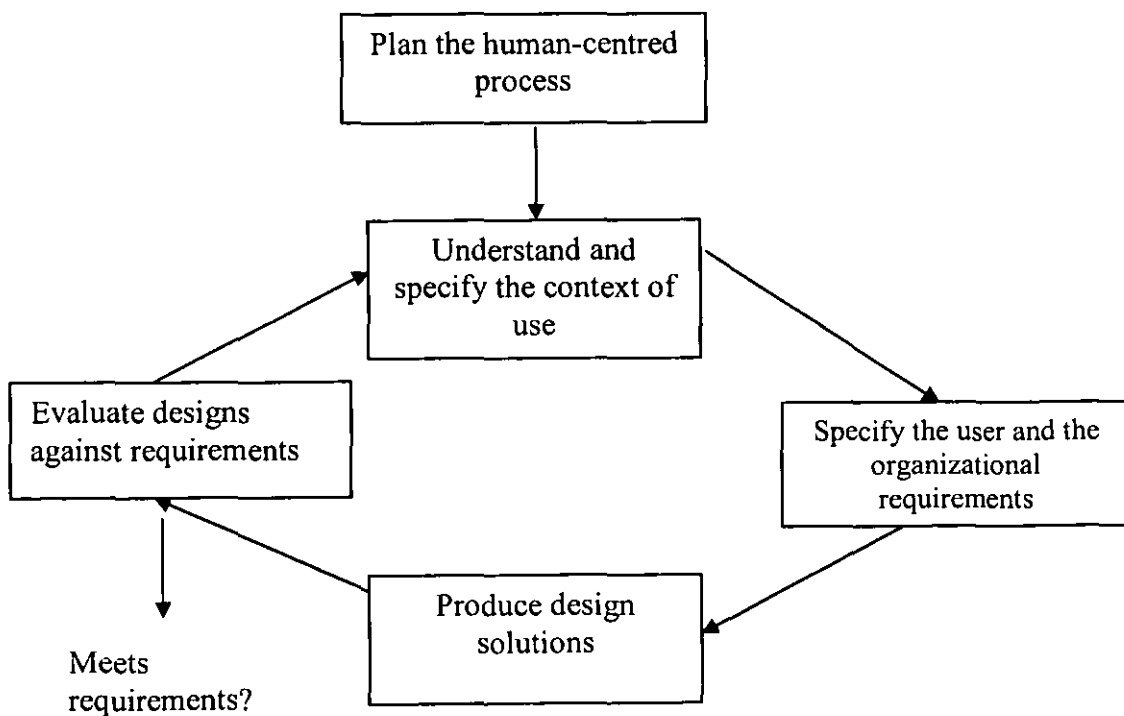
Information systems can be defined as "*a system that is involved in the gathering, processing and use of information*" (Beynon-Davies, 2002, 4). Avison & Fitzgerald (1995, 13) define information systems as "*a system which assembles, stores and delivers information relevant to an organization (or to the society) in such a way that the information is accessible and useful to those who wish to use it, including managers, staff, clients and citizens*". Another definition which does not reflect the use of a computer is provided by Checkland & Holwell (1997, 110) who state that an "*information system is a function supporting people who are taking a purposeful action*". These definitions demonstrate various aspects of an information system, which include computer software, people and their objectives and services to support people and organizations.

The concept of an information system is linked with data that is gathered from both operational or internal business systems and external data sources. Information technology helps in gathering and the management of data from a wide range of data entry sources e.g. direct entry which can be done by operatives or clerks, to batch entry and downloaded data entry from other systems. Internal business systems, which include routine activities within an organization (such as stock control system, activities recording stock flows, and the sales order system activities recording individual orders and each order's progress), generate a corporate database which the information systems can utilize (Leek, 1997). In the modern business organization the information system co-ordinates the resources and activities of the input, process and output subsystems of the organization. In so doing, it ensures monitoring and internal efficiency. It can also be used to scan the external environment and internal operations continuously to ensure achievement in organizational effectiveness (Yasin & Quigley 1994).

Information systems therefore play a central role in libraries and information centres, both in terms of service delivery to clients, and their impact on management. The design of information systems in this respect should consider the aspects associated with ease of use. This includes interfaces' selection methods such as command languages versus menus, and representation methods such as screen layouts and text/graphic combinations (Marchionini, 1997). According to Walters et al (1994), the information systems approach has caused library managers to change their approach towards the following: determining objectives and strategies; the planning process; operational structures, productivity and human dimensions. The trend to design information systems has shifted from the systems centred design to user-centred approach, which facilitates ease of use by the users. The user-centred approach takes into account placing the user at the centre of the design process (Norman & Draper, 1986). User comments and reactions help to work towards a better design. The user-centred design is an iterative process, in which, according to various standards such as the ISO 13407 standards on human centred design (ISO, 1999), the following processes are undertaken:

- Plan the human-centred design process: this involves the process of involving stakeholders of the system to determine various aspects such as the benefits of the established system, its objectives, intended users, their tasks and the like.
- Understand and specify the context of use: this aspect is concerned with identifying the users of the system, the purpose of using the system and conditions under which they will use it.
- Specify the user and organizational requirements: this is a process of determining user goals that should be met in order for the system to be successful.
- Create design solutions: this is the actual process of designing the system through the use of experience and knowledge of the users.
- Evaluate designs against requirements: this is a process of determining whether the design has been able to meet user requirements.

Figure 2-1 below summarizes the processes.



**Figure 2-1: Human (user) centred design cycle**

Literature reveals that information literacy is associated with other competencies in the use of computers and related IT infrastructure, which help to facilitate users'



confidence in approaching various information systems. Information literacy is therefore concerned with equipping users with skills of approaching and manipulating various information systems (Kanter, 1992). Furthermore, since libraries and information centres have shifted and provide services to clients based on a user-centred approach, certain service-related aspects such as information literacy tend to concentrate on the needs of learners, hence the notion of student-centred learning approach. To some extent, this resembles the user-centred design approach due to the fact that learners possess their own perceptual learning framework that should be taken into account when designing information literacy programmes.

In summary, following the analysis of various aspects of user studies above, the relationship between user studies and information literacy lies in examining the role of the information literacy programme for users. Information literacy programmes aim to meet users' information needs through the provision of relevant information search, retrieval and use of information skills. Information seeking and use skills are necessary in enabling users to manipulate widely available information systems. The succeeding sections of this review will demonstrate the relationship between information needs, information seeking, information use and information systems in practical examples.

#### **2.2.5 Historical overview of user studies in library/information management and focus on user training and information behaviour**

In the light of various aspects discussed above, user studies have a bearing on how information literacy courses could be designed, implemented and evaluated. The literature indicates that user studies have a contribution towards the availability of information and development of libraries (Heinström, 2000). The historical background of user studies and their influence in library users goes back to the 1870s when a study conducted by Raymond C. David (Salony, 1995), a librarian at the University of Michigan found that users did not possess adequate knowledge of libraries. He considered library skills important in facilitating easy location and access to information to meet relevant knowledge requirements for various subject disciplines. This resulted in the establishment of library instructions on how to use library resources such as card catalogues. This was followed by developments in library services during the 19<sup>th</sup> Century in the US higher education institutional

libraries, which realized a need to introduce library instruction programmes to users. The introduction of these programmes came as a result of curriculum changes, new teaching and learning methods, new technologies and increased students enrolments, which in turn influenced the growth of library collections and services. These changes resulted in students' ever increased need for a variety of subjects' knowledge.

However, in the modern times (that is 20<sup>th</sup> Century onwards) a number of articles trace the history of user studies back to 1948 and the Royal Society Scientific Information Conference during which a number of issues were discussed regarding how users use library collections and the nature of available library services to provide support to users. This conference came up with reports that included aspects related to the nature of support available to users such as bibliographic instructions, guides on the use of scientific literature and other library use support systems. In order to make effective use of library services available, the conference recommended the provision of library instructions to students. However in most of the reports presented in this conference, it was noted that the issues of needs of users in relation to services available were not discussed.

The above conference paved a way for further studies on users and another International Conference on Scientific Information followed in 1959. During this conference several research results on user studies were presented. These included Urquhart's (1959) questionnaire result report which was on where the users of periodicals and books circulated by a science library had learned about a publication and whether it contained the information they wanted. Others included Herner's (1959) study which sought to discover from research scientists how they looked for and obtained information, what publications and library services they used, and the extent to which they did their own searching or whether they relied on the help of librarians and information specialists. It was in this conference where several issues about user needs were mentioned. During the 1960s more empirical research on the information needs and uses of scientific and technologic users were conducted (Menzel, 1966). Various categories of studies carried out during this period include those that fell under communication studies (interpersonal communication). According to Menzel (1966), this period experienced the use of such scientific

approaches in user studies as critical incident techniques, solution development records approach, comparison of teams working on identical tasks and comprehensive studies. In the 1970s, researchers felt a need to fit system specific studies more closely to users. Due to the above realization, there was an emergence of studies based on various subject domains under social, biological and health sciences, mass media and information sciences. The social sciences studies that were carried out involved the use of information in education, sociology, economics, planning and law. These focused on themes such as sources of information for the design of information systems, information need and the use of social science information. The vast majority of studies of information needs were conducted by using scientific methods through the use of self-completed questionnaires as the main data-collection instrument. Later, social researchers turned to a qualitative research approach either as a complete alternative to quantitative research or as a preliminary. The methods employed in qualitative research included less formally structured interviewing procedures, observation, free-flowing discussion, and the analysis of documents (personal or organizational) and conversational analysis.

From the 1980s onwards, a focus on user-centered approaches in user studies was adopted, which centered on user-defined information needs and use. Many studies carried out during this period were done in the realization that studying users' information behaviours will make it possible to provide an index to their needs and uses (Dervin & Nilan. 1986). Many studies were carried out during this period to design and test different models of information seeking behaviours for the purpose of understanding what is involved in the information behaviour process. This new trend shifted the field of information seeking and retrieval behaviours from the domain of library and information to become more interdisciplinary. Studies occurring in disciplines such as medicine, business, public administration and marketing research, adapted the information seeking and retrieval behaviour approaches and modeling. In the field of psychology for example, the concepts such as motivation, uncertainty resolution, learning styles and personality types confirmed the view that information needs occurred not only sociologically but also cognitively in terms of characteristics that were unequal to each user (Hewins, 1990).

In summary, many studies that focus on user-defined information needs and use have been considered crucial in facilitating information literacy training. These studies, among others, have ascertained the need for users to acquire information seeking and use skills in order to meet their information needs. The section below demonstrates a few examples to support the above assertions.

#### **2.2.6 The role of user studies in development of information literacy programs in academic institutions**

There seems to be limited amount of literature that highlights the significance of user studies in facilitating the development of information literacy programs. Few information behavioral studies reviewed have shown that their findings contributed to the design or improvements of user training or information literacy programmes. Bruce (2002) argues that elements demonstrated in several information literacy models and frameworks could be described as systematic information behaviour. This can be seen to be true by examining the relationship between certain behaviours demonstrated in a number of information seeking behaviour models which in general include such concepts as: “recognize and accept an information problem”, “define and understand a problem”, “choose a search system” and so on) and information literacy processes enumerated in various information literacy models and frameworks. Several researchers in information literacy studies have adopted certain elements of information behaviour, which resulted from numerous information seeking behaviour research, in order to demonstrate different ways by which these elements could guide the development of information literacy programmes (Johnston & Webber, 2003). The above argument can be supported with a few examples summarized below.

Wildemuth (2003) for example, suggests that a model of the search process in Kuhlthau’s study could be used as part of a library instruction program, in order to provide library users with an understanding of their navigation of the search processes over a given period of time. In the study above, Kuhlthau and her colleagues compared search processes used by the patrons of academic, public and school libraries (Kuhlthau et al., 1990). The survey involved 385 library users of 21 libraries who filled out a questionnaire, in which they rated their cognitive and affective aspects of the search. The results had implications for practice in both

reference services and in providing library instruction. Allen (2003) supported Kuhlthau's model and proposed to integrate it into the undergraduate curriculum of Drexel University, Philadelphia. According to her, in addition to encouraging a learning environment most favorable to productive and meaningful research, the information searching process (ISP) model can also help to promote information literacy. This model reflects the idea of learning as a process of construction and of seeking meaning. The author argues that independent learning can be promoted by an instructional programme which gives students the chance to create their own meaning when engaged in a research work. A paper by Foster (2004) suggested various implications of a non-linear model as it applies to existing theory and models of information behaviour, including the development of information literacy curricula. This model is based on the findings of a study on interdisciplinary information-seeking behaviour and followed a naturalistic inquiry approach through interviewing 45 academics from the University of Sheffield across various faculties, in order to develop a framework for understanding their information-seeking behaviour. The model groups activities into three core categories; "opening" (moving from orientation to actual search), "orientation" (identifying existing research and a direction for search), and "consolidation" (refining and knowing when to stop). Therefore according to this study, the non-linearity and dynamic nature of information seeking, and the three activities indicated above could be taught in information literacy sessions as part of the information seeking process undertaken by information literacy teaching programmes.

A number of information behavioral studies have been conducted, with ultimate suggestions for improvements of instruction programs in particular institutions. Limberg (1998) reported the results of research conducted in Sweden to study information seeking through an explorative investigation of the interaction between information seeking and use and learning outcome. Data for this study consisted of 75 interviews with 25 Swedish high school seniors. Three categories of conceptions of information seeking and use were identified and described as follows: Information seeking as:

- a) Fact-finding;
- b) Balancing information in order to choose right, and;
- c) Scrutinizing and analyzing.

Also, three categories of students' conceptions of subject matter were identified, and were grounded in differences as expressed in the interviews after conclusion of their assignments. Results of this study indicated that variation in information seeking and use as presented in the three categories of description interact closely with variation in ways of experiencing or understanding the content of information, as presented in the three categories of description of learning outcomes. Phenomenography, which is an area of research that focuses on identifying and describing the qualitatively different ways in which people understand phenomena in the world around them (Marton, 1983), was found to be a useful method in studying variations in ways of experiencing information seeking and use. According to the author, the findings of this study could also provide a basis for didactic development of information literacy instruction. The three categories of conceptions of information seeking and use identified in this study could be taught in information literacy courses as part of the information seeking process.

Case-Smith & Powell (2003) report the results of a research study conducted to assess whether recent graduates of the Ohio State University's Occupational Therapy division applied information-seeking skills they learned as undergraduates, and sought their advice on ways to improve information-literacy instruction for current and future occupational therapy students. A survey was sent to individuals who had graduated from 1995 to 2000. Results from this study indicated that although some graduates believed they had benefited from information literacy programmes and put into use the resources they learned during the instructions, they had little time to put the gained skills into practice in the field, after they finished their studies. Therefore librarians and occupational therapy faculty were urged to intensify their efforts to convey the importance of applying research information to patient care and inform students of ways to access this information after they graduate.

Brown & Krumholz (2002) presented a report on the assessment made to information seeking, evaluating and usage abilities before, during and at the end of a senior level geo-microbiology course at the University of Kuopio, Finland. Literacy levels were measured using the Association of College and Research Libraries (ACRL) Information Literacy Competence Standards for Higher Education. Two

instruction sessions were provided in the use of bibliographic finding tools available from the Oklahoma University Libraries and in each subsequent class meeting, students presented, critiqued and discussed a refereed article. The survey results indicated an eleven per cent increase in information literacy, however there was no significant improvement in the students' ability to present, critique, and discuss information.

This study proposed a model for incorporating information literacy into upper-level undergraduate science courses and an instrument for measuring information literacy.

A study by Eskola (2005) further highlights the concept of information literacy through studying students' information seeking behaviour. The author carried out research on relationships between learning methods and students' information behaviour in Finland. Sixteen theme interviews were conducted at the Tampere University Medical School, which applied the problem-based learning curriculum. Also fifteen interviews were conducted at the Turku University Medical School in which the traditional curriculum with an early patient contact programme was implemented. Results of this study indicated that students demonstrated three different types of information literacy skills: developed information literacy skills; simple information literacy skills and; undeveloped information literacy skills. It was further revealed that the developed information literacy skills were likely to appear more in the problem-based learning curriculum than in the non-problem-based curriculum. This study indicated therefore that students' information literacy could be developed through active use of information and sources in connection with real information needs and also through an educational context which give students chances to get different viewpoints on their learning experiences.

To summarize the above review, a few studies in information behaviour research have created an impact on the design or improving of information literacy programmes in various higher education institutions. The impact came as a result of suggestions made to improve users' information skills. Despite limited studies in this category, a number of information behaviour research studies have also helped to indicate areas where information literacy training could be needed. The section below attempts to review such studies.

### **2.3 An overview of information seeking behaviour studies**

It is quite evident, according to literature that information seeking behaviour constitutes a part of the total field of information behaviour. Taylor (1991, 217) defines information behaviour as "*the sum of activities through which information becomes useful*". Wilson (1999, 249) defines information behaviour as "... *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.*" Information behaviour is demonstrated by a person in relation to information sources and channels, of which information seeking is one activity (Wilson & Walsh, 1996, 62).

On the other hand, the concept of information behaviour is much broader than that of information seeking since it also includes the use of information "*in satisfying the purposes for which it was required*" (Ford, 2004, 183).

For the purpose of this study, two category of studies will be highlighted: general studies and research in information seeking behaviour of professionals in specific fields such as scientists and social scientists; and studies and research in information seeking behaviour focusing on the academic environment. Whereas the first category of users experience their information seeking behaviour in their various domains, the academic environment concentrates on academic related issues, which may not necessarily apply to other categories of users.

#### **2.3.1 General studies and research in information seeking behaviour**

Many studies concerned the information seeking behaviour of users in different fields or occupations, social groups as well as ordinary citizens. These studies have made the use of both quantitative and qualitative methods in gathering data on their behaviour in seeking and locating sources of information. The quantitative approach has followed the general drift in the social sciences of putting value on the quantitative pattern of the natural sciences (Patton, 1991). However, social scientists discovered that the use of statistical analysis and mathematical formulae although useful, is often complemented by qualitative research. This has included the use of phenomenographical and other approaches.



### **2.3.1.1 Information seeking behaviour studies of professionals and the public in pure and applied sciences**

Several studies on information seeking behaviour have been carried out in professional scientific fields such as health, medical sciences, engineering etc. A study was conducted to investigate patients' desire for information (Harrison, Hepworth & James, 2003). This study aimed to provide an understanding of the information needs of people with multiple sclerosis (MS), to determine their most important needs, the information that was difficult to obtain and the type of information that should be made available to them. Qualitative and quantitative methods were used to obtain data on categories of information need, importance of the information and difficulties in obtaining it. The results from data obtained highlighted significant differences in terms of people's desire for the information, the topics in which they were interested and how they wanted that information. In addition, this study realised that people with MS faced difficulties in accessing the required information. The study highlighted the need to provide access to relevant information in appropriate ways in order to improve the quality of life of the person with multiple sclerosis and the scope of improving provision of information to them.

Studies in the medical sciences have also been carried out in Africa. Nweke (1995) described a survey of human and veterinary medical scientists in Borno State, Nigeria, to find out the way the scientists gather the information they require for their work. The study used questionnaires which listed different methods of obtaining information and interviews were used to validate answers supplied in the questionnaires. Results from this study revealed that health professionals in Borno State used informal methods of obtaining information since their use of formal methods was handicapped by the lack of appropriate sources. Two categories of scientists (human and veterinary) mostly used personal records which included photocopies of relevant sections of printed information sources, computer printouts, correspondence with experts in Nigeria and abroad, personal notes from discussion with colleagues, and records of experience from professional practice. They consisted of a mixture of handwritten and printed information sources. They also relied on discussion with colleagues, and scanning of a wide variety of reading materials.

Information seeking behaviour studies have also been conducted in other science disciplines such as engineering. These studies focused on investigating various ways that professionals in these fields seek information. Kwasitsu (2003) conducted research at Adomi Corporation (US) an international microchip manufacturing company whose aim was to establish the conditions that led engineers to seek information and to find out whether there were differences in the information-seeking behaviour of design, process, and manufacturing engineers. The study also sought to comprehend the influence of engineers' work roles and educational qualifications on information-seeking behaviour. The study used both structured survey questionnaire and semi-structured interview data collection techniques. Results from this study indicated that work roles and tasks played a role in activating their information needs. Also the higher the engineers' level of education, the less likely they were to depend on their personal memories as sources of information, and the more likely they were to rely on libraries. Also the higher their level of education, the more likelihood of them relying on external conferences as sources of information. This study identified work roles and associated tasks that individuals perform as the most influential factors for their desire to seek information. However, a clearer example of the influences of work roles and associated tasks in information seeking can be found in another study by Leckie, Pettigrew & Sylvain (1996) whose results help to indicate the influence of numerous work roles engineers perform, which lead to different information needs. Engineers' information behaviour, in this study, is geared toward problem-solving in contrast with the theory and evidence-based research found in other disciplines. In this case engineers use textbooks, technical reports, catalogs, and trade journals in searching for information. They made little use of scholarly journals and books, conference papers, and other external sources (Hertzum & Pejtersen, 2000).

### **2.3.1.2 Information seeking behaviour studies of professionals and the public in the social sciences**

There are a considerable number of studies on information seeking behaviour that have been conducted in the social sciences disciplines such as politics, business and law. Wilkinson (2001) carried out in the Canadian province of Ontario an investigation into lawyers' information-seeking behaviour. The study used critical incident technique in collecting data from lawyers who were asked to discuss, in

detail, problems they had encountered recently in connection with the practice of law. The findings of the study indicated that the problems encountered by most lawyers were concerned with administration of their law practices and substantive areas of law. In solving their problems, the lawyers favoured informal sources when seeking information. In addition, they preferred sources of information available within their organizations rather than external sources. Additionally, the study found that other tasks of lawyers such as administration of their law practices were identified as constituting problem-solving, information-seeking activities. The outcome of this study called for a modification of the model for the information-seeking behaviour of professionals which would create a new model offering a fuller picture of the behaviour of lawyers. Kuhlthau & Tama (2001) in a similarly study in UK revealed that lawyers were involved in complex tasks that required a constructive process of interpreting, learning and creating which made them prefer using printed texts over computer databases. Computer databases required well-specified requests and could not provide options for examining a wide range of information at one time. The main differences between the two studies discussed above is that, whereas the use of shadowing method ensured respondents confidentiality, it lacked detailed information on problems associated with information seeking behaviour as opposed to the critical incident technique.

Dwairy & Kendal (2002) studied how 22 staff who purchased health care services for a large national government accident-compensation system in New Zealand sought information on treatment effectiveness, how they evaluated information, whether they questioned the credibility of information sources chosen, and whether they were familiar with the key concepts of evidence-based health care (EBHC). Results of this study indicated that the awareness levels among the staff of the New Zealand Accident Compensation Corporation (ACC) regarding the use of evidence and understanding of the key concepts of EBHC was low. In addition, many ACC staff members who were surveyed indicated having a lack of skills or training to evaluate the effectiveness and credibility of information about effectiveness of a treatment. Furthermore, they had little idea about the information required to judge the effectiveness of a treatment. In addition, the majority of the respondents seemed less skilled in evaluating the health care literature.

Several studies on information seeking behaviour in social sciences have been carried out in Africa. Momodu (2002) presented results of a study on information needs and seeking behaviour of rural dwellers of Ekpoma in the Esan West local government area of Edo State, Nigeria. The study used questionnaires, interviews, and observations to a randomly selected population sample for data collection purposes. The study generally found that many people in the Ekpoma community were illiterate poor villagers whose access to information was insufficient due to geographical locations, language (English), and absence of basic amenities. Despite the above-mentioned limitations, the study revealed that information needs of Ekpoma people were varied, according to the occupations of the villagers. Information was available to the Ekpoma community through radio, television, and newspapers and through their extension workers, teachers, and health workers. The information seeking behaviour of Ekpoma people was found to rely on informal sources, while adult literates and school children used the formal approach to get information by visiting the local library in the villages. They preferred, and depended on, information from their children, their relations from the urban areas and information from trusted friends.

Ikoja-Odongo & Ocholla (2003) examined the information needs, information-seeking behavior, and the impact of information use on artisan fisher folk and fisheries extension agents at three major lakes in Uganda namely Kyoga, Albert and Victoria. A qualitative research method using critical incident technique based on a timeline was used for data collection. Participants of the study were represented in categories of fisher folks, boat builders, fisheries extension agents, fish guards and chairpersons. The findings revealed that fisher folk needed different kinds of information to carry out fishing activities effectively. The problems faced by fisher folk such as bereavements on the lake, costs of equipment and many more, often set the scene for information needs. Information seeking methods included contacting people who knew, listening and talking to people and asking friends, relatives, neighbours, or colleagues. Other sources included the fishing department, the revenue authority, the local government, the police, non governmental organizations and agricultural research organization. The study found that the formal system of information provision, especially the local public library had not been successful among the fisher folk particularly. Also information provision for fisher folk needed

to be modeled chiefly on the information systems that they were well acquainted with such as fisheries extension agents, meteorologists, the marine police, non-government organizations and the revenue authorities.

### **2.3.1.3 Summary of Information seeking behaviour studies of professionals and the public in the social sciences**

Studies of information seeking behaviour of professionals and the public in the social sciences assist to provide a general picture of several aspects of information behaviour. These studies reveal that information seeking behaviour research has gone beyond studies of specific user groups such as legal practitioners, engineers or medical practitioners. These studies have covered a range of communities such as citizens, rural societies, etc. The studies cited above identified several aspects including the fact that work roles and associated tasks of individuals facilitate the desire to seek information. Whereas engineers sought information related to engineering tasks, the artisans and fisher folk needed information associated with their fishing business (fish and equipment market prices, storms and accidents on the lakes and so on). Furthermore, for problem-solving purposes, the literature indicates that secondary sources such as text books, manuals and magazines help to provide relevant information towards the problems identified. The need to use informal (primary) sources of information such as TV, radio, newspapers, colleagues and the like was also noted. Noted also were problems associated with lack of knowledge of sources and how to search and access information. Major methodological issues found in the review were the use of qualitative approaches such as critical incidence techniques used by Wilkinson (2001) which proved to be more user-centered.

The review above revealed that qualitative approaches assist to give a clear picture of users' understanding and experiences of their information needs and factors for which such needs emerge. They show not only the sources of information users have consulted but also their attitudes towards the sources.

Generally, although several studies have attempted to investigate users' information behaviour, not much attention was paid to examining user behaviour in relation to

their information seeking skills and knowledge. However, many studies have highlighted problems associated with users' lack of information seeking skills.

### **2.3.2 Studies and research in information seeking behaviour in the academic environment**

There are numerous reports and research articles concerning studies of information seeking behaviour in the academic environment. Some research reports concentrate on needs and information seeking behaviour of academicians in everyday life, while others specifically looked at academicians' information needs and behaviours in their academic areas of studies. The literature reviewed indicated different formats of information sought, i.e. printed and electronic/digital. The analysis below reviewed both cases of information formats wherever possible in order to capture variations in academicians' behaviours in seeking for information.

#### **2.3.2.1 Various studies and research in information behaviour conducted in the academic environment**

Hurd, Weller & Curtis (1992) studied the use of abstracts and indexes by scientists and engineers at the University of Illinois at Chicago. The study paid attention to faculty members' use of eight databases accessible from the library's online catalogue located in Chicago and Urbana, University of Illinois. The study concluded that scientists were found to rely more on informal communication with their friends, by attending conferences, and using references in journal articles, than on secondary services for identifying the existence of relevant articles. The study also discovered that faculty members who utilized their desktop computers for other types of research were more likely to use it for accessing the databases available through the on-line catalogue. The study suggested that university computing centers and libraries should extend their services to scientists who were not making the use of available electronic systems and resources. Similar results were reported in another study which examined the information seeking activities of faculty members in the health sciences at the University of Illinois at Chicago (Curtis, Weller, & Hurd, 1993). The study reported a constant use of traditional formats for information despite the introduction of new formats. The faculty did not make maximum use of training provided by the library although the reasons for not doing so were not investigated. The traditional methods of asking friends, scanning

personal copies of journal, going through material in a departmental collection, and, consulting the library were still in use. This study realized a need for librarians to devise alternative ways to promote training to users.

On the other hand, the study by Pelzer, Wiese & Leysen (1998) indicated a more positive use of secondary sources for information problem-solving purposes than scientists in the above study. This study was carried out at Iowa State University to determine veterinary medical students' general use of the veterinary medical library and how they sought information in an electronic environment. It was a comparative study with another that was carried out in 1987 to determine the effect of the growth in electronic resources on student library use and information-seeking behaviour. Questionnaire survey method was employed to collect data on students' general usage of the library. Specific questions were on accessing information in electronic environments. The results of this study revealed that basic patterns of student activities in the library, resources used to find current information, and resources anticipated for future education needs remained the same as was observed in the earlier study carried out in 1987. Students preferred textbooks and handouts as sources of current information and used the library for photocopying, office supplies, and studying coursework. Students made much more use of computerized indexes and other electronic resources than print indexes and abstracts as was observed in 1987. Most students used the Internet, and electronic resources were mostly used by students who received the problem-based learning method of instruction. The study therefore identified the opportunity for information professionals to help prepare future veterinarians to access the wealth of information and services available on the Internet and Web.

Several studies have been carried out with academics to show the influence of work roles and associated tasks in information seeking. Hart (1998) carried out a survey of the faculty at the State University of New York (SUNY), College at Fredonia to identify patterns between the faculty members' commitment to teaching, research, and service and their use of a variety of sources of information. Questionnaires were distributed to collect data that described different categories of faculty's roles in their academic work and the extent to which these roles influenced the faculty members' use of various categories of information sources. The findings indicated

that there were evident patterns in the faculty's use of various sources of information and that the individual's commitment to teaching and research were factors that led to information gathering, even if not always in the manner that had been anticipated. Also the study discovered that the faculty members' age, academic status such as possession of a doctoral degree, and quality of the doctoral degree has a bearing on the commitment to doing research.

However, Given (2002) conducted a study that demonstrated the influence of work roles and associated tasks to groups of students with more roles than only academic activities as was the case with the above study. An in-depth qualitative study was conducted to investigate everyday and academic information needs and the information seeking behaviour of mature undergraduates at a Canadian university. Interviewees were contacted through an open invitation at a mature-student orientation session, with notices posted across campus, and using a snowball technique. The questions were focused on students' personal and professional lives, educational backgrounds, academic interests, perceptions of student identities, and the implications of their own identity constructs for their information seeking. This study revealed that mature students' information needs varied according to the way they struggled with activities in which they engaged themselves, such as parenting and volunteering. In order to manage their time effectively, these everyday activities and their resulting information behaviours became tightly interwoven with academic work. Research studies in everyday information seeking activities reveal that information behaviors associated with daily life are complex and cross many interests like parenting, entertainment, and other concerns.

A notable methodological approach was demonstrated by Whitmire (2003) who explored the relationship between undergraduates' epistemological beliefs, reflective judgment and their information-seeking behaviour. The theoretical framework for this study was based on Kuhlthau's (2000) Information Search Process (ISP) model and four other models of epistemological development from the educational psychology field. Interview sessions were carried out with undergraduate students who were attending an Ivy League institute, Yale University (US) to provide answers on their epistemological beliefs (i.e. making decisions on the best sources, criteria for choice of sources, decisions taken for sources having contradicting



results). Respondents in this research were categorized as follows: Absolute believers; these selected information sources based on their own views and through authority figures; Transitional believers used criteria to evaluate websites such as looking at the URL to assess the institutional affiliation of the author of the site. In addition, on reflective judgment levels, the study identified pre-reflective thinkers who selected the first hits returned by a search engine and did not use many criteria for judging the relevance of information from a website. On the other hand, quasi-reflective thinkers looked at the URLs of a website to determine its origin and were more incredulous about the information encountered. They could also recognize authoritative sites. Results from this study indicated that epistemological beliefs affected topics, the use of mediators during search processes, search techniques, the evaluation of information, and the ability to recognize authority. Also epistemological beliefs affected several stages of the ISP model, i.e. topic selection, pre-focus formulation, focus formulation, and collection. The findings from this study proved that theoretical explanations about individuals' information-seeking behaviour could be achieved by understanding individuals' epistemological beliefs and that the findings would assist academic reference librarians by providing insights into the impact of undergraduates' epistemological beliefs on their information-seeking behaviour.

Kerins et al (2004) report the results of a study which highlights the importance of students' acquisition of information seeking skills. An empirical study was carried out to explore the information seeking behaviour of engineering and law students in Ireland. This study used Flanagan's (1954) Critical Incident Technique to interview engineering students about their information seeking relating to their final year projects. It also used semi-structured interviews, in conjunction with a brief problem exercise to find out information seeking strategies used by law students. Findings reveal that there were similar patterns in the information seeking behaviour among students who were studying to become professionals. Furthermore, it was observed that students learned their information seeking strategies from educators. Results also revealed misperceptions of the role and value of libraries and information professionals in their studies, which prompted students to adopt information seeking strategies that excluded libraries and library staff. The two studies implied that engineering and law students in Ireland could make use of information literacy

training and awareness through enabling them to acquire requisite information skills in order to function effectively and efficiently in their future professions.

Bao (1998) reported the results of a survey of Internet users at Seton Hall University, which help to highlight aspects related to problems associated with lack of information search and retrieval skills. The study found that Internet users at Seton Hall spent an average of at least 30 minutes on each Internet search session. When performing Internet searches, their most common problem was finding too many hits. The respondents also complained that they did not find enough full-text resources on the Web. In nearly half the cases, the searchers did not find the information they were seeking on the Internet. A few respondents made use of the library's Web page. Most respondents reported they used a search engine or simply typed in a URL to search for needed information.

Few studies of information seeking behaviour in an academic environment have been conducted in Africa, which help to indicate a need to enhance users' information seeking skills. Fidzani (1998) reported on a study that aimed to determine the information-seeking behaviour and use of information resources by graduate students at the University of Botswana. A questionnaire survey was used to gather information from 144 Masters students from faculties of education, humanities, science and social sciences. Information solicited aimed to understand students' information seeking, use of library, awareness of library services and library instruction, together with their views on various issues relating to library service. Findings from this study indicated that users relied on librarians' guidance to locate and access information sources. In addition, users relied heavily on journals, library books and textbooks as the main sources of information for course work and research. The study recommended a questionnaire system which could be used to establish Masters students' ability to use information resources, when they register for their degrees. An aggressive information marketing strategy was recommended at both subject librarian and departmental level to create awareness among graduate students of what information sources were available.

Ocholla (1996) reported on a preliminary study of information seeking behavior by faculty members at Moi University in Kenya. This study used questionnaires and

interviews to obtain data from respondents who were randomly sampled from four faculties: health sciences, information sciences, environmental studies and education. The results obtained indicated that many academicians relied on libraries and colleagues for information and that although the academics heavily depended on textbooks for information, they showed interest in, and made use of current and research-oriented information sources. It was also found that the nature of discipline and level of programme perpetuated information-seeking behaviour of academics and also lack of awareness of information services, and non-use of current awareness services, and sources available at the university contributed to limited access and use of the information resources. However, academicians demonstrated limited access and use of the information resources, which was contributed to by lack of awareness of information services, the non-use of current awareness services and sources available at the university. The study recommended the development of the university library since many academicians relied on its services.

#### **2.3.2.2 Summary on studies and research in information behaviour conducted in the academic environment**

Studies of information seeking behaviour with regard to the academic environment point out a number of similar features with information seeking behaviour studies (i.e. pure/applied and social sciences). These include the types of resources and systems individuals used to satisfy their information needs and/or why they sought information. Others include the influence of work roles and associated tasks to information seeking. However, other distinctive aspects identified in information behaviour studies of academicians reveal that despite the availability of online sources such as databases and the Internet, scientists preferred using informal sources such as colleagues, conferences and reports. Reasons for the above, as observed by Dee & Blazek (1993) included familiarity of facts being sought, reliability, and accessibility, being inexpensive and often providing a concise answer synthesizing the available information. Studies also help to indicate that the use of traditional sources of information could be influenced by the way users have been trained to acquire and use information. (Amstutz & Whitson, 1997), whereas the use of sources from online databases may depend on content, connectivity, user-friendliness and cost (Lehmann & Renfro, 1991).

Research in information seeking has also revealed that epistemological beliefs (i.e. making decisions on the best sources, criteria for choice of sources, decisions taken for sources having contradicting results) have impact on the information seeking process. The epistemological beliefs and reflective judgment help to highlight various aspects associated with cognitive styles in information seeking. These consist of ways in which individuals prefer doing cognitive tasks (Martzoukou, 2005). This has implications for critical thinking skills in information seeking and use. Users who apply critical thinking in information seeking (in this case transitional believers and quasi-reflective thinkers) would yield better results than those who do not (absolute believers and pre-reflective thinkers).

Furthermore, information seeking behaviour of different groups reviewed above demonstrates varying levels of information literacy and their ability to demonstrate different information seeking competencies. This is indicated by the different ways users seek information and the types of resources accessed. Information literacy levels have been demonstrated through degrees of awareness of information needs, abilities to identify information sources, developing search strategies, information search and retrieval techniques, ways of evaluating and using information. The review in the preceding headings above have indicated users' attempts to learn information skills from others, such as lecturers and peers, and also the need to consider users' information seeking skills, i.e. the study of engineering and law students in Ireland by Kerins et al. (2004). However, problems associated with lack of information seeking skills (such as retrieving too many hits or zero results) were noted. Therefore the literature reviewed above may assist to demonstrate the significance of information literacy training, in particular the one that advocates independent learning, which is important in enhancing users' information seeking skills.

#### **2.4 An overview of information literacy studies**

There is a growing body of literature about information literacy. Various information science professionals have provided wide ranges of definitions that reflect various perspectives. As pointed out by Bawden (2001), the term information literacy has been used broadly and sometimes confusingly to relate various concepts

including library literacy, media literacy, computer literacy (information technology literacy, electronic literacy or electronic information literacy), to mention but a few. The concepts mentioned above (about various interpretations of the term information literacy), highlight various skill-based literacies that have emerged to serve the needs of a variety of information environments associated with new technologies, media and services. However these particular skills require a wider range of skills, knowledge, attitudes and understandings. Based on these observations, information literacy is broader than the skills-based literacies enumerated by various information scientists, since it takes on board various particular skills and general capabilities such as creativity and critical thinking. This is due to the fact that, in order for a person to be able to handle the intricacies of the current information environment, a complex and broad form of literacy (including the ones described above, although not necessarily restricted to them) is needed (Bawden & Robinson, 2001). According to Hepworth (2000), information literacy consists of two aspects: discrete skills and attitudes that can be learned and measured through various competency standards such as ACRL (2000); and mindsets associated with individual's experiences and view of the world he/she lives in. From the various analyses made of different approaches to information literacy, one can summarize various aspects, such as skills-based literacy, general capabilities, mindset and culture (Hepworth & Wema, 2006).

The term information literacy came into being as far back as the 1970s when Zurkowski (1974) described people who are trained in how to apply information resources to their work, as information literate. Following the above descriptions of information literacy and the description of an information literate person, various authors have proposed numerous definitions and interpretations of information literacy depending on various contexts. ACRL (2000) defined information literacy as a set of abilities to do the following: recognize information need; locate; evaluate and use the needed information effectively. Kuhlthau (1993) interpreted information literacy, from an information behaviour perspective, as a way of learning the behaviour or attitudes, and discovered that it consists of the following stages: task initiation, topic selection, pre-focus exploration, focus formulation, information collection, and search closure. Bruce (1997) interpreted information literacy based on users' experiences in using information, categorized as follows: the view of

information literacy as using information technology for purposes of information retrieval and communication, the act of finding information, executing a process, controlling information, new knowledge accumulation, working with knowledge to generate new insights, and wise and beneficial use of information. Similar views of information literacy in information behaviour sciences have been given by Johnston & Webber (2003, 336) who define information literacy as *"...the adoption of appropriate information behaviour to identify, through whatever channel or medium, information well fitted to information needs, leading to wise and ethical use of information in society."*

The definition above highlights a number of aspects in user studies, which include users' information behaviour and information needs. On the other hand, Shapiro & Hughes (1996, 2) looked at information literacy from a liberal arts background by defining it as *"a new liberal art that extends from knowing how to use computers and access information to critical reflection on the nature of information itself, its technical infrastructure, and its social, cultural and even philosophical context and impact"*

In addition to the above definitions, the Journal of Information Literacy (JIL, 2006) defines information literacy as follows: *"Information literacy is knowing when and why you need information, where to find it, and how to evaluate, use and communicate it in an ethical manner"*.

To sum up various conceptions of information literacy, common aspects in various definitions include users' awareness of their information needs and cognitive processes involved in finding and using information. Furthermore, Correia & Teixeira (2003) point out that Webber & Johnson (2000) highlight the main features of information literacy skills, consisting of the following: competency in selecting and interacting with the most appropriate source of information, whether that be in print, electronic or another person; feeling comfortable with the tools needed for that interaction; communicating information effectively and appropriately; taking an intelligently critical approach to information in whatever form (e.g. paper, electronic, other people) and appreciating the changes in information economy that affect what is presented; using and managing information effectively in a personal

and work context and; developing a sense of oneself as an information literate person.

The importance of information literacy in the academic environment has been highlighted in a wide ranges of studies (Varga-Atkins & Ashcroft, 2004). Generally, literature indicates that faculty members consider information literacy skills to be a requirement for academic success. However, on a more specific note Bundy (2002) points out that information literacy forms a requirement for participative citizenship, social inclusion, creation of new knowledge, personal empowerment and lifelong learning. With regard to specific aspects of information literacy, the American Library Associations standards for schools and the Association for Educational Communications and Technology (AECT) (ALA, 1998) highlighted the importance of information literacy to independent learning and social responsibility (Bruce, 2002). Similarly, the Library and Information Commission of the UK recognizes the importance of information literacy in facilitating access to knowledge (Webber & Johnston, 2000). In addition to the above observations, Bruce (2002, 1) argues further that *"information literacy is generally seen as pivotal to the pursuit of lifelong learning, and central to achieving both personal empowerment and economic development. Information literacy education is the catalyst required to transform the information society of today into the learning society of tomorrow"*. To conclude, various studies indicate that information literacy forms an important aspect of teaching and learning in various academic disciplines. This is true for the fact that information literacy provides learners with requisite information seeking skills and attitudes essential in enabling them to acquire the required information to solve various problems and acquire knowledge essential for the lifelong learning process.

#### **2.4.1 Common attributes of information literacy training programmes**

The literature reveals that various studies have put emphasis on teaching critical thinking skills, design of the instruction in a situated and experiential learning environment, utilizing constructivist views, collaborative learning, self directed inquiry based and problem-based approaches (Doherty et al, 1999). The emphasis on design programmes that enable students to demonstrate higher order abilities is reflected by various researchers (Ramsden, 1992; Rakes, 1996; Iannuzzi, 1999).

These higher order abilities include analyzing, synthesizing and evaluating information. Thinking skills are considered important in enabling learners to solve complex real world problems, generate solutions to problems, draw inferences and distinguish between facts and opinions. In the long run, thinking skills empower learners with lifelong learning and effective performance of professional and civic responsibilities (ACRL, 2000).

Thinking skills become effective when applied in problem-based and collaborative learning environments (Sage & Torp, 1997). The above is true for the fact that problem-based learning gives students the opportunity to learn how to solve real life problems through the application of knowledge and skills, and reflecting on their own experiences (Bligh, 1995). Problem-based learning is, in most cases, carried out in a situated learning environment in which learning is embedded in the social and physical context within which it will be used. This is achieved through performing goal-directed activities situated in circumstances that are authentic in terms of the intended application of the knowledge acquired. The main characteristics of situated learning among others include the provision of real context that reflects the way the knowledge will be used in real-life; valid activities, supporting collaborative construction of knowledge and promotion of reflection to enable abstractions to be formed (Brown, Collins & Duguid, 1989). As was mentioned above, situated learning is more effectively applied in a collaborative learning environment in which learners work in groups towards a common academic goal. The sharing of ideas among groups increases motivation to learn, and it helps to achieve higher level of thought and retention of information among participants (Johnson & Johnson, 1986).

In view of the aspects mentioned above, the teaching of information literacy in the past decade has considered applying these pedagogical practices in order to effect learning. There is much evidence of the applications of various aspects mentioned above. The DEDICATE (Distance EDUcation Information Courses with Access Through nEtworks) designed information literacy courses to create an environment which would encourage learners to engage in deep learning, to facilitate understanding and retention of knowledge (Fjallbrant et al, 1999). The DEDICATE courses emphasized the importance of enabling learners to engage in active, self-



directed and situated learning activities together with experiential learning about the use of networked resources and searching for scientific or technological information. The design framework and facilitation environment for the courses was based on a constructivist approach which considered knowledge construction process taking place through an evolving process of personal, active engagement with the external world. Through face to face meetings, hands on activities, collaborative projects and group work, participants were able to engage in activities related to designing distance education courses on training for information literacy.

Whereas the application of various pedagogical skills in the above example considered the usage of online resources for distance learners, Oliver & McLaughlin (1999) developed an online problem-based learning course based on a RonSub (a web-based database learning system that supports problem-based learning). The database provided various categories of students (campus-based and distance learners) with the means to collaborate on set problems, to share resources, to post solutions and to compare and review answers from other groups. Students undertook weekly activities which included information seeking, critical thinking, collaborative group work and problem solving. The results from this approach indicate that learners were encouraged to practice and develop requisite skills across a wide range of managerial skills, which included management of self, management of others, management of information, and management of tasks.

The analysis above has demonstrated the importance of problem-based approaches through situated, experiential and collaborative learning environments to facilitate critical thinking skills among learners. In the long run, these skills help learners participate in a lifelong learning process. However, literature indicates that not all forms of information problem-based learning settings would equip learners with problem solving skills. Oliver & Omari (2001) carried out a study to explore students' responses and reactions to a web-based environment that supported problem-based learning among undergraduate students in an Australian university. The findings revealed that while the majority of the students saw value to be gained from learning in a student-centred and collaborative setting, many expressed their preference for learning in the more conventional teacher-directed forms. The study also aimed to explore the potential of the environment to develop problem-solving

skills and to determine factors which impeded students' success and achievement. Results however, did not demonstrate distinct development of problem-solving skills despite students' extensive experience and participation in problem-solving activities. This study helped to suggest that participation in the problem-based learning setting requires conscious effort aimed at helping students to reflect on their learning process and provision of feedback which informs and encourages their learning.

In addition to the above, literature reveals that thinking skills, which among others include evaluating information, are considered to be complex processes that occur in the context that involves other tasks such as decision making and raising arguments (Fitzgerald, 1998). In a broader sense, these tasks involve various processes such as meta-cognition, goals and motivation, inquiring, reflecting and making decisions. It is from the challenge highlighted above that this research considered employing a number of teaching methods which among others encouraged reflections and feedback on the learning process. These include quizzes, reflective sessions and group work.

#### **2.4.2 Information literacy studies**

Literature indicates a number of studies related to academic information literacy. These studies have been conducted for various purposes, including demonstrating the need for information literacy training, applications of various teaching/learning methods, teaching information literacy in specific subject domains and assessment methods for information literacy competencies. In Canada, a study was carried out to analyse information literacy instruction in Canadian academic libraries (Julien & Boon, 2002). Results from semi-structured interviews with librarians and documentary reviews indicated a range of instructional activities such as using search tools and other library related services. These programmes were carried out through instructor-focused lectures, and guided computer laboratory hands-on activities. Others included using online tutorials. However, due to lack of knowledge in imparting information skills to users, this study proposed more training for instructors based on designing programmes which articulate learning objectives, with appropriate pedagogical principles and evaluation mechanisms.

In the UK, the Big Blue project (Big Blue, 2002) aimed to survey current practice in information skills training for students in higher and post-16 education. Through conducting an extensive literature review on practices in information skills training worldwide, it was found out that there was a relatively small amount of published literature which relates to the UK experience of information skills. Moreover, the available literature describes approaches to the introduction of information literacy programmes adopted by individual institutions. However, through using audits and case studies, this study also found that several individual institutions demonstrated good practice in terms of evaluation of programmes, innovative methods of delivery or the embedding of training into a curriculum. Unlike the Canadians' use of fewer delivery methods, most institutions in the UK used lectures, small group demonstrations and hands on activities. These were delivered in the form of induction and drop-in sessions. A need to embed information skills training into a curriculum was stressed.

While the Big Blue's study focused on students in higher and post-16 education, The JUBILEE (JISC User Behaviour in Information seeking: Longitudinal Evaluation of Electronic Information Services) research project was established to monitor, investigate and evaluate the use and/or non-use of Electronic Information Services (EIS) by staff and students within UK Higher Education Institutions, and review consequent impacts on teaching and learning. Results from this study discovered an exponential increase in the use of EIS with varying practice between institutions and disciplines, and identified a range of EIS which respondents preferred. However, there was a concern about a student's ability to evaluate and use the information that they found. This study further suggested the use of virtual learning environment (VLE) software to improve students' skills in using EIS.

Todd (2006) gives an account of primary schools students' indications for the significance of information literacy education to facilitate access to information sources. The purpose of the survey was to find out the extent to which information literacy skills that promoted critical thinking skills could aid students in searching for and locating information, selecting information on the basis of relevance and quality, structuring and organizing information to represent their understanding of their topic, and presenting their new understanding in appropriate ways. Results from Ohio School Libraries' study indicate that the information literacy

interventions helped them understand good research and how to undertake good research. The interventions also helped students to evaluate, analyze and synthesize information, engage constructively with information technology, and construct their own understanding out of ranges of information sources accessed and information gathered. In addition, the study indicated that information literacy training enabled them to use technology tools to access and evaluate information reflectively and critically in the creation of their knowledge products. Furthermore, the study indicated that developing information literacy skills gave students the ability to complete learning tasks and work independently outside the library environment.

The above studies help to demonstrate various efforts of teaching and learning information literacy courses in schools and institutions of higher education. These include traditional methods such as lectures together with hands-on activities in using technology tools (ICT) to locate and access information, group discussions and demonstrations. However, the above studies highlighted the importance of emphasizing thinking skills and the need to provide appropriate pedagogy.

While the above studies highlight collective projects, there is wide range of research studies that focused on information literacy initiatives in particular institutions. Porter (2005) reports on a research that was carried out at the University of the Sciences in Philadelphia. The purpose of this study was to find out whether information literacy knowledge was vital in students' understanding of a topic and for conducting research. Students received information literacy instruction and then selected, updated, and wrote about a current research topic in an upper-level cell biology course. Students researched the chosen topic using paper and electronic resources. They generated a list of relevant articles, prepared abstracts based on papers they read, and prepared a "state-of-the-art" paper on the topic. This study revealed that students were able to come up with well-researched and well-written papers that incorporated some of the latest research in cell biology. The findings from the study above demonstrate the importance of higher order thinking skills through a problem based approach in teaching and learning information literacy. Furthermore, this study proved that certain aspects of information literacy (finding, understanding, evaluating, and using information) could be taught through focusing on specific subject domains and yield better results.

The research results by Johnston & Webber (2000) indicate a further attempt beyond teaching various aspects of information literacy in a particular subject domain. The above authors conducted research to determine whether information literacy could be taught as an independent course. Through the use of responses from University of Strathclyde exercises and tutorials, this study revealed that students were able to experience and define information literacy while going through an information seeking process and recognized its importance in a life long learning process. Also students revealed that effective methods of teaching and learning information literacy were those that emphasized problem-based learning approaches which could improve deep learning. This study stressed further that there was a need to find out how information literacy could best be learned and assessed. Furthermore, there was a realized need to consider course designs that addressed how courses could be taught and what would be taught.

The two studies highlighted above help to indicate that with an appropriate course design, information literacy could be taught either as an independent subject or certain aspects of it could be taught in specific subject domains.

Literature further revealed that efforts have been taken to devise various suitable teaching methods for information literacy to meet learners' information seeking objectives. One way of teaching information literacy is through tutorials in both face to face and online formats. Hunn & Elliot (2005) conducted a survey of information literacy tutorials from English speaking countries, as part of the research phase for the investigation and development of an adapted electronic learning information literacy tutorial for students at Cranfield University, Shrivenham campus in the UK. This research aimed to investigate different ways by which tutorials helped students to learn, their effectiveness as a learning tool and relevance in terms of practical application. Results from 30 information literacy tutorials indicated that tutorials could easily cater for theorists and activists in information literacy and also, technology is being used to provide straightforward self-assessment, usually at the end of the tutorial. However, tutorials do not essentially offer a rich learning environment and many institutions have not been able to develop tutorials which are comprehensive in information literacy. Moreover, tutorials were found to be unable to provide help to the student on coping with information overload, owing to a

considerable inconsistency in tutorial and module size. This study helped to indicate a need to adapt several teaching and learning methods to supplement each other.

In addition to applying different teaching methods, studies in information literacy have demonstrated the need to adapt appropriate tools for assessing the learning outcomes of particular programmes. These could be through assessment tools such as tests or other forms of self assessment mechanisms. Assessment tools could assist in gauging levels of knowledge in order to “fine-tune” these problems for the best effects. Stubbings & Franklin (2005) developed sets of informal checklists and formal online tests at Loughborough University Library to determine research postgraduate students’ information literacy competencies prior to attending an information literacy course. The tests were intended to encourage postgraduate researchers to reflect on their information searching abilities. Following the assessments research postgraduate students then attended appropriate courses relating to their information literacy needs. Results from PhD students who responded to checklists and online tests indicated that they always over estimate their information literacy skills. Students were also seen to have difficulties in reflecting on their information literacy skills. They lacked motivation to attend and interact during information literacy courses as a result of the above weaknesses.

Worden (2006) conducted a study at The School of Languages and Area Studies, University of Portsmouth to check whether students acquired information literacy skills in first and second years of their studies. Multiple choice pre-tests were administered to the level two students two weeks before they attended their first session to enable subject librarians to gauge the students' level of knowledge and adjust the teaching programme accordingly. The questions also helped to show students why they needed further sessions in their second year. At the end of the block of three sessions the same multiple choice questions were administered again in order to check how much the students had taken in. The results indicated that an average score of between 9 and 11 out of 30 was the norm for the pre-test since 2001. Most students achieved much better scores in the post-test, with some even quadrupling their initial score. The assessment methods used in the two studies mentioned above assisted to demonstrate course aspects where more emphasis was to be focused to assist individual students achieve learning objectives.

Challenges on the need to apply theories of learning to information literacy education in coherent ways and various aspects of design, assessment, teaching and learning information literacy have been highlighted in the above studies and many more. In realizations of these challenges, Bruce et al (2006) proposed the Six Frames for Information Literacy Education model, a tool for analyzing, interpreting and understanding the challenges mentioned above. This model identifies six views by which information literacy is learned. The content frame model involves people who teach information literacy in a discipline orientation which assess information literacy through determining how much one has learned. The competent frame considers what learners should be able to do and at what level of competence. The learning to learn frame considers the aspect of thinking like an information literacy person and helping the learner construct knowledge appropriately (a constructivist approach). The personal relevance frame considers the sense of what information literacy can do for them (experiential learning) while the social impact frame considers how information literacy impacts the society through the way it can help communities inform significant problems. The relational frame on the other hand is concerned with the ways in which learners are aware of information literacy or specific relevant phenomena associated with information literacy. The relational frame with the use of Reflective Online Searching System (ROSS) assisted students to actively plan and reflect and influences the quality of their research results. In addition different frames could be used together for certain contexts.

What can be observed from results of studies above (and similar many others) includes emphasis on appropriate teaching and learning methods of information literacy. Literature reveals that the above can be fulfilled when the design of such courses focuses on enhancing learners' critical thinking skills (Brown & Krumholz, 2002). This concurs with observations made by Macpherson (2002) who argues that the design of information literacy programmes should focus on what and how to teach the skills. Further to an appropriate pedagogy, most studies emphasised a need to provide effective mechanisms for evaluating the courses in terms of skills acquired and teaching/learning methods used. Furthermore, the framework such as the one by Bruce et al (2006) provides the insight of the significance of course design that considers adaptations of various frames to assist in teaching, learning and evaluating information literacy programmes.

This review therefore serves to highlight the need to design information literacy programmes that take into account various teaching and learning methods and appropriate evaluation mechanisms. Bearing in mind the above needs, the sections below attempt to highlight different areas from which the design framework could be developed. In addition, various pedagogical aspects and theories of learning have been elaborated, to delineate further how teaching methods such as lectures, presentations and reflections could be applied through adapting appropriate educational theories.

## **2.5 Behavioural models and their characteristics**

Wilson (1999, 250) describes a model as “...a framework for thinking about a problem and may evolve into a statement of the relationships among theoretical propositions”. Models present the relationships between theoretical propositions and processes related with identification and satisfying one's information needs. Studies in information seeking behaviour have adopted different models in order to understand factors that influence the behaviour process such as cognitive, the affective, the social, the physical, cultural or spiritual factors (Bates, 2002, 3). Models in information seeking behaviour present set of actions, processes (such as Kuhlthau (1991) information search process: initiation, selection, exploration, formulation, collection and presentation) and mental states.

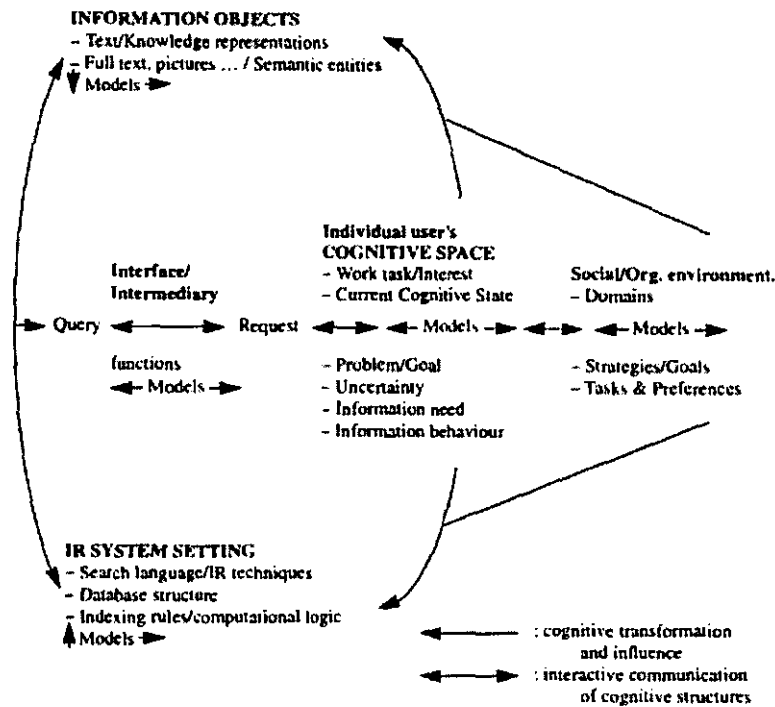
There exist various models of information behaviour research. The most commonly cited include Wilson's (1981) model of information-seeking behaviour; Belkin et al's (1982) Anomalous State of Knowledge (ASK); Dervin's (1983) sense-making theory; Krikelas' (1983) model; Ellis's (1989 and 1993) behavioural model of information seeking strategies; Kuhlthau's (1991) model of the stages of information-seeking behaviour; Marchionini's (1995) model of information seeking; Wilson's (1996); Ingwersen's (1996) model; Wilson's (1999) nested model; Hepworth's (2004) model, to mention but a few. These models can be categorized according to various criteria. This section intends to classify the models according to the main characteristics they demonstrate, which are: cognitive, information needs and sources, social and multifaceted approaches that most models attempt to demonstrate (Pettigrew et al, 2001, Case, 2002).



### **2.5.1 Cognitive approaches**

According to Pettigrew et al (2001), the cognitive approach focuses on the attributes of an individual when engaged in the information seeking process. This involves aspects of information seeking, cognitive and emotional factors in a particular context. The concept of cognition incorporates various components such as knowledge states. The knowledge state of an individual is important for enabling a person to perceive, interpret, modify or transfer information. According to Demey (1982), information behaviour that takes the cognitive approach focuses on studying various ways by which individuals apply their view of the world in terms of needs, seeking, presenting and using information.

Various models of information seeking have adopted the above approach. Examples include Ellis's (1989) information need and seeking behaviour model which identifies six main features of a search process namely starting, chaining, browsing, differentiating, monitoring and extracting, can interact for persons seeking information. The interaction varies among persons, depending on unique characteristics they exhibit while seeking information at a particular time. This model could be used as a tool to analyze and elaborate web searching behaviours of individuals. Similar models that fall into the electronic environments include Ingwersen's cognitive model which focuses on identifying cognitive elements which may occur in information processing (Ingwersen, 1996).



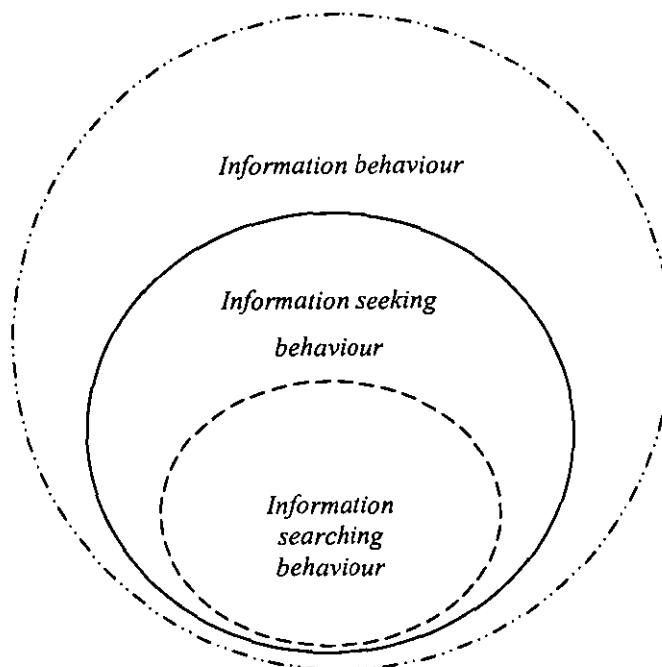
**Figure 2-2: Ingwersen's (1996) cognitive model (Wilson, 1999, 259)**

In this model, the information seeking process of an individual is mediated by the state of the knowledge of the device (such as a computer), and the knowledge of a subject domain. The individual generates and determines concepts and categories of what they know in relation to the information seeking process in a social context, in order to help in creating a new state of knowledge.

Kuhlthau's (1991) information search process model is another example of models that falls under the cognitive approach. This model is informed by the theoretical principles of Kelly's Personal Construct Theory, Belkin's (1982) Anomalous State of Knowledge and Taylor's (1991) Value Added models. The model presented three spheres of activity, namely physical, affective and cognitive. Kuhlthau identified six stages in the information search process that incorporate the attributes of feelings, thoughts and actions for an individual seeking information. These stages include initiation, selection, exploration, formulation, collection and presentation. This model is important in the cognitive approach since it illuminates various attributes of the individual which matches with each stage of information search process independent of context. The feelings associated with confusions, uncertainties, hope, frustration, relief and happiness take place throughout the search context. These

feelings are unique among individuals and can take place at different times when engaged in a particular information seeking experience.

In this category is also a general model of information seeking behaviour by Brown (1991) which identified aspects of information seeking behaviour, namely the conditions, the context and the process. This model is centred on the individual and helps to demonstrate information behaviour of an individual in relation to his/her cognitive and affective states. According to Brown, cognitive and affective states develop and change in relation to the individual's age. Information seeking behaviour develops and improves throughout an individual's lifetime due to changes that affect human activities. This model to some extent reflects the notion of lifelong learning in relation to information literacy since it treats information seeking as a learning process. Furthermore, Wilson's (1999) nested model attempts to elucidate various attributes of an individual which explain information seeking independently from variations in context.



**Figure 2-3: Wilson's (1999) Nested Model (Godbold, 2006)**

This model recognizes that human communication behaviour provides ways of understanding the cognitive aspects of information behaviour.

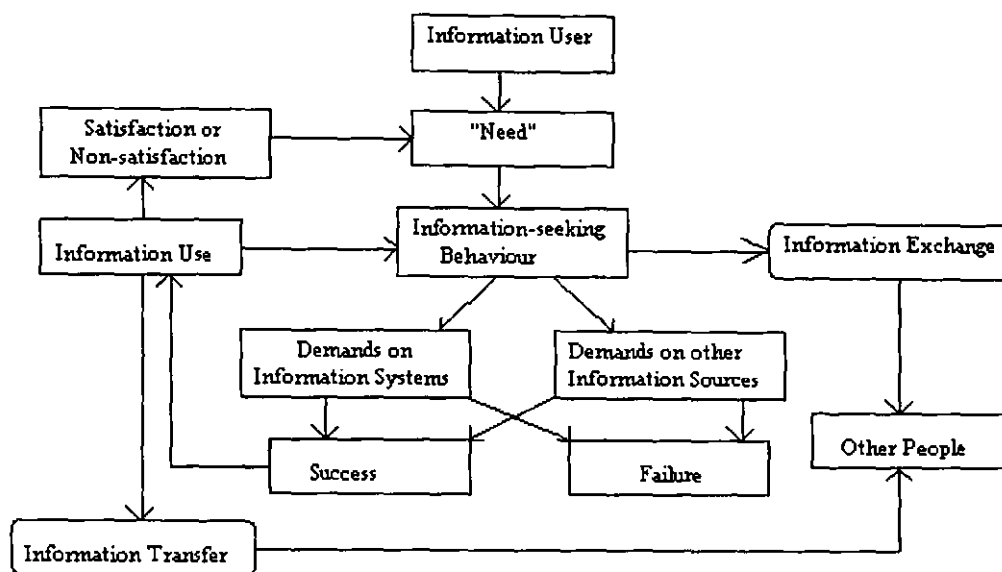
Despite being popular for over a decade, several criticisms have emerged against the cognitive approach. The focus on the individual has been criticized by Pettigrew et al (2001) who argue that this approach does not consider the role of a social context in shaping an individual's information behaviour and resulted in designing models which are context-independent. The critics recognize the important role that the social nature of information seeking plays in shaping an individual's information behaviour. Furthermore, the affective states approach tends to focus on information needs arising from problematic situations, hence focusing on information behaviour related to purposive information seeking (Talja, 1997).

However, despite various criticisms, models that are categorized under cognitive approach have attempted to provide an understanding of variations in information behaviour as a result of characteristics of an individual in relation to the information seeking process. Most of the models under this category recognize that information seeking process is context-independent.

### **2.5.2 Information needs and sources approach**

This category of information behaviour research centres on the notion that an information need arises when an individual discovers that there is lack of knowledge in his/her state of mind and therefore works to fill that gap (Wilson, 1981). In so doing, an information searcher consults various information sources that contain information that would provide answers to fill the knowledge gap.

Various information seeking behaviour models have addressed the above aspects. For example, Wilson's (1981) model recognizes that the information user has a need which may or may not originate from his/her level of information satisfaction or dissatisfaction (Case, 2002). The need prompts the user to consult various sources of information to meet his/her information needs.



**Figure 2-4: Wilson's (1981) information behaviour model (Wilson, 1999, 251)**

The information seeking may result in either success, and therefore satisfaction to solving the information need or failure to acquire the desired information.

Belkin (1990) argues that information seeking behaviour emerges as a result of a person's recognition of an Anomalous State of Knowledge (ASK). This means that the state of knowledge an individual has is insufficient to solve a current information problem. When users face problems and recognize insufficient state of knowledge to solve that problem, they decide to obtain information in the problem area as a means towards its resolution. Therefore this model recognizes that information needs prompt an individual to find solutions to the anomalous states of knowledge and advocates the fact that information need is a means towards satisfying some more basic need, i.e. the resolution to a problem.

Similarly, Leckie's model (Leckie et al, 1996) recognizes that work roles and associated tasks prompt a person to seek for information. Information needs create awareness of information sources and/or content hence motivate him/her to examine the sources in order to acquire relevant information. Success in obtaining the desired information is determined by the familiarity and prior success in using the source, method of information search, quality, accessibility and other related aspects. To some extent this model bears some similarities with Hepworth's (2004) model

which recognizes that roles, norms and tasks (which are grouped as sociological data) are seen as being responsible to create the information need in the context that an individual finds him/herself. The person then consults information sources which contain information that help him/her to resolve a situation and help complete the task.

Several critics to this approach have argued that viewing information seeking by considering users' information needs has connotations for the recipient of information being inferior and dependent on the information provider, hence creating unequal power relationships (Julien, 1998). However, despite the criticism, the models described in this category are considered useful in the design of an information literacy programme. These models recognize users' information needs or gaps that emerge as a result of their roles, norms and associated tasks in the academic environments, hence the need to approach appropriate information sources to solve the problem situation.

### **2.5.3 Social and multifaceted approaches**

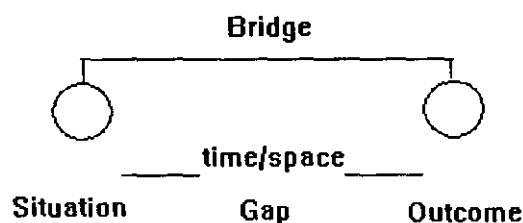
The social approach in studying information behaviour focuses on the meanings and values associated with social, socio-cultural and sociolinguistic aspects of information behaviour through a naturalistic approach. On the other hand, multifaceted approaches recognize the fact that human information behaviour is a complex phenomenon since it covers a wider span of information-related activities beyond the field of library and information science (Pettigrew et al, 2002).

The social approaches in information behaviour research have employed various methods including phenomenological and phenomenographic work in a variety of fields including sociology, philosophy and social anthropology. The advocates of this approach include Huotari & Chatman (2001) who developed frameworks for studying information behaviour through the theory of information poverty, theory of life and normative behaviour. In the theory of information poverty, for example, Chatman's (1999) framework provides an understanding on ways by which several situations exist in which people recognize the relevance and importance of information, however social and other costs prompt them to ignore it. The framework elucidates how individuals describe and use their life experiences in

order to endure in a world of information poverty. On the other hand, the theory of normative behaviour focuses on the characteristics of common or routine events in relation to the way people share similar cultural space. This theory is important in information seeking since it recognizes that through sharing similar cultural spaces and maintaining social types, the ways by which people engage in information seeking may be affected. This may result in prompting users to avoid or disengage in information seeking or moving to another social world where engagement in information seeking may occur more freely. The social approaches to information behaviour research have become common although research results in this category are still new.

The multifaceted approach has been used to study various models of information behaviour including cognitive, social, social-cognitive and organizational. According to Allen (1997), models demonstrate particular situations and particular type of need in each of the steps of problem-solving; however, no one could address all situations. Hence a need to have models that incorporate all aspects mentioned above was realized.

Several models have been developed that reflect the multifaceted approach. For example, the sense-making approach by Dervin (1999) is considered to be a metatheory that would guide the study of information seeking. Its main concepts include time, space, movement and gap. Sense-Making is based on a central organizing image of a person walking through time-space, facing a gap, bridging the gap to make sense, and moving on to the next moment in time-space.



**Figure 2-5: Dervin's (1999) sense-making model (Wilson, 1999, 254)**

This model is considered multifaceted since it advocates the notion that information seeking is not only tied to the cognitive domain. Humans undergo various kinds of

experiences while seeking information including emotions, feelings, wishes and perceptions. In addition, information seeking does not always end positively (sometimes information looked for may not be found). Furthermore, since information seeking and use does not take place in an ordered world, seekers may need to create or modify the order of things they encounter in the search process and that research in information seeking should look at the past and future as well.

#### **2.5.4 Summary of the information seeking models**

Most models draw various common elements that classify them into various categories as described above. However, these models differ in several respects from one another. For example, various models under the category of cognitive approach bear distinctive characteristics that differentiate one from the other. Some models such as Belkin (1990) and Wilson (1981) concentrate on stages when information need arises, such as problem recognition, problem identification and the like (Niedźwiedzka, 2003). Models such as Wilson's problem solving (1999) extract the intellectual process of problem solving from the context, and focus on it. Some models show the user in action, continuing from problem definition, through information seeking, interaction with certain information systems to the stage of information processing and use. One example is the model of Wilson (1981), and those of Ellis (1989) or Kuhlthau (1991) that are restricted to the stage of information search. Furthermore, models such as Hepworth (2004) and Kuhlthau (1991) realize that the information seeking process takes place associated with affective states in form of confusions, uncertainties, hope, frustration, relief and happiness, although Hepworth's model does not assume that one stage of information seeking leads to another since it is not designed according to stages.

Differences also arise from the categories of information behaviour studies which resulted in their creation. For example, the Leckie et al (1996) and Wilson (1981) models originate from the literature of information studies whereas the model by Marchionini (1995) has roots from information retrieval. Models such as Hepworth (2004) recognize people and organizations as sources of information whereas models such as Krikela (1983) emphasize the use of recorded literature. Furthermore, models such as Wilson (1981) recognize that information can be exchanged with other people (information transfer) when it is at the stage of use.



Wilson's (1999) general model identifies activating mechanisms as motivators for information seeking (Case, 2002). Intervening variables such as psychological, demographic background, social roles and so on, affect person's motivation to seek information. Similarly, Brown (1991) recognizes a range of barriers that information seekers encounter in the information seeking process. These include organizational structure, physical environment, organizational function, personality and search strategy. The difference between the two researchers mentioned above is that Wilson's categories of barriers such as cognitive dissonance; selective exposure; physiological, cognitive and emotional characteristics can be imposed (or controlled) by the information seeker him/herself.

While Wilson (1999) admits that feedback loops should exist in all models, this is not true for several models since they have failed to indicate the fact that information seeking is an iterative process (Spink & Losee, 1996). Much as a few models assume that this is the case, only Hepworth's (2004) and Wilson's (1999) explicitly indicate iteration taking place in the information seeking process. Iteration in information literacy is very important since learners do not go about the information literacy process in a linear form as various models tend to indicate. Furthermore, the intended applications of the models differ among each other. Whereas models such as Wilson's (1981, 1999) were meant to demonstrate the broad range of information behaviour, hence general in nature, Leckie's (1996) model is intended to study professionals whose work roles and associated tasks prompt them to seek information.

The above differences have resulted in making most models very unique in nature hence their intended applications vary from one information seeking context to another.

### **2.5.5 Fundamental issues in information seeking behaviour models and their significance in teaching and learning information literacy**

The models discussed above raise a number of issues that play an important role in understanding the relationships among theoretical propositions and processes connected with identification and satisfying one's information needs. They include the question of context, cognitive issues in the learning process, sources of

information and barriers to information seeking. These issues have a bearing on the teaching and learning of information literacy, information literacy skills and learning processes.

#### **2.5.5.1 Context issues in information seeking behaviour and information literacy**

Context is generally defined by University of Texas, Austin (2004) glossary as *"...social, cultural, political, historical factors that surround a particular event or development of thought. These are the forces of influence at play when the event actually occurs. Greater knowledge of the context of a thing leads to a deeper understanding of and more balanced perspective on its nature"*. Erickson & Schultz (1997, 22) describe context as *"...a mutually constituted, constantly shifting, situation definition that emerges through the interaction of the involved individuals. Contexts are not simply given in the physical setting ... nor in combinations of personnel.... rather, contexts are constituted by what people do and where and when they do it"* According to Dilley (1999, 19) context is *"... both constitutive of social action and itself the outcome of social action, it is both a generative principle and a resulting outcome."* Augier, Shariq & Vendelo (2001) argue that context becomes apparent when an individual comes across a situation, which results in context. Context emerges for an individual in a specific situation, based on what that individual experienced in the past. Context emerging to more than one person will not be the same since they have different experiences, however, similarities among individual experiences might result in contexts with many similarities.

Context plays a role in teaching and learning information literacy. Various researchers recommend that effective teaching information literacy considers students' learning context (Moran, 1998), whether traditional or cyber learning environments. In order to develop effective teaching and learning strategies, teaching staff need to become aware of the potential applications of processes, systems and resources to learning contexts (Bruce, 1994). The knowledge about the teaching context of information literacy courses helps to design course programmes that suit specific academic situations. The context in which course structure is applied may have an impact on the learning process (Orr & Wallin, 2001). For example, whereas a course structure for using the library database for undergraduate

students may cover a few hours, it may entail postgraduate students spending more hours to learn about various features the database has to help them with their final theses. Therefore the contexts in which the courses take place assist the design and implementation of information literacy courses. The aspect of context is also important in thinking skills since, as Siegel & Carey (1989) argue, context impacts thinking in general. In this case context includes physical environment, social situation, and the contexts surrounding the information itself.

#### **2.5.5.2 Cognitive and learning process in information seeking behaviour**

The Webster dictionary defines cognition as “*an intellectual process by which knowledge is gained from perception or ideas*” (Merriam-Webster, 1997). Morrison, Ross & Kemp (2001) define cognition as “*mindful process of knowing or being conscious of feelings or perceptions, including understanding and interpretation*”. Shariq (1999, 245) categorises cognition into two types as follows: “*Internal cognition is the accessed knowing of tacit, codified abstractions and artifacts by an enactor in a particular situation. External cognition is the embodiment of the natural and the artifactual environment with which the enactor is interacting in that particular situation. This includes faces, signposts, interactive computer visualizations and day to day artifacts. External cognition, however, is meaningful only through and during the interplay of internal and external cognition of the enactor*”.

Knowledge acquisition is described as a mental activity that entails internal coding and structuring by the learner, a process which can be referred to as learning. (Ausubel, 1967). Miller & Findlay (1996, 167) define learning as “*the process of acquiring knowledge, attitudes, or skills from study, instruction, or experience*”. It can also be thought of as the reorganization of knowledge structures. Through the learning process, an individual restructures the knowledge that has been organized by others, in order to make it fit in his or her own knowledge structure. Also the learning process is a result of the information seeking, since individual views of a topic are shaped through the information seeking process (Kuhlthau, 1991). Information seeking, like learning and problem solving, demands general cognitive facility and special knowledge and skills, and is facilitated by attitudes and

preferences. Cognitive facility or intelligence includes a person's abilities to remember, make inferences, and monitor intellectual activity (Marchionini, 1995). Cognition is very important in information seeking since it involves the integration of information into an individual's mental state that influences the information seeking behaviour process. The models outlined above, particularly those by Wilson, Belkin, Ellis, Marchionini and Dervin have approached the problem of information needs from a cognitive approach.

Cognition is central to teaching and learning information literacy. It is evident that in various learning process, students go through a series of cognitive processes such as synthesis, analysis, evaluation and utilization of knowledge (Ribbons, & Hornblower, 1998). Dennis (2001) argues that cognitive processes can not be separated from the searching stages of information literacy. These stages require users to use cognition in interacting with sources and search tools such as the Internet or library OPAC. In addition to the above, users exhibit various cognitive styles of information searching, such as perceptions and problem solving (Wang et al, 2000). These processes help users to acquire information literacy competencies, which consist of complex cognitive skills including problem solving, reasoning and higher-order skills such as self-regulation and learning-to-learn (Keen, 1992). Furthermore, cognition helps learners frame their mind sets with regard to information needs and the product. Through reflection, learners form meaning from the information accessed in connection to their prior knowledge of a particular information problem (Bundy, 2004). This helps them to determine the value added to the new knowledge and other unique characteristics of the information. It is also argued that the thinking process is an object of cognition and in the process of developing thinking skills, cognition plays a role in making learners active creators of their knowledge and frameworks of interpretations. This is because learning is a process of searching for meaning.

#### **2.5.5.3 Work roles and associated tasks**

The role of an individual consists of tasks, and these tasks can either be given to this individual, or a particular individual can identify the tasks. Each task has two parts, that is a beginning and an end. The beginning part of tasks contains known stimuli

and guidelines concerning goals and/or measures to be taken (Hackman, 1969). In information seeking, information-related tasks can be seen as perceived (or subjective) tasks or objective tasks. The perceived task always forms the basis for the actual performance of the task and for interpreting information needs and the choice of promising actions for satisfying them (Jarvelin & Wilson, 2003). Several models have highlighted the significance of work roles and associated tasks. Ingwersen (1996) demonstrates that within each area of his model the functions of the information user, the document author, the intermediary, the interface and the information retrieval system are the result of explicit or implicit cognitive models of the field of interest at that particular point. Therefore, users have models of their work-tasks or their information needs, or their problems or goals, which are usually implicit, but often capable of explication.

Work roles and associated tasks are very important because to some extent, they give rise to people's information needs. Byström and Jarvelin (1995) recognize the fact that people's information seeking depends on their task and how task complexity can be used to model information needs, seeking, channels and sources. Once the task is accomplished, a person has a more developed conceptual structure concerning the task and rechecking searches are made for possible additional information (Kuhlthau, 1999).

Work roles, associated tasks and goals have an impact on information literacy. In the academic institutions, the main tasks of academicians include teaching, learning and research. Information needs arise in the course of participation in these tasks, hence forcing an individual to seek for information. The design, teaching and learning of information literacy in an academic environment generally reflect these tasks and goals. Information literacy programmes are meant to prompt learners' awareness of their information needs, familiarize them with information resources based on fields of interest and determine a proper direction to take in the information search process through reflecting the characteristics of learners' information needs. Lupton (2002) argues that in order to meet students' information needs, course designers should embed information literacy into course content and programs of study. This helps learners to create appropriate information seeking

paths to locate, access, evaluate and use information relevant to their academic requirements.

#### **2.5.5.4 Sources/channels, characteristics and affective states in information seeking**

The sources and channels used to find information to resolve a need or fill a knowledge gap has been one of the major issues highlighted in most models and associated studies. This is due to the fact that the availability or lack of an information channel or source could motivate users into a certain form of information seeking behaviour. Most models highlight sources of information as formal or informal, print or non print, which users consult to bridge the knowledge gap. Byström & Järvelin (1995) classified the types of information sources as:

- General-purpose, which comprise of: experts (knowledgeable colleagues); literature such as books, journals, reports, and newspapers; personal collections such as personal notes, calculations and many others.
- Fact-oriented, which comprise of: registers such as manual and computerised catalogues and files and; commercial databases.
- Problem-oriented, which consist of: people concerned such as people who propose or are affected by administrative actions; official documents like agendas, meeting minutes, letters, applications, memoranda, maps and unpublished planning documents.

Channels can be defined as means by which ideas, opinions, facts and interpretations are communicated in a formal or non formal ways (Ford, 1984). Users determine which channel to use and sources to consult after considering several factors such as accessibility, quality and affordability of the information and the channel they can opt for. Situations that create gaps, anomalous state of knowledge or uncertainty promote the use of a variety of information source (personal or non-personal, internal or external). Kuhlthau (1997) argues that the criteria for making choice in the information search process are influenced by several factors, one being the availability of information.

In Wilson's general model of information behaviour, various characteristics (intervening variables) have been identified, which could also be considered as

barriers to information. According to Wilson, the environment within which the role is performed, or within which the inter-personal activity is played out could affect the situation of need. Environment could impose barriers of an economic, political, geographic or other nature. Ford (1984) has also noted other forms of barriers that influence information-gathering behaviour. These include cultural factors, national characters, language and informal networks.

The above aspects of sources/channels, characteristics and affective states in information seeking have a bearing on teaching and learning information literacy. Research has revealed that source characteristics contribute to availability of information. Information literacy is concerned with the knowledge of availability of information in varieties of formats (Doyle, 1992; Asher, 2003). According to Wilson (1996), source characteristics may support or deter success in information search. Lantz (1999) argues that information literacy assists users to alleviate barriers to information through successful identification of relevant information sources and application of appropriate information search strategies. In addition to the above, literature indicates that information seeking process is very much iterative (Marchionini, 1997) since it is a search-result-learn-refine search-result process. Due to the iterative nature, students feel confused and undecided at certain points during information seeking and may decide to abandon the process. Hence the notion of affective states in information seeking has implications for designing and running information literacy courses. Being aware of uncertainties arising at certain points during information seeking process, designers would ensure that learners are made aware of various feelings and encouraged to be emotionally at ease while at certain points in the process. Also the design of courses would consider utilizing the appropriate teaching and learning techniques which encourage students' motivations towards meeting their information seeking goals despite the impending difficulties. This may include employing wide ranges of active teaching and learning approaches such as group reflections, creative thinking and problem-solving which would assist students' work on their topics or assignments by appreciating the iterative nature of the information search process, rather than abandoning it.

To sum up the above review on fundamental issues in information behaviour models, this research identified the above mentioned aspects as important elements in the design of information literacy programme. The application of the above attributes is enumerated under the synthesis of Information seeking behaviour models/information literacy and thinking skills, as explained in the last section of this chapter below.

## **2.6 Information literacy models**

Models of information literacy assist users in solving their problems in seeking for information. Information literacy models vary in scope from those which focus on the process of searching for and using information, such as the Big Blue taxonomy (Big Blue, 2002), through models which are concerned with representing a general approach to information problem solving on a critical thinking skills approach, such as the Big Six (Eisenberg & Berkowitz, 1990). Each model unpacks these features in a slightly different way. There are various information literacy models and frameworks in use, a few of such include Stripling & Pitts' (1988) Ten Step Research Process model; Big Six (Eisenberg & Berkowitz, 1990); Irving's (1985) Nine Step model; I search process model (Joyce & Tallman, 1997); Bruce's (1997) information search process model; the Standing Conference of National and University Libraries (SCONUL, 1999) model; the Association of Colleges and Research Libraries (ACRL, 2000) model; Australian & New Zealand Institute for Information Literacy (ANZIIL) (Bundy, 2004) model, to mention but a few.

According to Bruce (1997), models of information literacy can be described by three approaches as follows:

### **2.6.1 Behaviourist approach**

In this approach, an information literacy learner should demonstrate certain characteristics and demonstrate definite abilities that can be observed and measured. Models that fall under this category are those that put emphasis on sets of standards and competencies that describe an information literate person. Examples include the ACRL (2000) standards which concentrate on six main aspects of information literacy competency, which are determining the nature and extent of information



needed; accessing information; evaluating information and sources; effectively using information and understanding legal and social issues surrounding information use. This model is categorized under the behaviourist approach due to the fact that it provides an assessment framework through a triangulated approach that is learning outcomes - teaching interventions – assessment. This is further emphasized as follows:

*To be information literate an individual must recognize when information is needed and have the ability to locate, evaluate and use effectively the information needed [...]. Ultimately information literate people are those who have learned how to learn because they know how information is organized, how to find information and how to use the information in such a way that others can learn from them (ACRL, 2000, 1)*

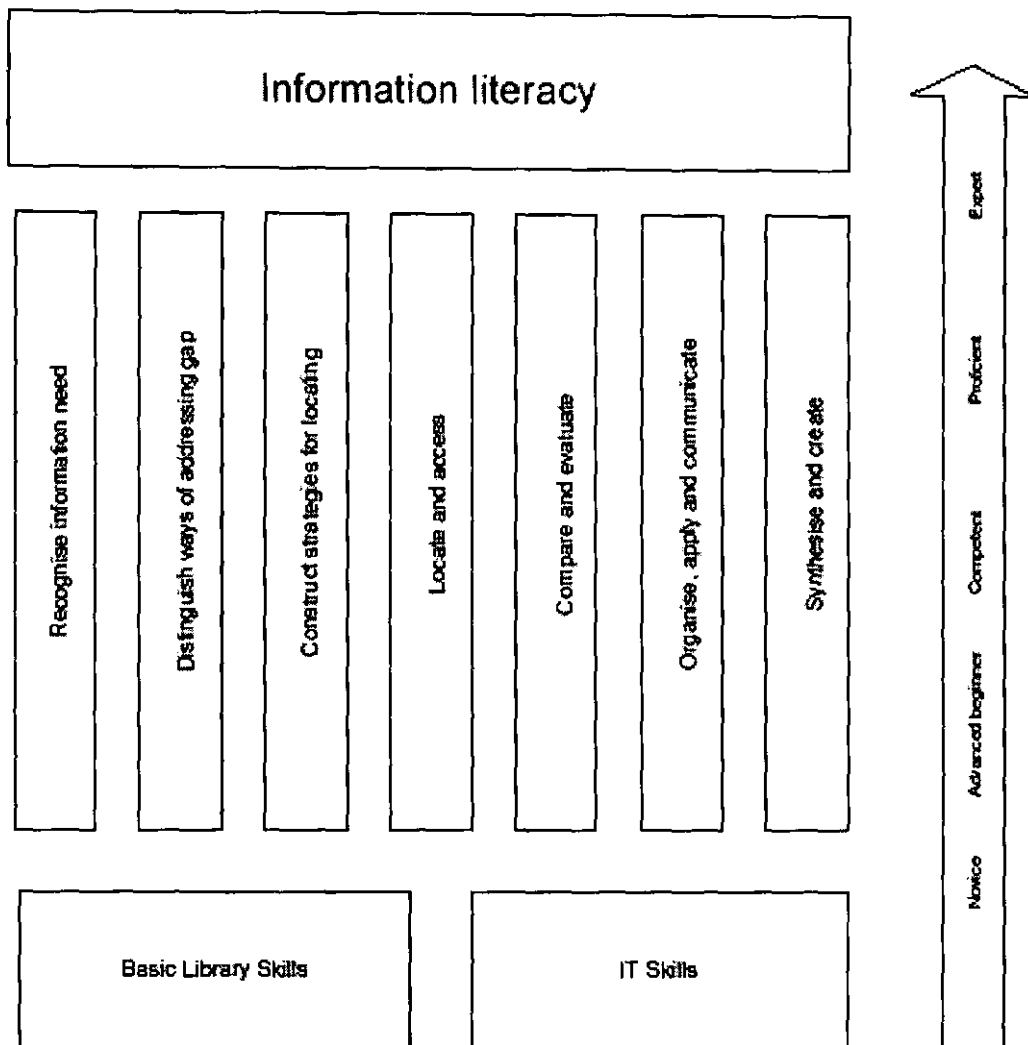
Apart from ACRL, the ANZIIL (2004) model also contains certain elements including the assessment framework in the form of learning outcomes, teaching interventions and assessment mechanisms.

## **2.6.2 Constructivist approach**

In this approach, an information literacy learner is expected to construct his or her own understanding of the world through his/her experience within a particular context. Models that fall in this approach emphasize information seeking for problem-solving through the use of higher order critical thinking skills. Examples of such models include the Big Six by Eisenberg & Berkowitz (1990). This model consists of six logical steps or stages namely task definition; information seeking strategies; location and access; use of information; synthesis and evaluation of information. These steps represent a general approach to information problem solving depending on critical thinking skills. Each stage is necessary in order to achieve a successful resolution of an information problem. It concentrates upon the ability to use critical thinking and manipulate information into a meaningful solution.

The SCONUL model recognizes that an information literate person should possess both lower and higher order thinking skills. In this model, lower order thinking skills include understanding how to use the library and its resources and possession of IT skills (to use a keyboard or mouse, word-processing software and network

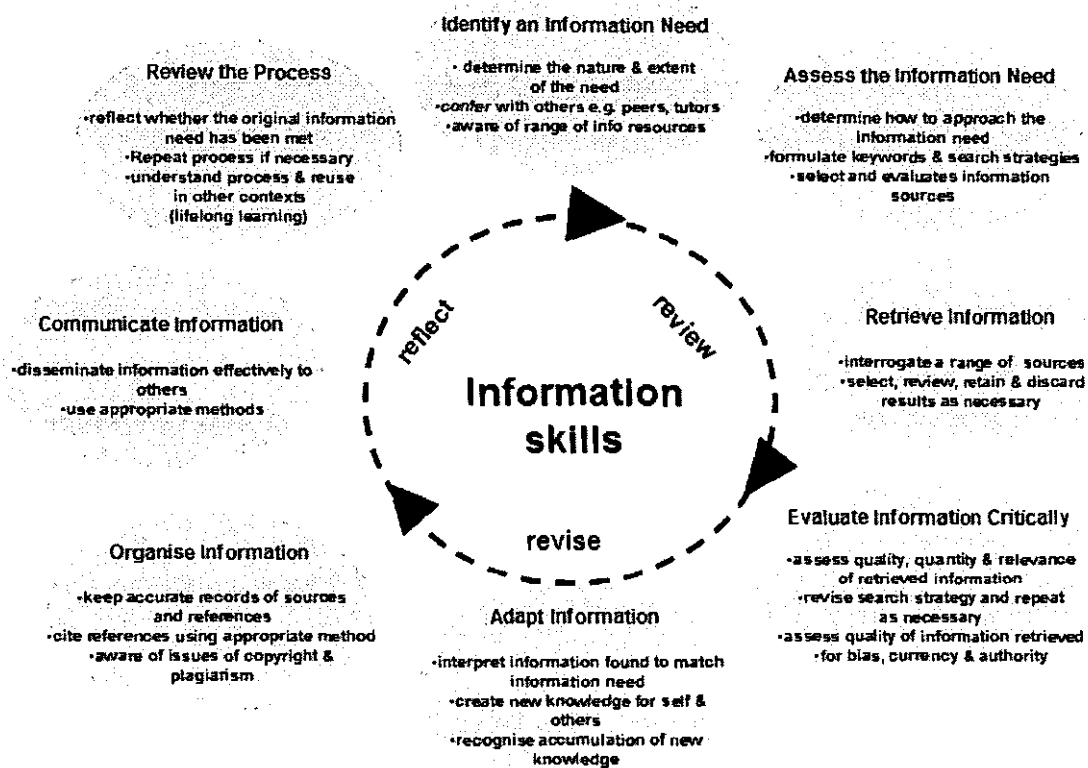
applications such as web browsers). On the other hand, higher order thinking skills include the exploitation of information sources, using evaluation criteria on information, using manipulation techniques and being able to present material to others.



**Figure 2-6: SCONUL (1999) Seven pillars of IL model (Webber, 2000, 383)**

This model falls under the constructivist category since it recognizes that an information literate person uses information and “*thinks critically about the entire information enterprise and information society*” (SCONUL, 1999, 4). To some extent, this model uses (at a higher level) the language of Bloom’s taxonomy regarding the six cognitive goals of education (knowledge, comprehension, application, analysis, synthesis and evaluation).

Similarly, the Big Blue taxonomy (Big Blue, 2002) constitutes various elements of constructivism since it emphasizes teaching information literacy skills based on learning experiences that move from a lower form through to a higher cognitive position (that is, critical evaluation/ analysis) via some form of meta-cognitive process.



**Figure 2-7: The Big Blue taxonomy (Big Blue, 2002, 18)**

This model has some similarities to Kolb’s learning cycle (reflective thinking- see 2.73. below) and includes several ideas that encompass cognitive theory (such as Bloom’s taxonomy).

### 2.6.3 Relational approach

In a relational approach, learners become aware of different ways of experiencing information use through engaging in relevant information practices and reflection. It emphasizes variations in people’s experiences by focusing on the information and the engagement of a user (Bruce, 1997). Learning occurs by differentiating things in complex or new ways, and the learner’s interest is focused on the phenomenon and

how that phenomenon is seen or experienced. Generally, this approach focuses on teaching information literacy in the light of the context and situation in which the phenomenon occurs. This approach encourages reflective thinking to learning and recognizes that reflection takes place throughout an information seeking process.

Johnston & Webber (2004) argue that the relational approach is useful in information literacy since it can influence learning outcomes in a range of subject areas that encourage learners to select, evaluate and synthesize information.

#### **2.6.4 Summary of information literacy models**

It can be noted that IL models have many similarities and few differences (Owusu-Ansah, 2003; Andretta; 2005). Many of the existing models are drawn from ACRL (2000) model and others like ANZIIL or Big Blue are a synthesis of a number of existing models. Most models of information literacy recognize the importance of critical evaluation, critical thinking, the need to reflect on the results of a search as well as the need to reflect on the information gathering process. However, SCONUL maintains that the critical skills are solely a postgraduate skill (Bainton, 2001).

Whereas some of the IL models are clearly hierarchical in structure (such as SCONUL and the Big Six), others such as Big Blue Taxonomy are cyclical and others are holistic (including ACRL and ANZIIL). The ACRL, ANZIIL and CILIP models specify the need for ethical use of information. Furthermore, ANZIIL identifies the importance of recognizing social issues in the use of information. The ACRL and ANZIIL are so far the most detailed models that contain examples of specific learning outcomes for each IL component. Models such as ACRL and SCONUL recognize the importance of IT skills but regard information literacy as a distinct and broader area of competence. Like the ACRL, the model by Bruce (1997) regards collaboration between faculty, institutional administrators and librarians as the most important aspect in the integration of information literacy into the curriculum. Unlike other models, CILIP recognizes wide ranges of formats of information sources including hard copy, electronic resources, people and other non-standard sources such as TV and radio. The ANZIIL model attempt to address

the aspect by which students should engage with the iterative process in the form of reflective practice, which characterizes information gathering

However, models such as the Big Six do not display some of the ethical features of other models nor do they appear to contain a collaborative aspect. The notion of communicating with others, which is a central feature of situated learning, is regarded as non-essential by ANZIIL model through such statements as “the information literate person ... may confer with others ...” (Bundy, 2004, 13). In addition, many models do not recognize that the information gathering process can fail and do not indicate how to deal with such a situation. Above all, many of the models do not directly specify which teaching interventions to employ although a few such as ANZIIL suggest that librarians should develop their delivery through becoming more familiar with learning theory and strategies, assessment and evaluation strategies, and the role of reflective thinking.

Despite their differences, models of information literacy provide an indication of what should be included in an information literacy course (for example information literacy aspects such as defining task, locating and accessing, evaluating and using information) and possible structure(s) of that course. Hence, the above-mentioned aspects were fed into the final information literacy course design.

## **2.7 Theories of learning**

According to the literature, schools of learning can be categorized broadly as follows: Constructivism (a cognitive approach) and Rationalism/Idealism (also known as Behaviorism) (Fry et al, 1999; Squires 1994; Race 2001). These schools are explained further below.

### **2.7.1 Behaviourist theories**

The theory of Behaviorism was initially put forward by Skinner (1971). Behaviourism contends that learning takes place when associations between stimulus and response are made (Fry et al, 1999). Knowledge is considered as an organized incremental buildup of links and components of skills (Mayes & de Freitas, 2004). This category of instruction is organized in such a way that tasks are

predetermined into sequences based on their relative intricacy with simpler tasks being a prerequisite to more complex tasks. This kind of a training mechanism enables students to accomplish what they want to learn by learning in small logically ordered phases. This approach is always practical to organize the teaching that is related to electronic resources. According to Race (2001) behaviorism emphasizes the importance of repeated activities and the use of rewards to aid the learner's retention of appropriate responses. Mayes & de Freitas (2004) note that behaviorism is centrally concerned with emphasizing active learning, most preferably, through immediate feedback on achievement of tasks, analysis of learning outcomes and the evaluation of learning outcomes, instructional strategies and related assessment methods, which may include tests, quizzes and exercises.

However, behaviorists admit that higher order thinking skills (e.g., evaluation and synthesis) could not be taught in this approach (Mayes & de Freitas, 2004). Moreover, students become passive learners in the long process of achieving their goals, since learning involves complying with the instructor's demands.

### **2.7.2 Constructivist theories**

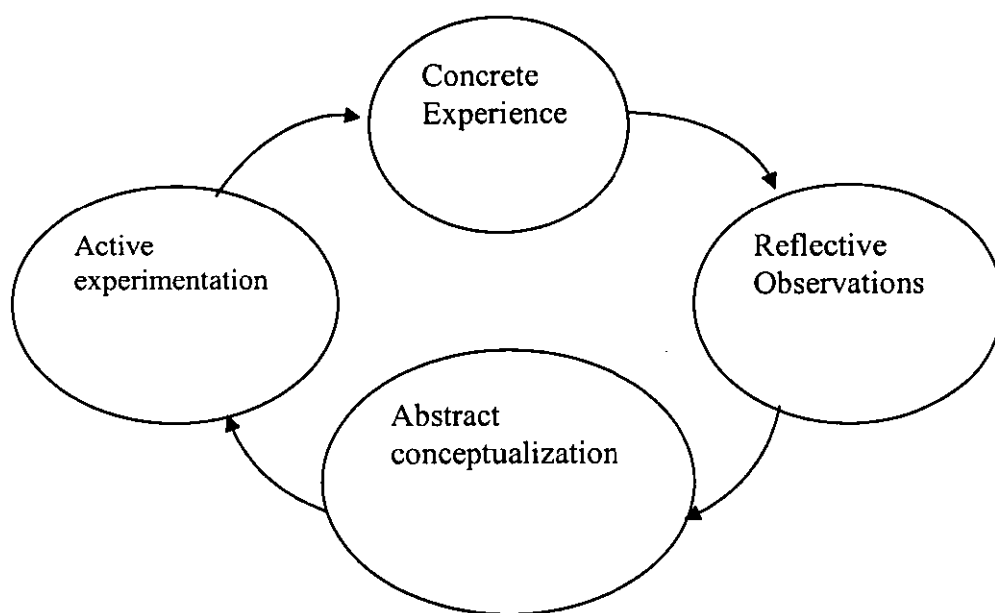
The constructivist approach based on Kelly's (1955) personal construct theory describes learning as the process of a continuous building and making improvements on what was learned in the past and additions of new ideas and experiences. This is a form of effective learning which involves individual transformations (Fry et al, 1999; Squires 1994; Race, 2001) since people actively construct their own knowledge (Biggs & Moore, 1993). Constructivist theory consists of higher order learning through reflections and experience (experiential learning), and it can take place when the learner's underlying schemata are changed to incorporate new understanding. In this approach, learners become responsible through working on a problem solving framework. This can be performed in various methods such as group work, project-based learning and the like (Rothenberg, 1999; Holmes et al, 2001)

Constructivist learning theories are currently very popular within higher education institutions (Gibbs & Coffey, 2004; Race & Brown, 2001; Race, 2001; Fry et al, 1999) because they are regarded as essentially student centred in approach. These

theories are opposed to didactic models such as behaviorism which focus on observable behaviors and repetitive activities such as quizzes and memorization. In addition, this theory shares the same viewpoint with theories of critical thinking (Moseley et al, 2004).

### 2.7.3 Experiential learning

This theory is advocated by David Kolb (Kolb, 1984) who argues that ideas are produced and reproduced incessantly through experience and that people bring their own ideas and notions to differing levels of elaborations in an iterative fashion. Kolb's (1984) learning cycle consists of four stages and it is always applied to work-based learning, teaching laboratory and practical work (such as information literacy hands on activities), action learning, role play and small group teaching. The circle is represented in figure 3 below:



**Figure 2-8: Kolb's (1984) Experiential learning circle**

The above circle involves four processes as follow:

- **Concrete experience:** learners should be fully and freely involved in the new learning experience (doing and experiencing).
- **Reflective observation:** learner needs time to reflect on new learning experiences from different perspectives (observe and reflect - closely linked to feedback).

- **Abstract conceptualization:** learners are able to form and reform, process, take ownership and integrate their ideas into sound logical theories (understanding underlying reasons, concepts, and relationships).
- **Active experimentation:** learner uses theories to make problem solving decisions and tests implications in new situations (trying things to see if they work out).

This cycle involves the following fundamental aspects: doing, reflecting, processing, thinking and understanding, which are in accordance with the learner's needs and goals. This approach assumes that learners become more skilful, notice more, make better connections, understand more and make more informed decisions regarding what to do next, as they continue around, and eventually complete the cycle. (Gibbs et al, 1998). The cycle assumes that learners develop concepts and learn the requisite skills as they work on a problem (learning by doing), rather than learning how to do it (Gibbs et al, 1998). In addition, more cycles may develop in the cases where students learn practical skills such as information searching, creating a learning spiral, with each loop more advanced than the previous one, which makes the learning process much longer and complex. Other authors such as Bloom (1956) argue further that learning is hierarchical, moving from lower to higher order learning.

However Race (2001) argues that the experiential learning process is not cyclical and proposes the 'Ripple on a pond' model, which emphasizes the motivation of the learner to learn and the aspect of continuous feedback. The Ripple on a pond approach proposes that learning is dynamic and can be achieved by doing, gaining feedback, making sense of what is learned and reflecting on what the learner went through in the learning process. Moreover, learning is considered to be iterative and driven by internal and external motivations. Within this model, reflection (the meta-cognitive element of the model) becomes the dominant aspect. Metacognition is essential in thinking skills because it helps the learner to monitor, evaluate and modify the learning in order to acquire a new understanding (Biggs & Moore, 1993).

Reflection is a key to course delivery. Race (2001) elaborates the importance of reflection by stating that: "*The act of reflecting is one which causes us to make*



*sense of what we've learned, why we learned it, and how that particular increment of learning took place. Moreover, reflection is about linking one increment of learning to the wider perspective of learning – heading towards seeing the bigger picture”* (in Hinett, 2002, 2)

Reflection is considered as both a pedagogical method (Kolb et al, 1991) and a learning outcome (Mayes & de Freitas, 2004). Reflection is useful for building on previous understanding of phenomena (Jonassen et al 1995). It also assists learners in a meta-cognitive process which provides a form of self-regulation which causes the learner to internalize learning from the social to the individual dimension (Hung & Chen, 2001).

#### **2.7.4 Situated learning**

Shor (1987) argues that situated learning is a way by which subject matter is related to the needs and concerns of a learner. According to this author, learning occurs through creating meaning from the real activities of daily living. Knowledge is acquired and learning transferred from the classroom into practice by embedding subject matter in the ongoing experiences of the learners and by creating opportunities for learners to live subject matter in the context of real-world challenges. Lave & Wenger (1991) add further that to situate learning means to place thought and action in a specific place and time in order to accomplish knowledge and skill tasks. One of the characteristics of situated learning is that it focuses on the ways in which knowledge is distributed socially (Mayes & de Freitas, 2004). In this sense, knowledge is regarded as situated when the ultimate product of learning makes it possible for an individuals to take part in the practice of a certain community more successfully.

Mayes & de Freitas (2004) categorize situated learning into two groups: socio-psychological and community of practice. Socio-psychological situated learning is centred on the importance of context-dependent learning in informal situations where the learning activity is given an authentically social context. For example, in problem based learning, the focus is on the relationship between the nature of the learning task in an educational setting and its characteristics when used in a real situation. The community of practice notion puts emphasis on the relationship

between the individual learner and a group of people, rather than the relationship of an activity to a wider practice. In this situation, a community provides the opportunity for the interaction with the learner while on the other hand; participation in activities provides the learner with the real meaning of experience. The interactions involved within a community, and the ability to assume larger or more intricate activities and projects through cooperation, tie people together and help to facilitate relationship and trust (Lave & Wenger, 1991).

The above approaches are important in teaching and learning information literacy. Literature reveals that constructivism through experiential and collaborative learning approaches provide a theoretical framework for the design and facilitation of learning environments (Fjällbrant et al, 1999). Gibbs et al. (1994) argue that the appropriate development of generic and transferable skills through information literacy should involve an experiential learning cycle which includes experiencing the skills, reflecting on performance, formalizing the acquired knowledge, planning and preparing activities. Practical applications of an experiential learning approach could be drawn from the Distance Education Information Courses with Access Through nEtworks (DEDICATE) project, which was funded under the EU Fourth Framework Telematics for Libraries programme. The educational design of the DEDICATE programme involved experiential learning, which helped the participants to get involved in active, self directed and authentic learning activities (Jällbrant, 2000).

### **2.7.5 Learning styles**

There is a wide literature covering various types of learning styles. These include Kolb et al's (1991) learning cycle illustrated above, Pask (1976) who identified two types of styles, that is serialists who prefer a step-by-step narrow focus and holists who prefer to work with illustrations and analogies based on a wider focus. Others include learning theories developed by Honey & Mumford (1982), who proposed the following styles:

- **Activists:** respond best to new experiences and problems;
- **Reflectors:** best engage when learning activities are well structured and where they have time to observe, reflect and think;
- **Theorists:** respond well to logical structure where they have time to explore methodically and question;
- **Pragmatists:** work best with practically based immediately relevant learning activities.

Gardner (1993) developed a “multiple intelligence” learning theory which consisted of the following styles:

**Kinaesthetic learners:** these learn by manipulating and doing tasks rather than reading about them. They mostly use their sense of touch and respond to physical rewards. They memorise by walking and seeing and like being involved in games.

**Aural (auditory-musical-rhythmic) learners:** they use sound, rhyme, music and use aural content in visualisation, they prefer reading out loud, find writing difficult but are better at telling, speak in rhythmic patterns, learn by listening, enjoy discussion, and remember discussions better than written text.

**Visual (spatial) learners:** they prefer using images, maps and pictures to organize and communicate information and enjoy drawing. These learners memorise by visual association, have trouble remembering verbal instructions and are good readers.

Learning styles are important in the teaching of information literacy. Manuel (2002) recommends that various learning styles in information literacy courses be used in order to make the learning process more active hence interesting. The emphasis should be on the use of new features of information technology such as images and sound recording, as opposed to excessive use of linear text and memorization. The activities should be contextualized and take place within a motivational context which engages learners as much as possible to encourage deep learning. The provision of various elements in a session allows for different learning styles although this does not always enforce them.

### 2.7.6 Thinking skills

The importance of thinking skills theories, which include problem-solving and critical thinking, is considered in the aspect of teaching information literacy because they form an essential part of information literacy models and frameworks (ACRL, 2000, Bruce, 1995) and information behaviour models (Ford, 2004). According to the Merriam-Webster English dictionary (1997) , the two concepts can be defined as follows:

Thinking

*“is concerned with exercising the powers of judgment, conception, or inference”*

Skill:

*“is the ability to use one's knowledge effectively and readily in execution or performance”*

Important aspects of thinking skills include problem solving and critical thinking skills. Mayer (1992) describes problem solving as a higher-order cognitive process that requires the modulation and control of more routine or fundamental cognitive skills. It involves analyzing a situation, determining the real problem, looking at possible solutions, evaluating each of the solutions, and choosing the best one for their purposes. In an information literacy learning environment, problem solving technique involves a number of procedures such as establishing goals for a particular work or assignment, identifying topical or subject problems and constraints that prevent the acquisition of information needed, identifying alternatives to the constraints, evaluating the alternatives, selecting the best solution and implementing the solution sought. Problem solving skills work effectively in a problem based approach in which students solve a particular problem by formulating a hypothesis and finding information to support their ideas for proposed solutions. They test the results and obtain answers that best solve the problem. The problem based approach to learning provides a driving force for each learner to participate actively, resulting in the acquisition of knowledge and problem-solving skills both individually and as a contributing member of a team (Enger et al., 2002). The problem-based approach works effectively in a collaborative approach in which learners work in small groups where peer interaction plays an important role in

learning through knowledge creation, sharing, and the overall learning process (Gardner & Korth, 1998).

Critical thinking can be described as careful thinking activity that focuses on problem identification and problem solving. It is a coherent response to questions that cannot be answered definitively and for which not all relevant information may be available. Critical thinking seeks to explore situations in order to arrive at optimal conclusions and rests on a careful consideration of the phenomenon being investigated without taking things for granted. Critical thinking skills form what is referred to as higher order thinking, which according to Moseley (2004), lead to a judgment or decision where an individual strives to make the right decision or present a position clearly. Bloom (1956) developed a taxonomy of cognitive goals which help to indicate different levels of thoughts that various models of information literacy and frameworks today have adapted to demonstrate a range of cognitive processes that information literacy learners should comprehend. The highest level includes higher order thinking skills such as evaluation, generalizations, imaginations, making judgments, predictions, speculations, hypothesizing and forecasting. These and other lower order thinking skills are summarized in the table below:

**Table 2-1: Bloom's (1956) Taxonomy of educational objectives**

| <b>Competence</b>    | <b>Skills demonstrated</b>  |
|----------------------|---|
| <b>Knowledge</b>     | <ul style="list-style-type: none"> <li>• observation and recall of information</li> <li>• knowledge of dates, events, places</li> <li>• knowledge of major ideas</li> <li>• mastery of subject matter</li> <li>• <i>Question Cues:</i><br/>list, define, tell, describe, identify, show, label, collect, examine, tabulate, quote, name, who, when, where, etc.</li> </ul>  |
| <b>Comprehension</b> | <ul style="list-style-type: none"> <li>• understanding information</li> <li>• grasp meaning</li> <li>• translate knowledge into new context</li> <li>• interpret facts, compare, contrast</li> <li>• order, group, infer causes</li> <li>• predict consequences</li> <li>• <i>Question Cues:</i><br/>summarize, describe, interpret, contrast, predict, associate, distinguish, estimate, differentiate, discuss, extend</li> </ul>                     |
| <b>Application</b>   | <ul style="list-style-type: none"> <li>• use information</li> <li>• use methods, concepts, theories in new situations</li> <li>• solve problems using required skills or knowledge</li> <li>• <i>Question Cues:</i><br/>apply, demonstrate, calculate, complete, illustrate, show, solve, examine, modify, relate, change, classify, experiment, discover</li> </ul>  |
| <b>Analysis</b>      | <ul style="list-style-type: none"> <li>• seeing patterns</li> <li>• organization of parts</li> <li>• recognition of hidden meanings</li> <li>• identification of components</li> <li>• <i>Question Cues:</i><br/>analyze, separate, order, explain, connect, classify, arrange, divide, compare, select, explain, infer</li> </ul>  |
| <b>Synthesis</b>     | <ul style="list-style-type: none"> <li>• use old ideas to create new ones</li> <li>• generalize from given facts</li> <li>• relate knowledge from several areas</li> <li>• predict, draw conclusions</li> <li>• <i>Question Cues:</i><br/>combine, integrate, modify, rearrange, substitute, plan, create, design, invent, what if?, compose, formulate, prepare, generalize, rewrite</li> </ul>  |
| <b>Evaluation</b>    | <ul style="list-style-type: none"> <li>• compare and discriminate between ideas</li> <li>• assess value of theories, presentations</li> <li>• make choices based on reasoned argument</li> <li>• verify value of evidence</li> <li>• recognize subjectivity</li> <li>• <i>Question Cues</i><br/>assess, decide, rank, grade, test, measure, recommend, convince, select, judge, explain, discriminate, support, conclude, compare, summarize</li> </ul> |

Other educational theorists such as Moseley et al (2004) have developed a thinking skills framework which synthesized Bloom's higher order cognitive components (analysis, synthesis and evaluation) and others.

Thinking skills enumerated by various educational theorists are important in teaching and learning information literacy. Biggs & Collis' (Biggs, 1999) SOLO (Structure of Observed Learning Outcomes) model is useful for assessment of critical thinking. The model is vital in understanding the outputs within the educational context in general and as a potential way of measuring information literacy in particular. The model is useful in developing a course structure that describes educational goals and evaluates the learning outcomes by identifying students' performance levels. Bloom's taxonomy is useful in teaching lower and higher level thinking skills to equip learners with important information literacy skills required dealing with difficult subjects and problems with rather uneasy solutions (Dennis, 2001). Thinking skills programmes based on various ideas elaborated above (such as Moseley et al, 2004) require students to plan, describe and evaluate their thinking and learning and implies that these activities can induce processes which produce desired mental products. In summary, thinking skills can be seen as a way of managing awareness and working memory to enable conscious and unconscious activity to work together in a more productive way.

## **2.8 Challenges noted in the literature regarding information behaviour studies and teaching and learning information literacy in higher education institutions**

The literature on relationships between user studies and information literacy, information literacy studies and information behaviour studies in academic institutions cited in sections above, indicate a number of challenges to library and information professionals.

Literature reviewed above highlights a lack of research studies indicating how various theories from information behaviour research and approaches in teaching information literacy have effectively been integrated with relevant educational theories and approaches. Several studies have made suggestions and/or indicated prospects of integration and application of theories, models and frameworks in teaching information literacy. However, out of these, few studies (such as Andretta, 2005) have demonstrated how the integration could work in real life situations, and the extent to which this integration has facilitated the design, implementation and evaluation of these programmes.

The review of literature has indicated that very few studies have attempted to employ a combination of various methods of teaching and learning information literacy that encourage reflection such as quizzes (which encourage discussions of questions and answers), group work, presentations and reflective sessions, together with active lectures. Furthermore, many studies made little use of reflective thinking; instead these skills are taught based on rehearsed answers and passive reception of what is being taught (Mazoué, 1999). The literature shows that, by using various reflective methods such as free-recall quizzes, group work and presentation, apart from improving understanding to learners, they help learners reflect on the learning process (Steiner, 2001). In addition, methods of teaching information literacy which encourage reflection engage learners in enhancing their information literacy knowledge (Johnston & Webber, 2000).

In addition to the above, studies on information seeking behaviour in higher education have revealed the need to implement information literacy programmes in higher learning institutions (Kerins et al, 2004). The literature review indicates that users studied in the academic environment demonstrated lack of knowledge of their information needs, low skills in identifying and selecting relevant information sources, lack or have poor information seeking strategies, information searching, evaluating and use skills. Above all, various studies highlighted above give the impression that despite the availability of regular information literacy training in various academic institutions, students are not well equipped with relevant critical thinking skills. Limberg (1998) pointed out that information seeking and use is facilitated by critical thinking skills which are responsible in making users able to analyse and evaluate information. However, the notion of using critical thinking skills for teaching and learning information literacy in order to enable the analysis and evaluation of information still creates methodological challenges for implementation (Doherty et al, 1999, Fitzgerald, 1999).

In addition, the literature cited above indicates that studies which have so far attempted to employ much more user-centred approaches, such as Whitmire (2003) and constructivist approaches, such as Given (2002), have been few. This study expected that these approaches could assist to provide clearer picture of users'



behaviour in information seeking and use, which could ultimately help provide recommendations for the most appropriate methods of teaching and learning information literacy.

The review of information literacy studies indicates that various information literacy courses have not successfully equipped learners with relevant skills that encourage life long learning. Research has revealed that approaches to teaching based on the traditional teacher-led fashion may not prepare learners to develop relevant critical thinking skills (Holland & Moore-Steward, 2000). Lack of critical thinking skills may result in learners being unable to retain the knowledge they have acquired, and to apply it in similar future scenarios (MacDonald et al. 2000). Furthermore, Webber & Johnston (2000) discovered that many information literacy courses lack the appropriate teaching and learning methods. One factor behind lack of appropriate teaching and learning methods could be the fact that the design of a number of courses take into consideration teaching the skills, and not imparting knowledge to learners (Town, 2003). Due to this observation, various researchers have called for a change in teaching methods to allow students to develop deep learning approaches (ACRL, 2000; Bruce, 1997; Bundy, 2004). Another challenge for developing learners' deep learning competencies may be lack of sufficient time to implement such programmes.

In addition to the above, design of information literacy programmes is handicapped by difficulties associated with learners' lack of awareness of their importance (Ward, 2003). Lack of learners' full involvement in the courses affects their motivation and they may not see immediate needs of attending the programmes. Also learners may not know that they lack these skills and could therefore not see the importance of attending such courses (Brown, Murphy & Nanny, 2003). The above problems occur in courses that do not focus on experiential, problem-based approaches in teaching and learning information literacy, which encourage reflections and shared learning.

Moreover, assessment methods constitute another major challenge in the design of information literacy programmes. Doyle (1994) argues that measuring information literacy may not be separated from the measurement of the critical thinking skills

and problem solving skills with which it is related. The review of literature above highlights assessment methods as being one of the problems identified in various studies. Several studies discovered that libraries only use simple multiple-choice questionnaires to assess whether a student has acquired certain skills. Due to this challenge, Webber & Johnston (2003) suggest that assessment should take a number of forms, including diagnosis of a student's knowledge, feedback on strengths and weaknesses and monitoring of progression.

The above challenges are considered to be gaps found in the literature visited. In this view, this study realized a need to design an information literacy programme based on the integration of information behaviour research, concepts of information literacy derived from library and information science and educational theories as an attempt to minimize the gaps.

## **2.9 The main features of information seeking behaviour models/information literacy and thinking skills and their relationship with teaching and learning information literacy**

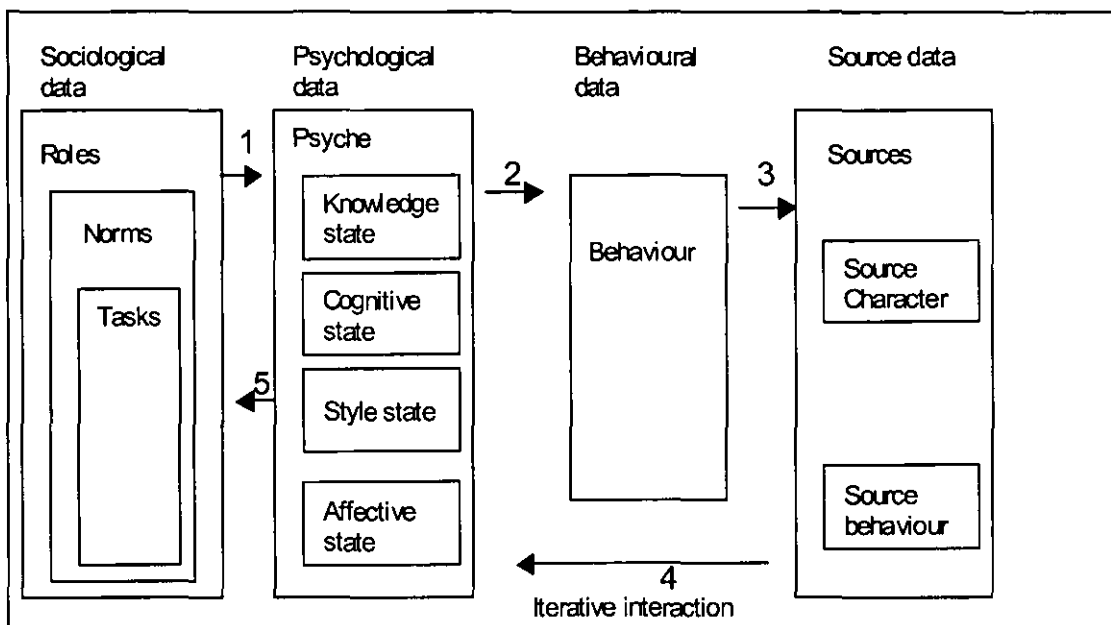
The relationship between information behaviour research, concepts of information literacy and education theories can be envisaged by examining the purposes for which various models, frameworks and theories have been developed. Below is a summary of the integration.

### **2.9.1 Models of information seeking behaviour**

The models of information seeking behaviour are concerned with finding solutions associated with individuals' information needs. When adapted in varied information services environments, they assist users to meet their information needs. In an information literacy environment teacher-librarians can adapt a variety of stages and characteristics of information seeking behaviour models into an information literacy problem-solving approach to create a suitable environment for solving problems associated with students' information needs.

This study attempted to adapt Hepworth's information behaviour model and synthesize its characteristics with those from information literacy and thinking skills frameworks. Hepworth's model was developed by Hepworth (2000) to provide a

framework for analyzing and organizing data that concerned the information experience of a group of people in need of information. It has similarities with other models such as Wilson’s (1999) and Ingwersen’s (1996) which emphasize the importance of similar categories of data, but this model concentrates chiefly on a “person-in-context” concept in terms of roles, norms and tasks. It breaks down intervening variables and distinguishes psychological factors. The concept psychological data (which includes style and cognitive state sub-categories) represents Wilson’s activating mechanisms and active/passive search. The model is represented diagrammatically as follows:



**Figure 2-9: Hepworth’s Information Behaviour model**

Key:

- 1= associated with
- 2= associated with
- 3= interaction with
- 4= has impact on
- 5= may resolve situation and help complete task(s)

The model can further be analyzed as follows:

**Sociological data**

Roles, norms and tasks (which are grouped as sociological data) are seen as being responsible to create the information need in the context that an individual finds him/herself. In the higher education context, the role dimension embodies a person

as a student; the norms are represented by the obligations to pass an award whereas the tasks are defined by the requirement to complete assessments (such as projects or assignments) through a set of pedagogical interventions (such as lectures, quizzes, group work or individual work). In addition, the learning context in which students experience learning, whether it is student centred or didactic, is put in this category.

### **Psychological data**

These are internal characteristics of the individual that are also regarded as important in information behaviour. They are divided into four areas namely; knowledge state, cognitive state, style state and affective state. The term state is used in this model to emphasise that these are conditions associated with a situation and its response, which is not necessarily a permanent condition of mind. In addition, specific processes may or may not be present depending on the role, task, knowledge and source characteristics of a particular condition.

**Knowledge state:** relates to the level of prior knowledge a person has of a subject area (which is similar to Biggs & Moore's (1993) 'presage factors'), in addition to the knowledge they have of an information system.

**Cognitive state:** reflects the thinking processes associated with situations such as the level of critical thinking in which an individual is engaged (Ford, 2004) which can be affected by learning styles. This state is regarded as important in information behaviour and may include various activities such as choosing, doubting, revising or 'plan-do-review' as summarized by Moseley et al (2004) and relate directly to the individual's feelings of certainty or uncertainty.

**Style state:** refers to the character (level of self-efficacy) individuals have towards a certain situation, which may affect their information behaviour consequently. In a higher education setting, this may include the notions of deep learning, which makes a learner more proactive. On the other hand, this may also denote a notion of surface learning, in which an individual is dismissive and less confident.

**Affective state:** refers to the emotional character of an individual which has a bearing on influencing information behaviour in certain situations. The presence or absence of positive affective states such as, high motivation, feeling good about

doing a particular task or the level of self-efficacy an individual feels will all affect the information behaviour embarked on. This is similar to the notions of self-regulation identified by Moseley et al (2004).

### **Behavioural data**

This is concerned with the physical activities in which individuals engage such as, browsing a database, reading, communicating with others and so on. It includes activities such as using electronic tools, sharing information with others and consulting with subject experts.

### **Source data**

These are grouped into seven areas:

- Organizations for example, government departments
- People for example, health service professionals
- Information objects for example, books, newspapers
- Equipment for example, medical aids
- Services (in the home) for example, home help
- Services (external) for example, hospital
- Financial for example, allowances

In the higher education context, the people category could be tutors and 'hospital' could become information service and so on. The above characteristics have been considered in the design of the information literacy programme, integrated with thinking skills and concepts of information literacy elaborated below.

### **2.9.2 Educational theories and thinking skills**

Educational theorists such as Kolb (1984) developed experiential learning, which focuses on creating knowledge through the transformation of experience. This approach encourages students to reflect on their experiences, hence developing new skills, new attitudes, and new ways of thinking (Kraft & Sakofs, 1988). The experiential learning approach was used in this study to enable learners to draw from their past experiences to acquire new knowledge and skills relevant in answering questions associated with their research topics. In addition, the teaching

and evaluation methods which originate from the behaviourist perspective, such as tests, quizzes and lectures were incorporated. These were used to teach specific skills (such as defining tasks, structures of databases, information search, evaluating information, bibliographic citations and presenting information) which assumed that these skills would be learnt and demonstrated.

In addition to adapting constructivist and behaviourist approaches described above, this study incorporated thinking skills associated with independent learning and creative thinking developed by Moseley et al (2004). These skills synthesize a large and well researched field of various aspects included in the works of Bloom (1956); Ausubel (1967); Allen, Feezel & Kauffie (1967); Romiszowski (1981); Gardner (1983); Gagne (1985); Quellmalz (1987), Collins et al (1991); Carroll (1993); Hauenstein (1998); and Presseisen (2001). In addition to incorporating theories developed by the above authors, various features included in Moseley et al (2004) model are recognized as important within higher education teaching and learning. The framework is summarised as follows:

**Information gathering:** This involves experiencing, recognizing and recalling (obtaining information from memory or by listening, observing or reading), comprehending messages and recorded information.

**Building understanding:** This involves understanding situation and carrying out simple procedures (develop meaning by elaborating, representing or sharing ideas, working with patterns and rules, concept formation, organizing ideas).

**Productive thinking:** This refers to analysis, synthesis and evaluation, which result in deeper understanding of a topic, a judgment, decision or solution, invention or work of art (reasoning, understanding causal relationships, systematic enquiry, problem-solving, creative thinking).

**Reflective thinking:** This involves monitoring or reviewing one's thinking to improve performance?

**Strategic management of thinking:** This involves the type of thinking that leads to a change in plans or approach to a problem.

The above thinking framework can be integrated in information literacy education in higher education institutions to prepare students to become life long and independent learners. It should be noted that most of the thinking skills aspects elaborated by Moseley et al (2004) resemble the cognitive states exemplified in Hepworth's model.

### **2.9.3 Concepts of information literacy**

Various conceptions of information literacy from library and information science have been developed through the work of models and frameworks that exhibit common characteristics. They are basically user-centred, focusing on the needs and abilities of the students. With the information literacy models, students take an active part in the construction of knowledge (Marcum, 2002). A range of literacy activities adapts the provision of information problem solving framework. These activities include defining information need, information seeking strategies, locating and accessing information, evaluating information (including critical thinking of the resources and curriculum needs) and using the information. Models which have been designed for information problem solving such as the Big Six Skills (Eisenberg, Berkowitz, 1992) deal with higher order thinking skills that assist students to think about the type of research question, possible resources to be used, where these resources can be found, how to access the information, relevant information, how it can be organized and used, and how to evaluate it. The model by Bruce (1997) considers information literacy as building up an individual's knowledge base in the most favourite area of interest. It involves a critical use of information based on constructing a personal perspective on the knowledge base. Information, in this understanding, becomes an object of reflection and appears to individual users in special ways; it takes on a subjective character. The information user evaluates and analyses information, whilst the information presents itself especially to the user.

This study integrated various information literacy characteristics adapted from the following information literacy models and frameworks: ACRL model of information literacy; The Big Six model; The SCOUNL information literacy model; Australian & New Zealand Institute for Information Literacy (ANZIIL) model and; The Chartered Institute of Library and Information Professionals (CILIP) model.

The reasons for selecting these particular models, including their key characteristics are explained briefly below:

**ACRL model of information literacy:** is based in cognitive thinking and learning theory. Its major concentration is on a list of a number of goals which have to be achieved before moving from one stage to the next. This model puts emphasis on the notion of life long learning since it enables learners to assume greater control over their own learning. It also draws attention to the need for students to be sensitized to their own meta-cognitive and reflective processes. Furthermore, the model allows for flexibility of approach to accommodate the differing needs of various subject areas.

**The Big Six model** is an information problem solving strategy which attempts to link information, problem solving and critical thinking (Eisenberg & Berkowitz, 1992). It is the most widely-known and widely-used approach to teaching information and technology skills in the world as it provides an essential framework to approach any information-based questions. This model reflects many of the features and language displayed by other models and also its brief style provides a straightforward structure to follow. Also, like the ACRL standards, this model has an iterative aspect and its central function is that of problem solving. According to Bruce (2002) information literacy in this model may be expressed as “systematic information behaviour”.

**The SCONUL information literacy model:** This model includes study skills (the ability to use a library and its resources, ability to search for literature and appropriate use of citations and references) and skills to apply when a student has completed studies. The model is built on the fundamental skills of basic library skills and basic IT skills and the process is iterative in nature.

**Australian & New Zealand Institute for Information Literacy (ANZIIL) model:** This model refers to knowledge-construction (as well as critical thinking) to describe the learning processes that underlie information literacy education. It reflects ideas of critical thinking, constructivist and cognitive models of learning since it highlights activities of experience, reflection and practice (Andretta, 2004). The model recognizes differences in terms of subject areas with differences in



information literacy requirements: the level of proficiency gained and the time spent on learning these varies from student to student. The model is iterative since it indicates that students are expected to evaluate the impact of, and to reflect on, the information seeking process in order to deploy a revised and improved process of enquiry.

**The Chartered Institute of Library and Information Professionals (CILIP) model:** This model recognizes information literacy as a way of how to find information and stresses an understanding of its limitations, the need to examine how people use the information, and how to manage it (Armstrong et al 2005). It also recognizes wide ranges of formats of information sources including hard copy, electronic resources, people and other non-standard sources such as TV and radio.

**Table 2-2: Summary of the five information literacy models**

| ACRL   | Big 6  | SCONUL   | ANZIIL   | CILIP                                   |
|--|--|--|--|---|
| Determines information need                    | Defines task   | Recognizes information need  | Recognizes information need                                    | Understands information need            |
|  |  | Distinguishes ways in which information gap is to be addressed     |  |   |
|  |  |  |  | Understands availability of information |
|  | Determines information seeking strategies to be used | Constructs search strategies                                       |  |   |
| Accesses information efficiently & effectively |  |  | Finds information effectively & efficiently                    |   |
|  | Locates & accesses information                       | Locates and accesses information                                   |  | Understands how to find information     |
| Evaluates information critically               | Evaluates information & problem solving process      | Compares & evaluates information                                   | Critically evaluates information & information seeking process | Understands how to evaluate information |
|  |  |  | Manages information collected or generated                     | Understands how to manage findings      |
|  | Synthesizes information                              | Synthesizes & builds on existing knowledge to create new knowledge |  |   |

| ACRL   | Big 6            | SCONUL  | ANZIIL   | CILIP  |
|--|------------------|---|--|--|
|  |                  |   | Applies information to new concepts & creates new understandings                               |  |
|  |                  | Organizes, applies & communicates information |  |  |
|  |                  |   |  | Understands how to communicate findings                    |
| Uses information effectively either individually or in a group           | Uses information |   |  | Understands how to work with & exploit results             |
| Understands legal, economic & ethical issues surrounding information use |                  |   | Uses information ethically & acknowledges social & economic issues surrounding information use | Understands ethics & responsibilities in using information |

This study integrated common features highlighted in the above-mentioned five frameworks and developed the following information literacy processes: define a problem or research topic; locate and access information; synthesize and evaluate information; communicate and use information. Table 2.3 below summarizes the synthesis of various aspects drawn from the information literacy frameworks described above:

**Table 2-3: Summary of aspects highlighted in information literacy frameworks**

| Information literacy process        | Tasks/activities involved  |
|-------------------------------------|--|
| Define a problem or research topic  | <ul style="list-style-type: none"> <li>• Recognize an information need</li> <li>• Identify/address an information gap</li> <li>• Determine availability of information</li> </ul>  |
| Locate and access information       | <ul style="list-style-type: none"> <li>• Determine information seeking strategies</li> <li>• Locate and access information effectively and efficiently</li> </ul>  |
| Synthesize and evaluate information | <ul style="list-style-type: none"> <li>• Organize information</li> <li>• Compare information</li> <li>• Synthesize information</li> <li>• Evaluate information</li> <li>• Build on existing knowledge to create new knowledge</li> </ul>           |
| Communicate and use information     | <ul style="list-style-type: none"> <li>• Communicate information</li> <li>• Use information effectively</li> <li>• Work with and exploit results</li> <li>• Understand legal, economic &amp; ethical issues surrounding information use</li> </ul> |

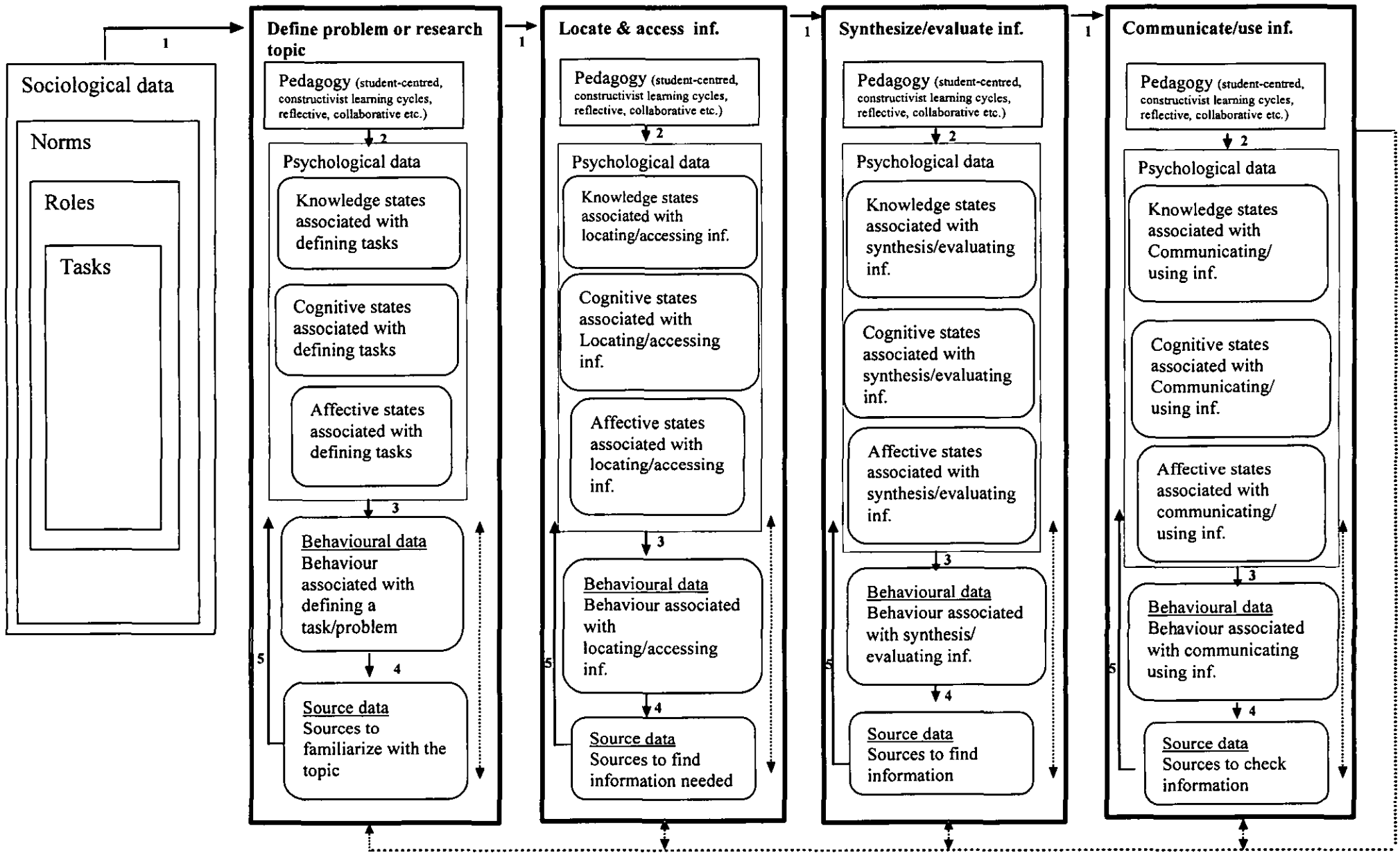
In summary, models and standards mentioned above are used by various institutions in the world for communicating the character of information literacy, for course design and evaluation. They help to demonstrate the richness of information literacy

experience as understood by various course designers. In recognizing the above, these models and frameworks were used in this study to assist the design of the course through the integration with educational theories and elements highlighted in various information behaviour research discussed in the preceding sections above.

#### **2.9.4 The synthesis of information seeking behaviour models/information literacy and thinking skills**

The description of information behaviour and information literacy models as well as learning theory including thinking skills above attempts to illuminate the main characteristics of each and interplay with each other. Most previous models and frameworks are highly abstract (Hepworth, 2003; Owusu-Ansah, 2003) and do not necessarily indicate what to teach nor how to teach information literacy. A synthesis of these three domains was undertaken to help develop a model that could be used to design and effect information literacy training. The analysis and synthesis of the above three domains resulted in an information literacy teaching and learning model shown in figure 2-10 below and a detailed description of the how the model was applied in teaching is shown in chapter 8 (figure 8-2). The summary of aspects covered in the programmes (which indicate how various aspects in the model were applied) is shown in chapter five (see 5.5. below) and the actual timetable for the information literacy course is shown in appendices K and L.

Figure 2-10: The synthesized information literacy teaching/learning model



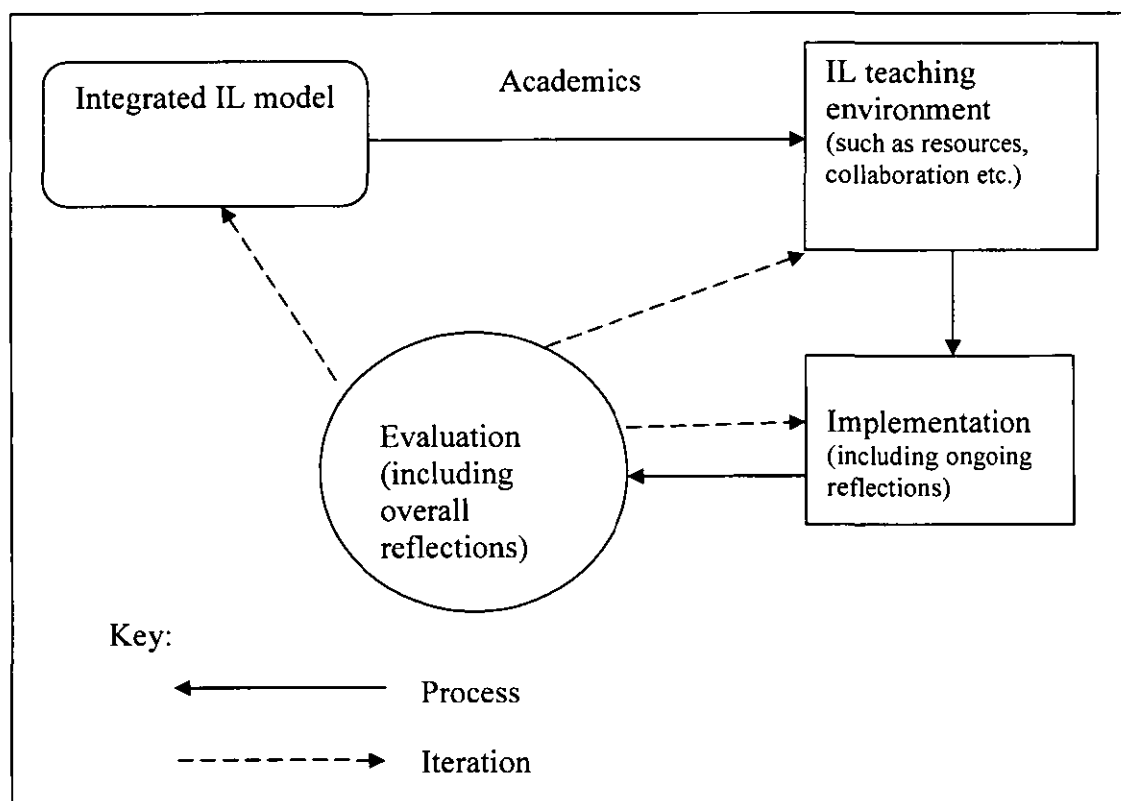
### **2.9.5 Brief summary of the synthesized IL teaching/learning model**

The model has been developed by focusing on an academic environment where students/lecturers/researchers were engaged in different tasks. Norms associated with academic work (for example the requirements to pass an award or completion of a research project) may make a person realize that he/she needs information to accomplish a particular task. This prompts the individual to acquire requisite skills that would enable him/her to locate, access, evaluate and make good use of the information acquired from a range of sources. The need to acquire these skills prompts a person to learn to define a problem or research topic, locate and access information, synthesize and evaluate information, communicate and use information. The appropriate pedagogy (such as lectures, demonstrations, quizzes or reflections) facilitates the teaching and learning of the above-mentioned skills (through an information literacy programme).

The appropriate pedagogy is responsible for developing the person's knowledge state in facilitating the need to acquire new knowledge by referring to what the person already knew about a particular phenomenon. Different cognitive aspects which are associated with thinking skills facilitate the information seeking process. These include creative thinking (such as broadening or narrowing search), problem-solving (planning a search strategy) and reasoning (judging from observable data). In order to improve his/her knowledge, the individual interacts with various sources of information (such as books, journals, Internet, peers) to acquire new knowledge to solve a particular problem, while exhibiting various behaviours (undertaking physical activities such as reading, browsing, asking). These activities take place throughout the information literacy processes (defining problem or research topic, locating and accessing information, synthesizing and evaluating information, communicating and using information) until the person is able to achieve his/her information seeking goals. The process is however associated with feelings such as uncertainties, frustrations, anxiety or feeling of relief which have influence on the information seeking process. The model recognizes the fact that each process is iterative and users must be made aware of likely confusions arising due to the iterative nature of information seeking process. Hence they should overcome the associated affective states in order to endure to the end of the process.

This model can be used to design an IL training course for any community/subject domain, level or age. Differences would be the fact that the contents for various aspects indicated in the boxes within the model would change to reflect the nature of subject domain. For example, whereas an information seeker dealing with printed or electronic text would exhibit the behaviour such as reading, others dealing with artifacts would need to see, touch or use different information seeking behaviour. Examples given for various aspects covered in the model are shown in figure 8-2 (see chapter 8 under 8.3.3).

The information literacy model described above could be supported by a diagram, which is summarized below:



**Figure 2-11: The process involved in teaching IL programme with an integrated model**

The illustration above assumes that the implementation of an information literacy programme in an academic environment would depend on the teaching environment and how effectively the integrated IL model is used to teach the programme. The teaching environment would include various aspects such as the availability of

physical and human resources to support the course, collaboration between librarians and academics, institutional support, subject domains (with relevant examples to support what should be taught) and other related aspects. In order for the information literacy programme to be more effective, evaluation of the effectiveness of the programme in terms of the applicability of the information literacy teaching model and the teaching environment should be made. This would help to see areas where the integrated model works effectively and considerations for the improvements of the particular resources (such as relevant topics, sources of information, facilitation and so on).

## **2.10 Summary**

Various models of information seeking behaviour and information literacy covered above complement one another and help to identify common features in information processes (needs, seeking, searching, evaluation and use). Different information seeking behaviour model and the features that they try to project, highlights key topics such as roles, norms, values, gaps, barriers, uncertainties, knowledge, thoughts, cognition and learning processes that information literacy trainers need to be aware of. Most models have been developed to ensure that users get the information that they need through the improvement of information systems and mechanisms involved in seeking, searching and using information but can be seen to be relevant to teaching information literacy. Evidence has shown that thinking skills form a fundamental part of information literacy training in terms of developing higher order thinking skills addressed in the models of information literacy skills. By integrating information literacy, thinking skills and information seeking, a suitable framework for teaching and learning information literacy could be constructed as shown in figure 2-10. In addition, the literature on the various studies on information behaviour and information literacy, served to indicate areas where information literacy skills are most needed and the problems associated with a lack of information literacy. The literature review above therefore played a fundamental role in developing the style and content of the new information programme. In addition the design was further influenced by literature on research methods and teaching methods discussed in chapter four: research methods.

### **3.0. CHAPTER THREE: DEVELOPMENT OF PUBLIC UNIVERSITY LIBRARIES IN TANZANIA**

This section provides factual information about Tanzania in general, the education and training system in Tanzania and the current situation in public universities and libraries. The details of the education system are given, together with the teaching styles from schools to tertiary institutional levels. In addition, the status of school libraries is also provided. Furthermore, a description of public universities in Tanzania is given. The main focus is a brief history of public universities, ICT and library services, and the nature of information literacy training.

#### **3.1. General information about Tanzania (United Republic)**

Tanzania is a united republic, which was formed out of the union of two sovereign states namely Tanganyika and Zanzibar. Tanganyika became a sovereign state on 9<sup>th</sup> December 1961 from British colonial rule, and became a republic the following year. Zanzibar became independent on 10<sup>th</sup> December 1963, also from the British colonial domination, and the People's Republic of Zanzibar was established after the revolution of 12th January 1964. The two sovereign republics formed the United Republic of Tanzania on 26<sup>th</sup> April 1964. The Government of the United Republic of Tanzania is a unitary republic consisting of the Union Government and the Zanzibar Revolutionary Government. Currently Tanzania has 26 administrative regions (21 mainland and 5 on Zanzibar) and 130 administrative districts (Zanzibar has 10 and mainland has 120 administrative districts).

Tanzania is located in Eastern Africa between longitude 29<sup>o</sup> and 41<sup>o</sup> east and latitude 1<sup>o</sup> and 12<sup>o</sup> south. Tanzania is the biggest of the East African countries (Kenya, Uganda and Tanzania). It is situated between Kenya and Mozambique bordering the Indian Ocean. Tanzania has a population of over 37 million people and covers a total land area of 945,087 square kilometers; the bulk of it is a highland plateau. Tanzania is home to Africa's highest point, Mount Kilimanjaro that is 5,895 metres above sea level. The lakes and mountains have a narrow coastal belt, some of it desert or semi desert and the rest savannah and scattered bush. Tanzania also has three of the largest lakes in Africa: Lake Victoria (the world's second largest



freshwater lake), Lake Tanganyika (the world's second deepest and longest) and Lake Nyasa.

Tanzania has a tropical type of climate. In the highlands, temperatures range between 10°C and 20°C during cold and hot seasons respectively. The rest of the country has temperatures never falling lower than 15°C. The hottest period spreads between November and February (25°C - 31°C) while the coldest period occurs between May and August (15°C - 20°C). Two rainfall patterns exist over Tanzania. One is unimodal (December - April) and the other is bimodal (October - December and March - May). The unimodal rainfall pattern is experienced in southern, southwest, central and western parts of the country, and the bimodal is found to the north and northern coast. In the bimodal regime the March - May rains are referred to as the long rains (or Masika), whereas the October - December rains are generally known as short rains (or Vuli) (Berry, Mascarenhas & Steward, 1982).

The social economic situation in Tanzania is of a subsistence nature, consisting of agricultural, fishing and livestock keeping in rural areas. Major crops are coffee, cotton, tea, sugar, cashew nuts, tobacco and sisal. These crops contribute to 60% of the country's foreign exchange earnings. Also Tanzania has a significant amount of mineral resources such as diamonds, gold, iron ore, coal and many others. Tourism is another great potential for foreign exchange earnings, with wide beach resorts, historic places, wildlife and tribal cultures (Kapinga & Kondo, 1999).

Kiswahili and English are the Official languages; however the former is the national language. While Kiswahili is the medium of instruction at primary school level, English is the medium at higher educational levels.

### **3.2. Education and training system in Tanzania**

The education system in Tanzania is pyramidal in structure and hierarchically divided into three levels: primary or basic, secondary, and tertiary. The education system follows a 7-4-2-3+ system, where the official school entrance age is 7 years old (in addition two years of pre-primary education). The basic level consists of pre-primary, primary and non-formal adult education. Primary education is a seven-year education cycle at the end of which pupils go on to secondary education. Secondary

or second level education has ordinary and advanced levels of secondary schooling. It consists of four years of junior secondary (ordinary level), and two years of senior secondary (advanced level). Tertiary or third level includes programmes and courses offered by non-higher and higher education institutions are for a three or more years period of time. (MOEC, 1997).

Co-ordination of the education sector is done by the Ministry of Education and Culture and the Ministry of Science, Technology and Higher Education. However, the Ministry of Regional Administration and Local Government also manages basic education. At tertiary level, planning and service delivery are vested with the institutions themselves through their Governing Councils. Nonetheless, co-ordination and quality control is the responsibility of the Higher Education Accreditation Council (HEAC). At primary and secondary levels quality assurance remains the responsibility of School heads, the Ward Education Office and the School Inspector (MOEC, 1995)

The main feature of Tanzania's education system is the bilingual policy, which requires children to learn both Kiswahili and English. English is essential, since it links Tanzania and the rest of the world through technology, commerce and also administration. The learning of the Kiswahili enables Tanzania's students to keep in touch with their cultural values and heritage. English is taught as a compulsory subject in the primary education whereas at post primary education is the medium of instruction. With regard to Kiswahili, it is the medium of instruction at primary education while at post primary education it is taught as a compulsory subject at secondary education and as an option at tertiary education.

There are two levels of training institutions in higher education provision in Tanzania, namely academic full professional training and intermediary professional education and training institutions. Universities and non-professional training institutions at a lower stage represent these. Each of these has a clearly delineated mission, objectives and curriculum orientation and concentration. Universities are the highest levels of institutions, which are dedicated to the professional and intellectual development of mankind and society in general. They concentrate on research, training and public services or research. On the other hand, intermediate

institutions of higher education are devoted to human resources development for the middle and intermediate levels of the occupational structure of the society, for which they concentrate on the pedagogical mission of teaching, instructing, career training and role modeling. (MSTHE, 1999, 7)

Tanzania's teaching and education system is significantly affected by the economic difficulties and many reforms including the Arusha Declaration, socialism and education for self reliance which ensued between late 1960s and mid 1980s. The Arusha Declaration called for a refurbishment of the economic system through African socialism and self-reliance through a villagization program that was administered locally by the village leaders (Nyerere, 1973). As a result of these reforms the government took several measures that seriously affected the quality of the education system in Tanzania. These included nationalization of all denominational schools and properties, introduction of political education and activities in the educational system to propagate socialism and discourage western education as being colonial, the introduction of Kiswahili as medium of instruction in primary school level.

Tanzania is one of the poorest countries in the world. Current estimates indicate that only 7-8% of the national budget is allocated to the educational sector (SIDA, 2000). This can not be compared with neighbouring countries such as Kenya where the government spends 17% of its national budget in education, Cameroon (17.8%), Uganda (18.3%), South Africa (18.1%) and Botswana spends 25.6% on the same. Again Tanzania can not be compared with other countries in the West such as Italy (10.3%), the Netherlands (10.7%), France (11.4%) and United Kingdom (11.5%) (UNESCO, 2006). In Tanzania, half of government's overall contribution to education is collected from parents in the form of fees and voluntary contributions. Donors contribute greatly to the overall development of the educational sector in Tanzania. The literacy level has dropped from 90% in 1970s to 71% in 1997. The primary school gross enrolment rate is estimated at 75% (1999) but only 60% (or less) of children complete primary school. The transition rate from primary to secondary is 18% and the transition rate to Higher Education is 0.24% (1999 estimates). In urban areas some of the schools experience a situation in which a couple of hundred children are in one room with one teacher, because few schools

are being built despite increasing urbanization. In rural areas teaching and the educational sector is affected by lack of educational materials and shortage of competent and motivated teachers (SIDA, 2000, 9).

When Tanzania became independent in 1961, it inherited an education system, a pattern of government machinery and the economy which had served the British colonial regime. At the time of independence Tanzania did not have sufficient manpower competent to run the various sectors of administration in new Tanganyika. There was an acute shortage of teachers at all levels of schooling throughout the country. The government had to rely on teachers from Britain and United States of America. However, several years after independence to the year 1974, there was an expansion of primary education following the villagilization policy of 1971 and success in eradicating adult illiteracy. However due to economic recession of early and mid 1980, there was a drastic drop in student enrolment in schools between 1984 and 1989. There was a slight rise after 1989 following the country's adoption of liberalization and partnership policies in education provision. Enrolment at tertiary education levels has been virtually stagnant until 1990s when several tertiary institutions were introduced by the government and other private enterprises (MOEC, 1999).

### **3.2.1. Teaching and learning style**

The survey conducted by Senzige & Sarukesi (2003) indicated that the teaching and learning process in Tanzania, right from primary school level, is mostly teacher-led. This "chalk and talk" method assumes that learning is purely listening thus denying students the chance to dynamically participate in the learning process. In the teacher-led classroom, the teacher is thought of as a knowledge machine and in most cases the student is a passive recipient. The above observations were also reported in a study organized by the Ministry of Education (MOEC, 1995, 114) that most teachers in Tanzania schools tend to lecture instead of using methods that could encourage student-to-student interaction and meaningful learning. This seriously hampers the rate of retention and therefore the quality of education provided. Also this system does not prepare students to become independent and critical learners, instead they rely on their teachers for what and how to learn. The

teaching styles vary from one teacher to another and from region to region in the country. There are cases where teachers prepare lesson notes, but the lesson events are not given their proportionate share or relevant activities, or are entirely left out. Also in some situations teachers present very little from what they have prepared, and the application of what they teach is either little or completely insignificant to what the students would require. As a result, when these students finally join higher education institutions, they find it very difficult to actively participate in a self-motivated learning system owing to the nature of the learning processes in primary and secondary school levels.

Most primary and tertiary education institutions make very little use of ICT facilities (PED, 2001). In the late 1960s and early 1970s primary and secondary schools were provided with radios to enable them to listen to educational programmes designed in partnership with, and broadcast, by Radio Tanzania, Dar es Salaam. Audiocassettes with pre-recorded subject matter were also used. However, such training materials are no longer provided. The widespread use of TVs in the mid 1990s has had a very small impact on the development of the education system in Tanzania. Currently only DTV (Dar es Salaam Television) broadcasts South African designed lessons on various subjects for primary and secondary schools. Many primary and secondary schools do not use computers (for which a few schools using computers are privately owned). Where computers are used, it is mainly for learning some basic programming skills, word processing, spreadsheets and databases. They are not used as teaching/learning tools in other subjects. However, higher learning institutions are increasingly adjusting themselves in the use of ICT as a means of delivering subject matter. In the current situation, an A level student aspiring to join the top educational level finds it difficult to cope with this because there has been no basic training in ICT use in secondary schools.

In the light of the above educational situation, the government has taken into account the reality of very low academic achievements precipitated by the poor teaching and learning environment and formulated the Education Sector Development Programme (ESDP, 2000, 3-4). The programme, among others, initiated the education sector policy whose objectives are:

- To decentralize education and training institutions;
- To devolve more powers of managing and administering education to districts, communities and educational institutions;
- To improve the quality of education;
- Strengthening in-service teacher training programmes;
- Supply adequate teaching and learning materials;
- Rehabilitation of school and college physical facilities;
- Consolidate teacher-training programmes;
- Promoting research in education and training institutions;
- Strengthening monitoring and evaluation;
- To promote access and equity to basic education;
- Encourage equitable distribution of education institutions and resources;
- Expand and improve girls' education;
- Ensure disadvantaged social and culture groups access to education;
- Identify talented, gifted and disabled children and make sure they are given appropriate education and training;
- Provide education facilities to disadvantaged areas;
- To broaden the base for education financing;
- Cost-sharing measures;
- Establishment of education funds;
- To promote science and technology;
- Intensify vocational education and training;
- Rationalize tertiary institutions;
- Establish polytechnic institutions;
- Strengthen science and technology education;
- Develop formal and non-formal programmes for the training of technologists;
- To expand provision of education;
- Involve the private sector;
- Promote and strengthen formal and non-formal, distance and out-of-school education programmes;
- Optimise utilization of existing education facilities and resources.

In early 1997 the Tanzania Government developed a Basic Education Master Plan (BEMP) to guide development in basic education provision. In response to the local Government reforms agenda, an action plan for transferring responsibility to local school committees has been prepared. A pilot project for decentralization through a Block Grant system covers 37 Local Authorities. In principle less developed regions/districts are given preferences in opening new secondary schools or receiving assistance to do so (ESDP, 2000, 17).

### **3.2.2. Library services in primary and secondary schools**

In general, the status of Tanzanian school libraries is poor. Libraries lack materials (books, reference sources and other forms of library materials) and manpower. Between the mid 1960s and later 1970s primary and secondary schools had a system whereby teachers used to bring books into the classrooms for students to read and summarise. This system is no longer present to date and hence the efforts to build a reading culture have been undermined (MOEC, 2000). In addition, between 1970s and mid 1980s the Ministry of Education and Culture had established literacy support programmes which included the rural libraries, rural newspapers, radio, film and a workers' programme. These programmes were however inoperable by the end of 1980s due to inadequate allocation of financial, material and human resources (MOEC, 2001). Poor library services in primary and secondary schools have been attributed to lack of financial resources and policies to facilitate the same. However, this is a general trend in most primary and secondary schools in Africa where school library services have been poor due to similar reasons mentioned above (Badu, 2002).

Apart from school libraries, another crucial agency for provision of library services to schools is the Tanzania Library Services Board (TLSB). The TLSB was very effective between 1970s and 1980s when it played a significant role in providing library services to the country. The role of TLSB has been to supply library services in various regions in the country and it runs special collections for school purposes where students could go and read. It also offers training for library assistants from different sectors in the country. Few of these library assistants are employed by the Ministry of Education and Culture to work in secondary school libraries. However,

for the past decade, there has been lack of coordination between the Ministry of Education and Culture and the schools on one hand, and the TLSB on the other. This has greatly affected the effectiveness of the TLSB in contributing towards effective implementation of innovations in schools (Kiwia, 1992). In addition to the above, the TLSB is adversely affected by lack of financial resources to stock its collections with up to date and relevant reading materials. The situation has been of this nature since 1980s, from which time the main source of finances such as government subventions and international donor contributions dwindled drastically (Mcharazo & Olden, 1999).

Following problems affecting the TLSB, the efforts to facilitate library services for primary and secondary schools were left in the hands of the Ministry of Education and Culture. Furthermore, TLSB services were focused in urban areas where special collections for primary and secondary schools were enhanced. In Dar es Salaam, National Central Library (NCL), the TLSB established the children and schools department which deals with student information services. However, these services have not been adequate due to the growing information needs of students and lack of resources to facilitate the same (Hatibu, 2004).

There is however, no evidence for school libraries (this also includes tertiary institutions) to have any form of user education/information literacy education offered to students. Much as the TLSB's efforts in 1970s and 1980s to offer services to school libraries, the evidence of the presence of such training is absent (Hatibu, 2004). However, this problem does not affect school libraries in Tanzania alone. Mutula (2004) argues that due to lack of libraries at school levels, reading materials and qualified staff, many students at various levels of education are not familiar with the variety of information sources and services provided within and outside the library. This is caused by the absence of information literacy programmes in such schools to equip students with the needed skills. Measures have however been taken to ensure that libraries' services are enhanced to meet students' information needs. The Ministry has put efforts into building, revitalising and restocking libraries with relevant and up to date reading materials and plans to build new school libraries. To begin with, both the Basic Education Master Plan (BEMP) and Secondary Education Master Plan (SEMP) have allocated budgets for ensuring the above



(MOEC, 2001). However, despite these efforts, there has not been evidence that the Ministry of Education and Culture has plans to introduce and integrate information literacy programmes into primary and secondary schools.

### **3.3. Public Universities in Tanzania**

Tanzania has a total of 29 tertiary institutions (according to estimates made in the year 2000). Out of this number, ten institutions are recognized as public and private universities (five in each category), seven university colleges and twelve non-university tertiary level institutions (MSTHE, 2001). As pointed out above, a review of the higher education system in Tanzania in the early 1990s indicated that there has been a serious problem in low student enrolment, a gross imbalance in student intake for the sciences relative to the liberal arts, gender imbalance, poor financing of higher education, unregulated and uncontrolled proliferation of tertiary training institutions and the tendency among these institutions to distort the levels and the real worth of the academic programmes they offer (MSTHE, 1999). The description of public universities in Tanzania and the available ICT and library services is given below.

#### **3.3.1. University of Dar es Salaam**

The University of Dar es Salaam (UDSM) was first established in 1961 as a college of the University of London. In 1963, it became a constituent college of the University of East Africa and became fully-fledged University in 1970 by an Act of Parliament No. 12 of 1970. The University of Dar es Salaam started as one faculty of law, which has now grown up to include three campuses: the main campus, Muhimbili College of Health Sciences (MUCHS) and the University College of Lands and Architectural Studies (UCLAS). The main campus of the University of Dar es Salaam offers a variety of academic programmes in the liberal arts, sciences and engineering and technology. The University also established a number of faculties and institutes as permitted by the enabling act that established the University. Currently the University has a total of twelve faculties and six institutes and the total number of students is above 11,5000 (Mshana & Mashalla, 2004, 3-4).

### **3.3.1.1 Development of ICT at the University of Dar es Salaam**

Development in the application of ICT at the University of Dar es Salaam started in the mid 1990s. Currently the campus has a computer network in all its 26 academic buildings, and the library. Each building has at least one point connected to the backbone. The University Computing Centre has been given the role of overseeing ICT implementation and of serving as an IT resource-management centre for the entire university. Eight kilometres of high-speed fibre-optic cable were laid to make the backbone possible. Its transmission speed is currently 10 Mbps, and is expected to increase to 100 Mbps when upgrading activities are completed. All faculties and departments have Local Area Network in place. The Muhimbili College of Health Sciences (MUCHS) and the University College of Lands and Architectural Studies (UCLAS) are linked to the backbone through a two Mbps wireless connection and fibre-optic links are planned with the main campus. In addition, the Computing Centre established wireless links to connect to other institutes outside Dar es Salaam such as the Institute of Maritime Studies in Zanzibar (Mutagahywa and Bakari, 2000).

The university has Internet connectivity with the speed of 512 Kbps with a direct link to the United States, although the speed will be upgraded to more than one Mbps in the near future. A large percentage of the teaching staff has easy access to computers. Postgraduate students, particularly those in the faculties of Engineering and Sciences, also have reasonable access, though this is not the case in every department. Undergraduates are the ones with the most difficulty in getting computer time. The university has estimated a ratio of one computer for every ten undergraduate students, with more PCs for those studying for postgraduate degrees. As part of the university's ICT upgrading activities, computer labs have been established in each faculty. The computer labs are fully networked and have access to the campus backbone and the Internet. The university has embarked on two activities that have changed the way teaching and learning is taking place at the university. The first, funded by Belgium, is called the Technology Enhanced Independent Learning (TEIL) project, which is managed by the Instructional Technology Resource Unit (ITRU). The aim of the TEIL project is to create a virtual learning environment for both students and faculty. Currently, several

faculties including Arts and Social Sciences, Sciences, Law and the prospective College of Engineering are utilizing this facility. The e-learning programs at the university are coordinated in collaboration with partner Universities in Africa (Makerere) and abroad (Tufts University, US). The second initiative involves the creation of a Centre for Continuing Education. The centre provides quality control services to academic programmes of the University of Dar es Salaam. It provides continuing education to university staff and related personnel through supervision and coaching staff members in course development through supporting course developers and teachers/trainers with the view to making deliberate and skilled use of ICT (UDSM, 2002).

### **3.3.1.2 The University of Dar es Salaam library**

The University of Dar es Salaam library came into being when the University College of Dar es Salaam was established in 1961. Originally the UDSM Library catered for a small number of 14 law students and their staff since this was the first of the University Faculties to be established. By 1970 both staff and students had increased in number with the addition of four other faculties: Arts and Social Sciences, Science, Medicine and Agriculture and Forestry. Upon its establishment, the University College had to embark upon building up its stock of library materials for teaching and research requirements even though it was a constituent College of the University of East Africa. Due to poor communication it was not possible for users in other College campuses to fully utilize resources of their sister libraries. However, inter-library loan and exchange facilities were utilized fully. The number of library clientele increased immensely from the 1970s when there was a total of 2000 library users to 5500 in 1980s and 8,000 in the 1990s as a result of adding on new subject areas for the new faculties of Engineering, Commerce and Management, Veterinary Science (before the Faculty of Agriculture became an autonomous Sokoine University of Agriculture). The Library also serves the Institutes of Development Studies (IDS), Kiswahili Research (IKR), Institute of Resource Assessment (IRA), and the Institute of Production Innovation (IPI). The library is a legal depository of materials on East Africa generally, Kenya, Tanzania and Uganda. The materials consist of books, pamphlets, periodicals, newspapers, manuscripts,

theses and reprints. These materials are stocked in the East Africana section of the library (UDSM Library, 2002).

In late 1998, with funding from the Netherlands and Sweden (Sida/SAREC), the library implemented the Library Information System (LIBIS) Project. The Netherlands also provided technical assistance to implement the system. Through the LIBIS project, the library has automated all library activities including the library catalogue, loans, acquisitions and serials. The database is now available on the library LAN, on the campus backbone and via the Internet. Users anywhere on campus or the world are able to access information on UDSM library holdings. The Online Public Access Catalogue (OPAC) has been installed at the University of Dar es Salaam Main Campus and UCLAS libraries, replacing the manual card catalogues. The catalogues therefore can be accessed wherever there is Internet connectivity (Nawe & Kiondo, 2003). The OPAC installed has simple and advanced search options, using Adlib software. Plans are underway to convert the manual catalogue of MUCHS library into an online catalogue.

The library introduced CD-ROM services in 1992 with a grant from the Carnegie Corporation of New York. In 1994, UDSM participated in a three-year CD-ROM Pilot Project of the American Association for the Advancement of Science, through which seven African universities were provided with seven bibliographic CD-ROM databases and document delivery. The goal was to evaluate how well CD-ROM and document delivery could supplement and even replace journal subscriptions when necessary. CD-ROMs are more heavily used by students than academic members of staff (Abegaz & Levey, 1996). Currently the library has installed four CD-ROM towers that are accessible within the library, although there are ongoing plans to make them accessible throughout the university network.

The university library subscribes to online journals as part of financial support from Sida/SAREC through the International Network for the Availability of Scientific Publications (INASP) and Programme for the Enhancement of Research Information (PERI). Students and staff of the University of Dar es Salaam have access to a wide range of journal databases in various academic disciplines. The online access includes access to full text journal articles, abstracting and indexing

services. To access the scholarly literature, relevant URLs and passwords are necessary.

Due to the establishment and increased use of online and other resources and high rate of students' enrolment at the university, the library introduced information literacy programmes to enable users to effectively exploit the resources available. Initially the library conducted four week library users training programmes for new undergraduate and postgraduate students during which guidelines and instructions on usage of library resources were provided. However, some students never attended these training sessions, and even those who did, the training could not make significant change to their seeking and searching patterns. They continued relying on librarians to locate resources in the collections. In 1998, with the establishment of the Programme for the Enhancement of Research Information (PERI), information literacy programmes were introduced during which a few students and members of staff were introduced to these sessions as a way of creating awareness to students and faculty on the availability of various library resources. As a result of awareness sessions, many faculties and departments sent their students to the library to learn how to search library materials and prepare bibliographies for their assignments; hence the training became part of the library's major activities. Currently the reference and document delivery section runs these programmes. Training is conducted in groups of students, academic members of staff and individuals. Users are trained in searching, accessing and evaluating information. However, library user training programmes are still run for newly enrolled undergraduate and postgraduate students (UDSM library, 2001). More details of the current information literacy training can be found in chapter one under 1.2.

### **3.3.2. Muhimbili University College of Health Sciences (MUCHS)**

The Muhimbili University College of Health Sciences (MUCHS) is the constituent college of The University of Dar es Salaam, Tanzania. It is a public institution of higher learning specializing in health sciences training, research and consultancy services. The MUCHS was established in July 1991 when the then Faculty of Medicine was upgraded to a College. The Faculty of Medicine started as a School of Medicine in 1963, to boost the meagre supply of doctors then being produced for

the country from Makerere University College of the University of East Africa. The college has five schools and five institutes. The college has a network facility in several of its schools and institutes, and the library. The mandate to coordinate all ICT related activities is vested with the college's Directorate of Information and Communication Technology (DICT). The role of DICT is to maintain the university ICT resources and training students and staff on the utilization of those facilities (UDSM & MUCHS, 1999).

### **3.3.2.1 Muhimbili University College of Health Sciences (MUCHS) library**

The library was established in 1991 when the status of the Faculty of medicine was raised to that of a college of the University of Dar es Salaam. The library has several collections, which include a general book collection, a special reserve collection, a periodicals collection as well as slides. The special reserve collection includes, apart from rare and highly demanded books, a collection of photocopies of articles and papers on Tanzania and on AIDS while the periodicals collection includes many non-serials WHO publications.

The library has a book stock of more than 14,000 titles (27,000 volumes) and a periodicals stock of over 1,000 titles (15,000 volumes). Sida/SAREC has supported journal subscription, but due to the introduction of online journals through the International Network for the Availability of Scientific Publications (INASP) and the Programme for the Enhancement of Research Information (PERI) programme, hard copy journals subscription is coming to a halt. As for books, due to financial and foreign exchange constraints, acquisitions depend on donations and the British Government (ODA/British Council) Book Presentation Programme. The immediate clientele of the library are the students (including postgraduates) and the academic (teaching and research) staff of the college. However, the library also serves other users (mainly medical and health personnel) within the Muhimbili Medical Centre (MMC - the parent institution of the college) outside the Centre within Dar es Salaam and even outside Dar es Salaam. Currently the library operates as a de facto national reference library of health sciences since there has not been any other library with such resources in the country.

The library acquired its first computer in 1998, which was used for creating and maintaining a database of Union list of periodicals held by the SAREC supported libraries of the University of Dar es Salaam, Sokoine University of Agriculture and Muhimbili University College of Health Sciences. The library uses a Health-Net information service which enables users to communicate with and obtain health information from colleagues within the country and internationally. Also the library is linked with the Health Sciences library at Memorial University of Newfoundland in Canada. Users of the Health Net information service include academic and non-academic members of staff; postgraduate and undergraduate students; and those coming from outside Muhimbili consisting of health and non-health related users. Also the library subscribes to the MEDLINE database that is being supported by the Dreyfus Health Foundation of New York. The library is connected to the Internet and it has one computer laboratory that is being used by students (undergraduates and postgraduates) but also by some academic staff members. Due to much use of computers for other academic programmes at the college, users who come to the library need maximum assistance in searching for online resources. The library is in the process of automating its services and the card catalogue is heavily in use. (MUCHS Library, 2002).

### **3.3.3. University College of Lands and Architectural Studies (UCLAS)**

The University College of Lands and Architectural Studies (UCLAS) is a constituent college of the University of Dar Es Salaam (UDSM) and was established on July 1, 1996. It was originally founded in 1956 as a Survey Training School located at Mgulani on the then outskirts of the City of Dar Es Salaam. In 1972, it became Ardhi Institute and began offering tertiary level education in the areas of Land Surveying, Urban and Regional Planning and Land Management and Valuation. The functions of the college are: carrying out training, applied research and information dissemination in the fields of housing, human settlements and environmental management in general. The college has two faculties and six departments. It also has a total of 979 students and 99 academic staff.

The College is connected to the main trunk telephone lines and has an Internet link with the University of Dar es Salaam main campus. Efforts are under way to link UCLAS with the main campus's fibre network. The ICT related activities at the

college are run by the Centre for Information and Communication Technology (CICT). CICT coordinates all ICT related training programmes for students and staff in Geo Information Systems and remote sensing, database management systems, architecture and building related programmes, programming and others (UDSM & UCLAS, 1999).

### **3.3.3.1 The University College of Lands and Architectural Studies (UCLAS) library**

UCLAS library was established in 1972 as Ardhi Institute library. The library provides information, services, and materials to support learning, teaching, research and consultancy at the college. The library has a stock of 30,000 book volumes and 1,500 periodical titles and newspapers. It subscribes to 13 international journals that deal with aspects of human settlements, environment and geomatics. The library stock is maintained mostly through donor funding. The main donors of books and periodicals are Book Aid International (London), The Textbook Centre Project, and to some extent individuals, and publishers. However, due to the introduction of online journals at the main university library, UCLAS library gets access to online resources through the International Network for the Availability of Scientific Publications (INASP) and the Programme for the Enhancement of Research Information (PERI) programme.

The library has a total of twelve computers and out of these, eight are used by library users for Internet access, e-mail, access to the OPAC and CD-ROM databases. The library is in the process of fully automating its services and at the moment most of its card catalogue has been converted into the OPAC system. The library provides both print and electronic information services. The services include lending, reference, advisory, email, Internet, current awareness (CAS), selective dissemination of information (SDI) and reprographics. Users who utilize library resources need maximum user instructions in searching and using resources available in the collections since the Centre for Information and Communication Technology (CICT) does not offer training courses on online information searching (UCLAS, 2003).



### **3.3.4. Sokoine University of Agriculture (SUA)**

The university was created in July 1984 from the former Faculty of Agriculture, Forestry, and Veterinary Science of the University of Dar es Salaam, which in turn was until 1970 a university college of the University of East Africa that also incorporated the current University of Nairobi and Makerere University. The University's main campus is located in Morogoro town, about 200km west of Dar es Salaam. Other campuses include the Solomon Mahlangu, which is on the western outskirts of Morogoro town, the Olmotonyi campus in Arusha and the Mazimbu campus, which is located in the Usambara highlands in north-eastern Tanzania.

The University main specialised areas are teaching, research and extension in all aspects of agriculture, veterinary medicine, forestry, and related fields including food science and technology, agricultural and forest engineering, meteorology, environmental science and nature conservation, aquaculture, bee keeping, wildlife management, and agribusiness. The university consists of four faculties and six institutes/directorates, and twenty academic departments (SUA, 2002).

#### **3.3.4.1 Development of ICT at SUA**

SUA has a network facility in all faculties, institutes and the library. The mandate to manage computerization of the University is under the university computing centre which oversees the functions and maintenance of a university wide computerization system to support the functioning of the university research, teaching, consultancy, library and administrative activities. There are more than 200 computers hosted in smaller postgraduate or departmental computer rooms and individual staff offices throughout the university. Most of the computers in the university, including those in student training or working laboratories, are connected in a local area network, therefore making it possible to share hardware, software, and user data resources in the university. The network is based on the fibre optic backbone and is running at 100mbps. The university's computer system is connected to the Internet via VSAT equipment. Thus all computers that are in the LAN are automatically connected to the Internet and users can have easy access to such Internet services as email, surfing, ftp, and other electronic information services. Due to the introduction of computers at SUA, the computing centre also developed and reviews computer

curricula for undergraduate and postgraduate students, as well as for staff from within and outside the University. It offers introductory courses in information technology to all undergraduate students in all degree programmes (Paul, 2004).

#### **3.3.4.2 Sokoine University of Agriculture library services**

Sokoine National Agricultural Library (SNAL) was established by an Act of Parliament in 1991. It serves both as a university library and a national agricultural library. It is located at Sokoine University of Agriculture's (SUA) main campus and is the single largest agricultural library in the country. It has a branch library at the SUA's Solomon Mahlangu campus. The library is a legal depository of materials published in Tanzania and collects materials published elsewhere about Tanzania. It is also a depository for publications from the United Nations' Food and Agricultural Organization (FAO) and of all unpublished theses and dissertations from SUA graduates and its staff. The library collection is diversified in scope and represents the various disciplines, which have developed over time at the university. The library contains about 75,000 volumes of books and subscribes to an average of 100 periodical titles. It operates on an open access basis except for special collections such as Tanzanian published materials, government publications, theses and dissertations and electronic materials (Chilimo et al, 2005).

The library acquired computers in 1988 but rapid ICT development took place in the following years. The library is still in the process of automating its services and the manual card catalogue is being converted into an electronic one with the use of Micro CDS/ISIS software. The Online Public Access Catalogue (OPAC) is in place. The catalogue contains a database (SUALIB) for book holdings at SNAL. Library staff offer OPAC search assistance to readers when required. The database can be accessed online through the library website. The library also has CD-ROM databases. It subscribes to two agricultural databases: CAB ABSTRACTS and TROPAG & RURAL databases, and has a number of other databases on CD-ROM. Currently the library does not subscribe to any printed journals due to financial constraints, but accesses a number of online journals under the International Network for the Availability of Scientific Publications (INASP) and the Programme

for the Enhancement of Research Information (PERI) programme. SNAL is also subscribed to the Essential Electronic Agricultural Library (TEEAL) CD-ROMs, which contain more than 140 agricultural related journals in full text.

The library, in liaison with the university computing centre, is running library user training courses to enable them to search for and evaluate the available library resources. Currently these courses are conducted for all new undergraduate and postgraduate students who join the university. The university is planning to introduce these courses into the university curriculum following the introduction of various new courses that demand substantial literature for teaching, learning and research, and also due to an increase in students' intake in the late 1990s (Chilimo, 2005).

### **3.4. Summary**

Public universities in Tanzania are still at a slow speed of development. Due to poor financial resources and lack of an effective education management system in the country, most universities struggle hard to cope with the high rate of student enrolment and developments in science and technology. The education system in the country, which from the grassroots is characterized by lack of active student-teacher interaction in the teaching and learning process, does not prepare students to become independent learners at tertiary levels. This has a big impact on information literacy programmes which require students to critically evaluate sources of information they encounter so as to independently apply the knowledge gained in their learning process and in their future careers.

Furthermore, due to poor library facilities in primary and secondary schools, students lack information seeking skills. This is also attributed to lack of information literacy education at those levels which would equip students with relevant information seeking skills and knowledge.

The factual information provided above helps to demonstrate factors which may be responsible for students' inability to effectively make use of available information resources in most tertiary institutions in Tanzania. Apart from lack of relevant

information literacy training, the current education systems at school levels do not prepare students to become critical thinkers due to its passive nature. More so, lack of well established library services at school levels means that students have not been accustomed to information seeking skills through secondary information sources. The nature of most courses at tertiary levels being inquiry and resource based, pose difficulties to students who have not been exposed to critical thinking skills at the grassroots levels. As a result, much effort is called upon to overcome these obstacles to enable students to achieve their learning goals. This research therefore intended to adopt teaching and learning approaches that would support the development of teaching/learning approaches that encourage critical thinking and independent learning and that would help address this situation.

## 4.0. CHAPTER FOUR: RESEARCH METHODS

This chapter discusses the research methodology related to this study. Issues addressed are the philosophical and theoretical aspects of research: qualitative and quantitative approaches in social science research and the reason for adopting a qualitative approach for this study. Discussed also are data collection methods, population and sampling strategies.

### 4.1. Definition of research

Wilkinson (2000, 11) defined research as *“the process of arriving at dependable solutions to problems through planned and systematic collection, analysis and interpretation of data”*. According to Gorman & Clayton (1997, 35), research *“is an enquiry process that has clearly defined parameters and has as its aim the discovery or creation of knowledge or theory building, testing, confirmation revision, refutation of theory and knowledge and or investigation of a problem for local decision making”*. Juznic & Urbanija (2003, 324) define research as *“an inquiry process that includes the components for collective inquiry, research design, methodology, data collection and analysis, concluding with the communication of the findings”*. Research is a process, where a difference can be made between the formulation and construction of theory (explanation) and test of theory (Gronhaug & Olson, 1999). Yin (1994, 28) argues *“it is the logic that links or connects the empirical data to be collected to the initial question of the study and ultimately to its conclusion. Thus it is an action plan for getting from here (that is, research question) to there, some set on conclusion (these are answer about research questions)”*.

To sum up the above definitions, research aims to find answers to doubts and uncertainties for the purpose of generating knowledge and creates opportunities for further enquiries. The section below briefly discusses epistemological issues of quantitative and qualitative research and the reasons for adopting a qualitative approach for this particular study.

## **4.2. Philosophical approaches in social sciences research**

There are two approaches in social science research, which have been applied to studying social reality. These approaches have led to the creation of two distinctive research traditions and various schools of thoughts: Objectivism or Positivist, and Constructionist or Interpretivist. These paradigms are embedded into quantitative and qualitative approaches in social science research as explained below.

### **4.2.1. Positivist approach and quantitative research**

Positivism originates from a French philosopher Auguste Comte (1798-1857), who with other philosophers in the group of Vienna Circle in 1920s, intended to introduce the ideas derived from natural sciences and mathematics into social sciences. The term positivist refers to something that is posited or given, observed by the way of scientific methods as a verified factual knowledge. It stems from epistemological theory of a belief in an external reality comprised of facts that are structured in a law-like manner (Evered & Louis, 1991). Positivists emphasize logical positivism, and are concerned with facts and thorough empiricism, that is checking ideas against the world (Crotty, 1998). They maintain that there is a separate and distinct social reality out there, separated from those who experience it and waiting to be discovered and reported (Vignali & Zundel, 2003). According to this group of philosophers, so long as a discipline formulated claims about the world that could be translated into physical actions to verify those claims then that discipline could be called scientific and could be counted a part of the unity of science program. They thus argue that science should seek to describe the regularities of cause and effect in order to explain the world. Bryman (1988, 11-44) outlines some of the main features of positivism as follows:

- Positivists maintain the belief that procedures and methods in natural sciences are suitable to the social science studies.
- Phenomena that are apparent, in the sense of being agreeable to the senses, can sensibly be justified as knowledge.
- Scientific knowledge is reached through the accumulation of verified facts, which provide for the theoretical structure pertaining to a particular domain of knowledge.

- Scientific theories provide a background to empirical research that give rise to formulation of hypothesis in the form of assumed causal connections between entities that are then submitted to empirical test.

In consequence, the positivist perception and belief of data relies upon the removal of the unique qualities of the phenomenon under investigation to consider what is generally applicable. This approach is inclined towards the use of questionnaires for data collection and analytical statistical analysis such as hypothesis testing, random sampling, aggregation, precision and measurement. The above features are common in quantitative research ideal in studying social phenomena. The kind of research carried out using this approach generates results that fulfill the requirements of both generalisability and reliability.

However, the positivist approach refines and broadens what is already known, and that in so doing, it can methodically overlook key features not embodied within the quantitative outlook resulting into less useful results (Easterby-Smith *et al.*, 1991). Nuemann (1994) argues that the concerns with abstract laws and formulas are not relevant to the actual lives of real people because it reduces people to numbers thus neglecting common sense reasoning. In relation to the above, Gorman & Clayton (1997) point out that the counting approach does not go far enough in helping understand the meaning behind the figures or addressing issues that are not readily quantifiable. Also, the notion that the only valid accounts are those refined with objectivism and methodologically correct procedures is not correct since it denies the complexities of social life and the recognition of context sensitivity in everyday lives (Smith, 1994).

Due to the above observations, this study did not adopt a wholly positivist approach since it is not intended to establish laws, formulas and hypotheses. Nevertheless some quantitative techniques were applied to provide an indication of change in the knowledge of students.

#### **4.2.2. Constructivist/Interpretivist approach and qualitative research**

The constructivist/interpretivist approach has been developed from Constructivism, which is a philosophy of learning. It originates from the principle that, by reflecting

on one's experiences, a person can construct his/her own understanding of the world he/she lives in. People generate their own mental models and rules, which they use to make sense of what they experience. Learners construct knowledge for themselves; each learner individually (and socially) constructs meaning as he or she learns (Brooks & Brooks, 1993). In Latin language, "to construct" (or *construere*), means to arrange or give structure (Merriam-Webster, 1997). Based on the above principle, constructivist epistemology maintains that there is no objective truth waiting to be discovered somewhere out there, but rather truth and meaning come into existence through engagement with the world. Meaning is not discovered but rather created incrementally, or constructed and interpreted. Crotty (1998, 4) argues that "*all knowledge and meaningful reality is contingent upon human practices, being constructed in and out of interaction between human beings and their world, developed and transmitted within an essential social content*". It is concerned with *understanding* which is differentiated from the *explaining* approach found in the natural sciences. The constructivist approach focuses on a systematic analysis of socially meaningful action through the direct detailed observation of people in a natural setting in order to arrive at understandings and interpretations of the way people create and maintain their social worlds (Nuemann, 1994). Constructivist researchers start with the argument that objectivity and value free sciences are difficult to be achieved (Hedrick, Brickman & Rog, 1993). In view of the above, qualitative researchers usually seek to illuminate the meaning of social reality from the participants' perspectives (Reichardt & Rallis, 1994).

Therefore, from the Constructivist approach, qualitative research is concerned with developing explanations of social phenomena. It aims to assist in understanding the world in which people live and the way things happen in a given pattern. It is therefore concerned with the social aspects of the world and seeks to answer questions about:

- Why people behave the way they do.
- How opinions and attitudes are formed.
- How people are affected by the events that go on around them.
- How and why cultures have developed in the way they have.
- The differences between social groups (Hancock, 1998, 2).



In short, qualitative research is concerned with finding the answers to questions which begin like: why? how? in what way? Straus & Corbin (1990) define qualitative research as "*...any kind of research that produces findings not arrived at by means of statistical procedures or other means of quantification*" Gorman & Clayton (1997, 23) define qualitative research as "*a process of enquiry that draws data from the context in which events occur, in an attempt to describe these occurrences, as a means of determining the process in which events are embedded and prospective of those participating in the events, using induction to derive possible explanations based on observed phenomena*". Bryman (1988) and Hancock (1998) summarize the main characteristics of qualitative research as follows:

- Qualitative research is concerned with the opinions, experiences and feelings of individuals producing subjective data.
- Qualitative research is contextual; the natural setting where events occur is the observation post for gathering data while quantitative research detaches itself from the events.
- Qualitative research describes social phenomena as they occur naturally, which are not quantitative but rather verbal narrative by the participants themselves.
- In qualitative research the understanding of a situation is gained through an holistic perspective of their subjects, their feelings, beliefs and their interpretation of events. On the other hand, quantitative research depends on the ability to identify a set of variables.
- Qualitative data is collected through direct contact with individuals, through one to one interviews, focus group discussions or by observation. The intensive and time-consuming nature of data collection necessitates the use of small samples.
- Qualitative research uses different sampling techniques that are concerned with seeking information from specific groups and subgroups in the population. On the other hand, in quantitative research, sampling seeks to demonstrate representativeness of findings through random selection of subjects.

- Data is used to develop concepts and theories that help in understanding of the social world. It uses an inductive (or bottom up) approach to the development of theories based on the observed phenomenon. Quantitative research is deductive; it tests theories that have already been proposed as hypotheses, in order to confirm or deny it.

Patton (1990, 59) points out that the above are not *“absolute characteristics of qualitative inquiry, but rather strategic ideals that provide a direction and a framework for developing specific designs and concrete data collection tactics”*.

This research therefore follows a qualitative approach to develop an information literacy program with the view of improving information seeking skills of students in public university libraries in Tanzania. Strauss & Corbin (1990) argue that qualitative methods can be used to understand a phenomenon that is not very well known. In addition qualitative methods can be used to gain new perceptions on things that are already known, or gain more in-depth information that may be difficult to express quantitatively. In this regard, although there has been research into information literacy for students in academic libraries throughout the world, little research has been done that tries to determine the efficacy of developing an information literacy programme that brings together a knowledge of information seeking, information literacy, thinking skills and pedagogy nor has much work been done in Africa and particularly in Tanzania. Qualitative methods have the potential of providing insight into the successful or unsuccessful provision of information literacy knowledge into public university libraries in Tanzania through a variety of data collection methods such as group presentations, quizzes, diagnostic tests and reflective sessions, as well as observations. The study focused on specific groups in the population (students, librarians and academicians), who demonstrated their experiences, feelings and interpretations of what they learned and how the learning process took place. In addition to taking a qualitative approach to the data gathering process, a primary constructivist approach was taken to the design of the information literacy training course.

#### **4.3. Justifications for constructivist and behaviourist approaches to teaching and learning information literacy for Tanzania's public University libraries**

This research followed two approaches to learning, namely constructivist and behaviorist.

##### **4.3.1. Constructivist learning approach**

The constructivist learning theories believe that *"knowledge and truth are constructed by the learner and do not exist outside of their minds"* (Duffy & Jonassen, 1992, p.3-4). Learners construct their own knowledge by actively participating in the learning process. The constructivist approach describes learning as the continuous building and adjusting a previous structure as new experiences such that effective learning involves individual transformation. Constructivist instructional developers take into account collaboration, learner autonomy, generativity, reflectivity and active engagement. According to Shrage (1990, 40-41) *"collaboration is the process of shared creation: two or more individuals with complementary skills interacting to create a shared understanding that none had previously possessed or could have come to on their own. Collaboration creates a shared meaning about a process, a product, or an event"*. Moallem (2001) argues that course designers who use a constructivist approach provide tools for a learner controlled path in which learners set their own objectives and decide on where to go from there, encourage self-reflection through questions and guidance and provide tools that help learners decide what to do next based on self-reflection. In addition, the need for discussion and communication of ideas, i.e., sharing understanding was felt to be an important part of the learning process

This research therefore considered it imperative for constructivist learning theories to be used in teaching and learning information literacy. As a result during the information literacy programme, learners worked in groups to construct knowledge associated with their research topics. This was based on their experiences in terms of subjects under investigation. Students identified their own research topics and developed research problems based on their personal experiences, they determined their previous knowledge associated with the topics and identified gaps that prompted for information seeking. They located, selected and accessed sources

suitable to their research problems and also reflected on what they experienced in the training programme through hands on activities in groups and presentations. Through experience students were able to develop multiple cognitive processes, such as selecting, organizing, integrating, encoding technical or physical processes and also developed critical thinking. By actively participating in the course programme collaboratively, students would be able at a later time to utilize the skills gained for their independent life long learning information problem solving activities.

#### **4.3.2. Behaviourist learning approach**

Despite various researchers criticizing this approach (see under 8.3.4.2.), behaviourist methods were applied through the use of lectures, diagnostic tests and quizzes in order to facilitate teaching and learning information literacy. This approach was used because it was felt that certain essential knowledge needed to be taught and that some indications of students' understanding was required to see what learning had been taken on board. In addition some of these techniques actively encouraged individual reflection, communication and sharing. Furthermore some of these methods provided feedback to the students and provided a "scaffold" for learning. Gagne (1985) suggests the following learning events as necessary to the learning process:

- Gaining attention.
- Telling learners the learning objective.
- Stimulating recall of prior learning.
- Presenting the stimulus – e.g. displaying the new associations or information to be learned.
- Providing learning guidance: helping understanding by providing organization and relevance.
- Eliciting performance: ask the learner to respond in some form of activity or test.
- Providing feedback to the learner on their performance.
- Assessing performance, in a concluding phase, to reinforce learning.
- Enhancing retention and transfer to other contexts by providing varied practice to generalize the capability.

Hence short lectures, quizzes with immediate feedback, followed by hands-on activities, group work and reflections were considered important. Furthermore, this approach was found useful when combined with a “learn by doing” approach (Hartley, 1998). This was encouraged by making students active listeners through answering facilitators’ questions and discussion with each other about various aspects of the programme.

#### **4.4. Research design**

Research design is a logical model of evidence that allows a researcher to draw conclusions concerning causal relationships among the variables under investigation (Nachimias & Nachimias, 1976). As highlighted in the previous definitions, research is about creating new knowledge; therefore every type of empirical research has an implicit/explicit research design (Gilham, 2000). Research design is a blueprint that highlights the following problems (Yin, 1999):

- What questions to study?
- What data are relevant?
- What data to collect?
- How to analyze the results in a logical structure?

De Vaus (2001) argues that research design aims to produce unambiguous evidence that helps to answer the initial research question. It serves to conceptualize an operational plan to undertake the various procedures and tasks required to complete the study. The procedures have to be adequate in order to obtain valid, objective and accurate answers to research questions (Kumar, 1999) or meaningful believable insights.

##### **4.4.1. Previous research strategies**

In order to ensure that appropriate methods were determined for the research, a number of previous studies in designing, implementing and evaluating information literacy courses were analyzed. Many of the studies reviewed have attempted to give a narration of how specific information literacy courses were designed, implemented and assessed. Methods used in many of the studies were primarily

qualitative although some had used tests, exercises and questionnaire surveys. Below is a summary of a seven studies reviewed.

**Table 4-1: Summary of previous similar research**

| Authors                          | General purpose of study  | Institution study conducted                          | Sample Population                       | Methods   |
|----------------------------------|---|--|---|---|
| Fowler (1999)                    | Evaluation of students' perceptions of the course through analyzing their reaction, learning, behaviour and results   | James Cook University                                | 1998 – 13 students<br>1999- 17 students | Survey (Donald L. Kirkpatrick's four stage evaluation model)        |
| Lombardo & Condic (2001)         | Studying undergraduate periodicals use  | Oakland University                                   | 260 students                            | Pre/post-tests, Final test  |
| Bloom, B. Deyrup (2003)          | Evaluation of student knowledge and skills in information searching and library skills  | Catholic University (US)                             | Numbers not given                       | Survey, Quizzes, Journaling, Anecdotal evidence                     |
| Tucker & Palmer (2004)           | Evaluation of student knowledge and skills in basic information literacy in recognising common types of references – before and after the information literacy session. | Deakin University Engineering & Technology Programme | 66 students                             | Questionnaires, Pre-tests/post tests                                |
| Andretta (2005)                  | Assessment of achievement of a web-based gateway to the learning resources to foster independent learning skills  | London Metropolitan University                       | Several undergraduates & postgraduates  | Survey, Pre-test/post tests   |
| Walton, Barker & Hepworth (2006) | Facilitating information literacy teaching and learning in a Level 1 Sport & Exercise Module by means of collaborative online working via a VLE                         | Staffordshire University                             | 20 students                             | Reflective, sessions<br>Pre-post module assessments, Questionnaires |
| Worden (2006)                    | Measuring the impact of information skills sessions: pre- and post-testing student competence.<br>Theme: Practical approaches to Information Literacy                   | University of Portsmouth                             | Several students                        | Multiple-choice, Pre/post-tests                                     |

Due to the nature of this study, several methods of collecting data/teaching as indicated in the studies summarized in the table above were not used. These include journaling, anecdotal evidence, questionnaires and surveys. Several of these methods (such as journaling) were replaced by reflective sessions, which provided immediate feedback and were used for summative assessment of the course. This study did not use highly structured questionnaires since as a qualitative study; it was concerned with collecting data based on opinions as opposed to statistical data.

#### **4.4.2. Qualitative research approach**

There are various approaches in qualitative research and the most common approaches include phenomenology, grounded theory, ethnography, case study and action based research. This study adapted case study and action based research approaches. Phenomenology, which is a study of the development of human consciousness and self-awareness (Merriam-Webster, 1997), could be used in this study to explore perceptions of information literacy. However this was not the main aim of this study therefore this approach was not taken. In addition, this study could have used a Grounded Theory approach through students taking quizzes, reflections and group presentations to build a general theory that would provide an interpretation of each method in teaching and learning information literacy. Since this was not the purpose of this study, grounded theory approach was not followed. Furthermore, this study could have adapted Ethnography, which, according to Dey (2002), is an effort to understand and interpret a particular cultural system in which the researcher becomes absorbed for long periods in the empirical domain (Lewis, 1985). In this context, the researcher could have spent time with students in their day to day lives to understand their ways of managing and dealing with information literacy. But this approach is very time consuming and this study did not aim to collect information about students' ways of life in managing/dealing with information literacy. Hence this approach was not taken.

Further explanations of case study and action based approaches and reasons for using the same are provided below.

##### **4.4.2.1 Case study**

According to Yin (1994, 13) "*a case study is an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident*". The qualitative approach to case study is described in such a way that its value relates to the in-depth analysis of a single or small number of units. Such entities described in case study research include a single unit such as a person, an organization or an institution.

Case studies identify how a complex set of conditions come together to produce a particular manifestation. It is a highly flexible research method and employs a number of data collection methods such as document analysis, artifacts, direct observations and systematic interviewing (De Vaus, 2001). It is also argued that case study strategy provides a rich multi-dimensional picture of a situation being studied and could illustrate relationships, corporate-political issues and other patterns of influence in the particular context being studied (Remenyi et al, 1998). The case study approach is preferred in examining contemporary events in a situation where relevant behaviours cannot be manipulated. Data relevant to the case is gathered and organized in terms of the case, in order to provide an opportunity for the intensive analysis of many specific details often overlooked by other research methods. This study adapted the case study approach for reasons explained at 4.5.1. below.

#### **4.4.2.2 Action research**

According to Cunningham (1993, 4) action research *"is a term for describing a spectrum of activities that focus on research, planning, theorizing, learning and development. It describes a continuous process of research and learning in the researcher's long-term relationship with a problem"*. Westbrook (1995, 8) observed that action research can be seen as an alternative to case research, but whereas a case researcher is an independent observer, an action researcher *"...is a participant in the implementation of a system, but simultaneously wants to evaluate a certain intervention technique. ... The action researcher is not an independent observer, but becomes a participant, and the process of change becomes the subject of research"*.

There are a range of types of action research, such as participatory action research, action science, action inquiry, and appreciative inquiry. However, Lippitt and Lippitt (1978) came up with three categories of meanings of action research as follows:

- The first definition is diagnostic research, in which the researcher gathers the data and presents them to those who are in a position to take some action.



- The second is whereby the researcher collects data from participants of a system and provides feedback about the findings of the data as an intervention, to influence ongoing action.
- The third definition of action research is seen as the most pure form; here the researcher participates in a social system and is involved in a data collection process about themselves and they use the data that they have gathered about themselves to inform some action.

This research took the second route, in that the researcher collected data, while participating in the pilot implementation stage in which he discussed various aspects of the course with librarians, re-designed and implemented the second programme to students. The data collected from both stages would later on be delivered to the library system to prompt more actions into the ongoing information literacy programme. In general Lippitt's definitions of action research are satisfactory to demonstrate that in action research the researcher can have different types of commitment with the community under study and the associated action processes.

#### **4.5. Justification for a research strategy choice**

This study used a combination of case study and active research strategies. Reasons for the above combination are characterized below.

##### **4.5.1. Case study**

Unlike other strategies, a case study approach seeks to achieve both a more complex and fuller explanation of phenomena and also seeks to achieve idiographic (study of the individual) as well as homothetic (study of a cohort of individuals) explanations (De Vaus, 2001). Also Remenyi et al (1998) argues that a case study provides a rich multi-dimensional picture of a situation being studied and can illustrate relationships, corporate-political issues and other patterns of influence in the particular context being studied. This research study had a social orientation which needed to investigate teaching and learning information literacy in experiential and situational learning approaches based on a local context that influenced the use of local resources. It also examined how information literacy knowledge was transferred from librarians to students through the use of similar course structure. In this context the case study strategy was more useful in providing fuller explanations

and in depth study of how the above mentioned approaches worked among the cases studied. Case studies centre on a theory or set of rival theories regarding a particular phenomenon (Yin, 1999). On the basis of a theory a prediction is made for a case with particular characteristics to have a particular outcome. The major point for a case study is to see whether a particular assumption becomes true in a real life situation. If it did not work then the research would seek to understand from a careful analysis of the case as to why the predictions did not prove to be right. Many reasons might contribute to this: the assumptions might be wrong or not applicable under specific circumstances; or the assumptions might need further refinements (Yin, 1999, De Vaus, 2001). In this research study, one of the assumptions was that, the conscious integration of library science approaches to information literacy with both the knowledge of information behaviour and pedagogic theory would aid the development of a training course. This assumption worked, since apart from aiding the design of a course, the integration had expected to engage learners throughout the course. More details can be found under 8.3.3 below.

Case study research design has the following components (Yin, 1999, 11-60):

#### **4.5.1.1 Study's question**

In most cases, the questions *who*, *what*, *where*, *how* and *why* are used in case study strategy to provide a clue regarding the most relevant research strategy to be used. Yin argues that case studies strategy is most likely to be appropriate for *how* and *why* questions. For this research, one of the questions addressed was "*What should be covered in an information literacy programme*". The form of this question which has a *what* has led to selection of a case study approach.

#### **4.5.1.2 Study's proposition**

In this case, each proposition directs attention to something that should be examined within the scope of the study. In this study attention was paid towards providing answers to aspects of design, teaching and evaluation of information literacy training courses. Another consideration in the study proposition was that the scope of the study is confined to public universities in Tanzania.

#### **4.5.1.3 Unit of analysis**

A case is the object of the study. This is the unit of analysis about which the information is collected. Unit of analysis may be a person about whom the study may try to build an understanding that is informed by the context in which the whole case exists. Other units of analyses could be organizations, events, decisions, time periods and others. In this study the unit of analysis were University of Dar es Salaam postgraduate (Masters) students, librarians and the faculty. Reasons for choosing this institution and postgraduate (Masters) students will be discussed in the forthcoming sections.

#### **4.5.1.4 Logical linking of data to proposition**

This is the method by which data is linked to the hypothesis or research question. It provides guidance on data to be collected and methods of analyzing it. In this case the data to be collected was determined by activities associated with the design, implementation and evaluation of the course. These activities included soliciting views of the faculty and librarians (through interviews) and the actual process of teaching/learning information literacy through lectures, quizzes, group work, diagnostic tests and reflective sessions. Data that was generated through these activities was analysed based on their characteristics.

#### **4.5.1.5 The criteria for interpreting the findings**

This refers to the analytical framework used to manage data collected. In this case, the criteria for analyzing data collected was based on the main aim of the research, that was to develop a training course that inculcated information literacy and could be implemented by staff in the library. The analytical framework used to manage data collected was developed by judging the success of the course in terms of knowledge transfer and learners' ability to take on board what was taught.

#### **4.5.1.6 Validity and reliability in qualitative, case study research**

Research design is supposed to represent a logical set of statements. Adams & Schvaneveldt (1985) argue that it is essential to recognize that validity and reliability issues are important in assessing the trustworthiness of measurements. In quantitative research approaches validity refers to "... *the appropriateness,*

*meaningfulness, and usefulness of the specific inferences made from test scores.*" (The American Psychological Association, 1985, 9) whereas reliability refers to the situation whereby an experiment, test, or any measuring procedure yields the same result when repeated. This is not the case in qualitative research in which various terms have been used to describe validity and reliability. In qualitative research, validity and reliability have generally been described as trustworthiness (which contains aspects such as credibility, neutrality or confirmability, consistency or dependability and transferability) (Lincoln & Guba, 1985; Davies & Dodd, 2002). For example, on credibility, Patton (2002, 14) argues that in qualitative research, "the researcher is the instrument". Therefore, the credibility of qualitative research depends on the ability and effort of the researcher.

Based on the above observations, in order to ensure trustworthiness, this study considered the fact that constructivism values multiple realities that people have in their minds and that reality changes whether the researcher wants it or not (Hippis, 1993). Furthermore, the qualitative research process is iterative, which requires a researcher to move back and forth between design and implementation to ensure congruency among data collection methods, question formulation and the process of collecting and analyzing the data. In order to maintain trustworthiness, verification strategies should be in place in order to determine when to continue, stop or modify the research process (Morse et al, 2002).

Therefore, to acquire valid and reliable multiple and diverse realities, multiple methods of searching or gathering data such as interviews, quizzes, group presentations, reflective sessions, observations (qualitative methods) and diagnostic tests (quantitative method), were used. These were intended to ensure that the results obtained at each stage of the course could demonstrate students' understanding of what was taught. Furthermore results obtained would determine whether or not learners acquired skills transferred, and provide an indication of the increase (or decrease) in students' knowledge.

#### 4.5.2. Action research

Galliers (1991) argues that action research is often embodied in a case study. This is one among several reasons that prompted this research to adopt an action research method. Coughlan & Coughlan (2002) characterize action research as follows:

- Action researchers take action.
- Action research always involves the two goals of: solving the problem (the role of the consultant); and making a contribution to knowledge (the role of the researcher).
- Action research requires interaction and cooperation between researchers and the client personnel.
- Action research can include all types of data gathering methods.

This study was action-based, whose intention was to solve problems associated with teaching and learning information literacy. The course was successfully conducted with the cooperation between the researcher, lecturers, library staff and students, who interacted during the programmes. Ranges of data collection methods were used to accomplish the main aim of the research. It also expected to develop new knowledge about how to teach and learn information literacy.

The above characteristics have further been expanded by Vignali & Zundel (2003, 208), who argue that action research “... *aims to contribute both to the practical concerns of people in an immediate problematic situation and to the goals of social science by joint collaboration within a mutually acceptable ethical framework*”.

According to Gronhaug & Olson (1999, 9), action research involves the following:

- Emphasizes the importance of both scientific contributions and the solving of practical, real-life problems.
- Focuses on the common values and standards of researchers and clients.
- Represents an intensive research strategy.
- Involves some aspects of collaboration between researcher and client.
- Action research is longitudinal and emphasizes gradual learning and improvements.

- Action research assumes that the researcher needs contact and interaction with clients to really know their problems and influencing factors.

Rowley (2003, 134) identified the following main stages of action research:

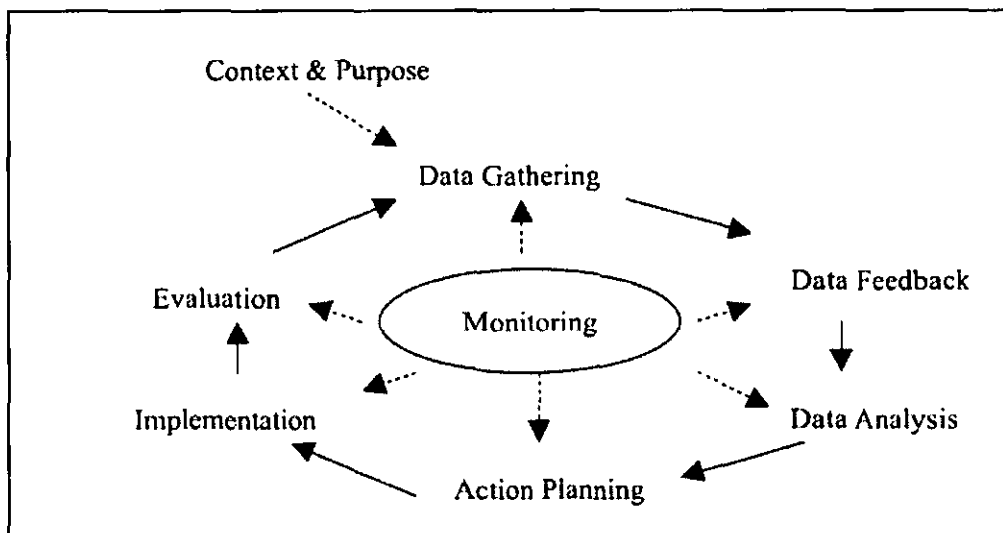
- Pre-stage: context and purpose - this step is focused on the establishment of the context for the action research intervention, with particular reference to external factors and internal forces that suggest change is necessary.
- Diagnosing is concerned with the identification of the issues, and therefore, the focus for action. In keeping with the spirit of action research, diagnosis must be a collaborative venture, so that the process commences with a shared understanding of the basis for subsequent action.
- Planning action is the stage that is concerned with planning the intervention; like diagnosis, planning should be collaborative.
- Taking action is the step during which plans are implemented and interventions enacted.
- Evaluating action is the step that offers the opportunity to focus on the outcomes of the intervention. Outcomes are evaluated in terms of whether the desired outcome has been achieved, but also in order to assess whether the original diagnosis was correct and the action taken was appropriate.

This study adapted Rowley's stages as follows:

- Pre-stage: this involved selecting the University of Dar es Salaam, an institution in which the study was carried out. This was based on the fact that this institution had conducted some information literacy courses which, however, had several weaknesses including lack of a comprehensive course programme, lack of appropriate pedagogy, failure to effect learning to students and other related problems. Hence the University of Dar es Salaam was chosen for this research based on the factors outlined under 4.7.1. below.
- Diagnosing: This was done through interviews with academicians and librarians at the University of Dar es Salaam and through reading the related literature. Whereas interviews revealed a need for introducing information literacy programmes based on active, problem-based learning approaches, the literature helped to identify what was to be taught and methods of doing the same.

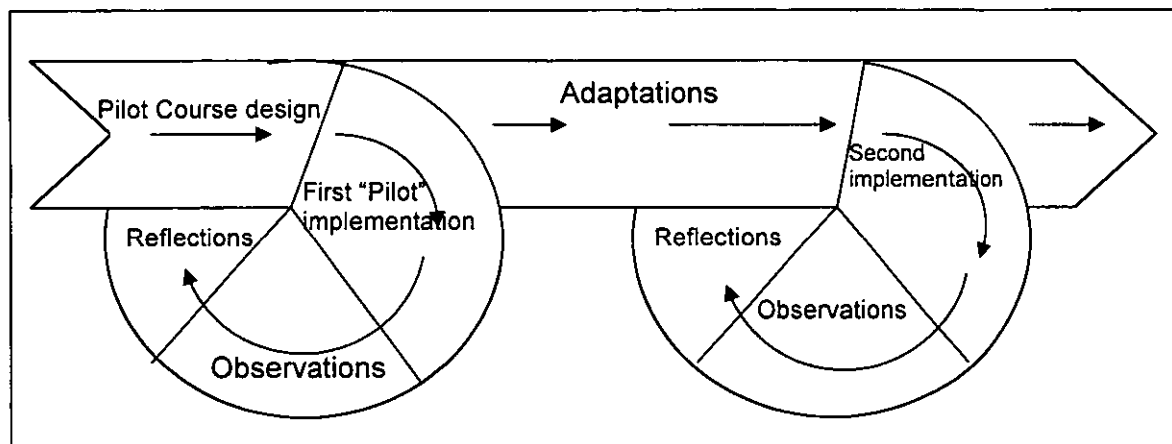
- Planning action: This was done through preparing course materials and structure by the researcher and also in collaboration with academicians within the Faculty of Education and librarians. Other activities included preparing other support materials and training facilities and soliciting course participants. This was done in collaboration with the University library, the Faculty of Education and University administration (see chapter five for more details).
- Taking action: this involved the actual teaching of the course to the librarians (pilot implementation) and Masters of Education students. The pilot programme aimed to determine whether the course could be run the way it was envisaged (for Masters of Education students) and also it intended to teach the librarians how to teach information literacy.
- Evaluation action: This involved evaluating the course programme by both formative and summative methods. Formative evaluation of the course consisted of reflective sessions with course participants and discussions that followed after taking the quizzes. On the other hand, summative evaluation was done through carrying out reflective sessions at the end of the programme, diagnostic tests and E-mail surveys conducted with the students and lecturers.

Furthermore, the above explanations by Rowley (2003) have been supported by Coghlan and Brannick (2001) who proposed a research circle as shown in figure 4-1 below:



**Figure 4-1: Coghlan and Brannick (2001, 230) Action research circle**

The study carried out at the University of Dar es Salaam was carried out based on the action research model by Andretta (2005) indicated below:



**Figure 4-2: Action Research Circle (adapted from Andretta, 2005)**

Relating the above diagram to this research, the first implementation “pilot” programme which involved 15 librarians took place between 5<sup>th</sup> and 13<sup>th</sup> April 2005 at the University of Dar es Salaam library. The progress of the programme was observed by the visiting supervisor and two research assistants and data was collected through various methods explained under 4.7 below. Through reflections by librarians, the visiting supervisor and the research assistants, adaptations were made on several teaching aspects. Then two librarians who had participated in the first “pilot” implementation used the same teaching and learning framework to implement the course with 12 Master of Education students between 4<sup>th</sup> and 15<sup>th</sup> July 2005. Observations were made by the researcher and two assistants. Students’ reflections were also used to suggest possible enhancements for future courses and further research.

#### **4.5.2.1 Significance of action research for this study**

According to Swepson et al (2003) action research that is carried out within a learning organisation can be beneficial to the organization in terms of its results, such as new courses, new academic reforms and many others. Also it can bring benefit to the body of knowledge about which a research report is written. This research on the design and implementation and evaluation of information literacy in Tanzania could be beneficial to both the researcher and the community and the University could benefit from the research in making improvements to its ongoing



programmes. Furthermore the research report could build on the existing body of knowledge on information literacy initiatives in Africa. Koo (1999, 90) defines action learning as *"a concept and a form of action which aims to enhance the capacities of people in everyday situations to investigate, understand and, if they wish, to change those situations in an ongoing fashion, with a minimum of external help. Action learning is concerned with empowering people in the sense that they become critically conscious of their values, assumptions, actions, interdependences, rights, and prerogatives so that they can act in a substantially rational way as active partners in producing their reality"*.

Both action research and action learning involve experiential learning cycles whereby learning knowledge is gained from observations, questioning and reflection related to experience or action. This kind of situation results in generalizations or the formulation of abstract concepts, the implications of which are tested in another situation. It then creates a new concrete experience, followed by another cycle of learning. The process of understanding, improvement, and transformation of the specific situation in which the group are working is the ultimate outcome of these learning cycles (Cardno & Piggot-Irvine, 1996). The reflections by library staff assisted the design and second implementation of information literacy course to students, whose reflections assisted this study to recommend further actions to be taken by the University authorities and information literacy professionals.

To summarise the justifications for selecting the two research designs, that is case study and action research, this research also puts into consideration overcoming challenges associated with adapting these approaches. The literature points out that case study methods have several weaknesses, one being the fact that it may be difficult to determine the representativeness of cases being studied. In addition to the above, cases selected may be exceptional, hence obtaining results which may not represent the real situation of the entire population being investigated (Odell, 2001). To overcome the above weaknesses of the case study approach, the researcher ensured that the selection of course participants particularly for the second implementation programme considered students' varying ICT skills. Students without the necessary skills were included in the course together with

those who possessed the required skills. The results of the pre-test and reflection sessions helped to indicate further that students selected were of varying capabilities since several of them indicated low ICT and other skills related to information literacy (see chapter seven below for details).

On action research, Mills (2003) suggests that significant time is required to plan for an action research, collect data, analyse and write research report. In addition, lack of resources, including facilities, may hamper the research taking place as planned. Furthermore, action research may be prone to resistance from authorities or people involved, due to the fear of possible changes that the study may propose at the end. This may result in poor support from them. To overcome various challenges mentioned above, the researcher took several measures. Time for the research was planned well in advance, between December 2004 and August 2005 to enable the researcher to gather data, analyse and report the findings. The researcher was assisted by the University of Dar es Salaam's Research and Publications Directorate personnel, who ensured that logistics and training facilities were made available for the research to take place. In addition, the support for the research from University authorities and participants in the study was high. These factors enabled the researcher to conduct the study more successfully.

#### **4.6. Conceptual framework and theoretical approach to the study**

The literature revealed the following generally:

- There is a tremendous explosion of information which various library user instruction courses have not been able to effectively demonstrate how to deal with.
- Little research has been conducted in Africa (Tanzania in particular) that indicates efforts to design and teach information literacy skills by integrating library science approaches to information literacy with both the knowledge of information behaviour and pedagogic theory.
- There are a lack of assessment methods for information literacy courses.

In the light of the above observations in the literature, this study adopted a synthesis of Hepworth's (2004) information behaviour model, and a number of information literacy and thinking skills frameworks for designing, implementing and evaluating

an information literacy training programme suitable for Tanzania public university libraries. The reasons for choosing these frameworks were as follows:

#### **4.6.1. Hepworth's model**

- This framework is concerned with understanding information needs of users of information in different environments. Information literacy education aims at teaching students to meet their information needs by locating, accessing and retrieving relevant information from sources. This framework can thus be used to teach students to define their tasks, determine their knowledge in information seeking related activities and use their cognitive skills (identify, analyzing, synthesizing, evaluating) to seek information from sources in order to solve an information problem.
- This framework is a result of synthesis of various models that deal with identifying similar variables and highlight different aspects of information seeking environments. The framework can be applied to help study specific communities such as students in higher education institutions.
- As noted in the previous sections of this study, the current available literature shows that no study of this kind has been carried out in Tanzania. Most studies carried out elsewhere have focused on adapting and implementing information literacy models and standards that assume abundantly available resources and IT skills. This framework is designed in such a way that it can deal with sources inside and outside the library environment.

The details of Hepworth's model have been covered under 2.9.1.

#### **4.6.2. Thinking skills frameworks**

The adoption of a thinking skills framework as developed by Moseley et al (2004) was considered for a number of reasons:

- Since information literacy involves lifelong learning, a framework of this kind can be used as a guide in formulating specific learning objectives and assessment items. One of the specific learning objectives of information literacy was to facilitate learners' lifelong learning process through the

acquisition of problem solving skills associated with independent learning and creative thinking.

- The frameworks were suitable for adult learners who needed to develop a mature understanding of thinking and learning in situations where learners take the largest share of responsibility for their own learning. In information literacy training learners are expected to value the possible transferable skills into their life long journey.
- The frameworks consist of ‘higher level’ activities such as problem solving, decision making, critical thinking, logical reasoning and creative thinking. These skills emphasize discrete thought processes that identify a purpose, establish a frame of reference, identify problem, develop alternatives, make appropriate inferences from information gathered and employ a creative process that results into a meaningful information product.

A thinking skills framework is important in information literacy programmes because, as it has been pointed in the literature, information is expanding at such a rate that students need transferable skills to allow them to address different information problems in different contexts at different times throughout their academic life and thereafter. The tremendous growth and changing nature of information requires students to assimilate information from multiple sources, determine its veracity and make judgments (Wilson, 2000).

#### **4.6.3. Information literacy models**

Information literacy models as adapted from the Big Six skills, Standing Conference of National and University Libraries (SCONUL) model (Bainton, 2001), the Australian and New Zealand Institute for Information Literacy (ANZIIL), the Chartered Institute of Library and Information Professionals (CILIP) and Association of College and Research Libraries (ACRL) standards provide frameworks that assist students to develop meta-cognitive approaches that are vital in deciding actions to take in gathering, analyzing, and using information to solve their problems. Information literacy models have been developed for use by students when they are in a situation that requires information to solve a problem, make a decision or complete a task. The situation could be both personal or

academic. The key components of the five models have been elaborated in details under 2.9.3.

Generally, the above models bear certain characteristics making them suitable for this study:

- These models recognize that before a person engages in an information seeking activity, a drive to do so must be present (recognition of an information need or problem).
- Almost all the models stress the need for students to undergo a meta-cognitive process (reflection and/or re-evaluation/examination or iteration) when seeking for information.
- Some models (such as ANZIIL and ACRL) enumerate lower and higher order thinking skills, which could be applied to all skills of learning (students at different levels, which is primary schools, colleges and universities).
- Furthermore, models such as CILIP recognize that information is not just from hard copy or electronic resources but can be people and other non-standard sources such as TV and radio. This is a very important observation for communities in third world countries where sources of information in terms of electronic (online) formats face several handicaps including electrical power failures and low Internet bandwidth.
- Modules like SCONUL recognize a need to devise skills that students can still use even when they finish their studies, which is the ultimate aim of most information literacy programmes: to enable students to become lifelong, independent learners.

Therefore this study reflected on major characteristics enumerated in the Hepworth model, educational theories and thinking skills frameworks and IL models as explained in previous chapter under 2.9. and came up with a synthesized framework elaborated in figure 2-10 above.

#### **4.6.4. Teaching and learning methods**

In addition to the integration of the three domains mentioned above, together with various approaches of doing research pointed in the previous sections in this chapter, this study used a number of methods for teaching and learning (pedagogy)

information literacy, namely constructivism, reflections, experiential and learner-centered, as summarized below:

**Constructivist teaching/learning method:** This approach was intended to support learners in developing ownership of their tasks; design authentic tasks; support and challenge their thinking and provide opportunity for reflecting on what they learned and how the learning took place (Savery & Duff, 1995). To fulfil the above, the programme used a constructivist method of teaching to carry out hands-on activities in their own groups in order to construct their own interpretations of various answers to problems addressed by their topics. Through group presentations, discussions and reflective sessions that followed, it was expected that this approach could help learners reflect on the content learned and what they went through.

**Behaviourist teaching/learning method:** This method of teaching and learning was used to enable learners to acquire knowledge which could not be easily acquired through other methods. It was used on the assumption that learners would acquire certain knowledge through lectures and demonstrations (Gagne, 1985). In addition, this approach was used to enable learners to reinforce the knowledge acquired through step-by-step learning process supported by quizzes and diagnostic tests (Entwistle, 1981).

**Reflective teaching/learning method:** As recommended by Kolb et al (1991) the reflective learning approach was used to make learners become more skilful, make better connections with what was being learned, understand more and make meaningfully informed decisions regarding what they had to do next throughout the course. Reflective learning was intended to enable learners to make sense of what they had learned, how the learning took place, how a particular increment of learning took place and the relationship between various aspects learned throughout the course (Race, 2000). Reflective learning took place in the form of reflective sessions, quizzes and group presentations.

**Experiential learning method:** This approach was used to actively engage learners in learning through experience (learning by doing) while working on authentic problems addressed by their topics. It was intended to actively involve students in group activities to define problems associated with their topics, plan for information

searching, understand information systems, perform searches, analyse, synthesize and evaluate information, present information to one another and use it ethically. Experiential learning was also intended to enable learners to reflect their experiences in order to develop new skills and ways of thinking (Kraft & Sakofs, 1988) . The role of course facilitators in this case was to organize and facilitate the learning process.

**Learner-centred teaching/learning method:** This method was used to take on board learners' experiences, perspectives, abilities and needs in the learning process. The purpose of this approach was to enable learners to know how to solve problems associated with their topics. To fulfill the above, the teaching and learning considered using particular situations and examples that reflected what students would consider to be useful. This was initiated by learners' freedom to choose their own topics and groups, which was considered to be a factor that facilitated their readiness to participate in the programmes.

The above approaches had a fundamental impact on the teaching process, the details of which have been explained in chapter eight below.

#### **4.7. Study population, sampling, research questions and data collection methods**

##### **4.7.1. Study population**

The study population for this study was Masters Students at the University of Dar es Salaam (UDSM) main campus who do arts and science courses. Outlined below were reasons for selecting Masters Students and UDSM:

- UDSM was the largest public institution in Tanzania. It is comprised of the main campus and two constituent colleges, that is University College of Lands and Architectural Studies (UCLAS), and Muhimbili College of Health Sciences (MUCHS).
- UDSM main campus had academic and research programmes in almost all academic disciplines including social sciences, sciences, engineering, humanities and law, whereas other universities are subject specific. These included Sokoine University of Agriculture (agriculture, veterinary and

forestry sciences), Mzumbe University (business studies, public administration and law) and University of Zanzibar (business studies).

- University of Dar es Salaam was equipped with ICT related facilities and resources as compared to other public university institutions in Tanzania.
- The population of Masters Students at the UDSM main campus was larger than other institutions mentioned above. These students were involved in academic and research programmes in almost all academic disciplines.
- In most departments at UDSM main campus, the course work component for Masters Students included student coursework, practical training and seminar presentations. All these learning and teaching approaches required independent work which could encourage the independent use of resources available in libraries and elsewhere.
- Most of the lecturers in the faculty of education were aware of the on-going information literacy courses run by the library. They occasionally sent their undergraduate students on those programmes. Therefore when approached, these academicians were more willing to allow a group of students to participate in the information literacy programme with the hope that the new programme would be much more suitable to the group of students and also to be considered for future campus wide programmes. In the longer term, it was hoped that inculcating information literacy among future teachers could lead to the incorporation of information literacy teaching in schools.

#### **4.7.2. Sampling techniques**

This study employed a non probabilistic, purposive sampling approach in selecting sample units. Non-probability sampling is one in which the probability of a population element being selected is either not known or not easily obtained (Patton, 1990). On the other hand, a purposive sampling involves a selection of a typical group of individuals who have the possibilities of representing a larger population and data is collected from this chosen group (Talmage, 1988). Stake (1995) argues that in large collective case studies the sample size may be too small to permit randomization, for qualitative studies he recommends purposive sampling, selecting reasonably representative respondents but leaning towards cases that seem to offer opportunity to learn.



Following the above argument, for the first part of the information literacy programme this study made a choice of sample units based on attributes of interest that provided variety measured by considering access and the opportunity to learn, which was an important attribute of case study research. In this case, 15 new and established staff from the library were selected due to their involvement in teaching the on-going information literacy courses. As for the second iteration with the Masters of Education students, the criteria to select 12 out of 56 students in the faculty was based on the fact that few of them had attended any information literacy courses offered at the university library for the academic year 2004/05. Also, these students were selected based on their availability at the time since the rest of students were writing their examinations (Masters of Education students did not write examinations).

In addition, students were selected based on gender balance that is equal distribution between male and female students. However it should be noted that selection based on gender was only meant to ensure equal participation, since the University encouraged gender equality (UDSM GDPC, 2006). The University had instituted a gender policy for all academic programmes whose aim was to facilitate gender mainstreaming and ensured equal participation in academic and research activities. For the case of this research, the selection of students based on gender equality did not mean that students' performance was to be weighed based on gender differences. Therefore data was not collected based on gender differences.

In order to solicit course participants, a note was placed at the Faculty of Education for volunteers to participate into the course. The initial plan was to enroll a total of 20 Masters Students to participate in the programme; however, 12 students were finally registered for the programme. The reasons behind this were due to the fact that facilities to support the course, such as computers and teaching aids could not accommodate the above planned number of students. In addition, most students were involved in administering Teaching Practices for undergraduate BA/BSc away from the University. Two out of the 12 students selected had once participated in the on-going University library information literacy programme. However, results indicated that these two students did not perform better than others who did not attend any of the previous programmes.

To sum up the sampling techniques used, the literature does note several weaknesses with regards to non-probability sampling techniques. These include difficulty in making inferences to the entire population due to subjectivity of non-probability sampling and selection bias (Henry, 1990; Bernard, 1994). However the samples for this study (both library staff and students) were selected based on the criteria mentioned above and that findings should be reasonably transferable.

#### **4.7.3. Research questions and data collection methods**

Data for this study was collected based on the following research questions:

- (i). What is the nature of the ongoing information literacy skills programme at the University of Dar es Salaam?
- (ii). What are the problems associated with students' information literacy skills?
- (iii). What are the gaps in the literature that give reasons for the need to design a suitable information literacy programme?
- (iv). What should an information literacy programme teaching model consist of?
- (v). Which information literacy skills should be included in the course programme?
- (vi). How should the information literacy course programme be implemented?
- (vii). What should be covered in an information literacy programme?
- (viii). What are the appropriate methods of teaching information literacy?
- (ix). To what extent has the designed information literacy course programme enhanced students' information literacy skills?
- (x). What would facilitate the teaching and learning of information literacy in Tanzanian public universities?
- (xi). How should public universities in Tanzania organize information literacy courses?

Research instruments for this study were designed by reflecting the above questions. Below is a summary of each research question and the corresponding instrument.

**Table 4-2: Summary of research questions and data collection instruments used**

| <b>Research questions</b>   | <b>Various data collection instrument</b>  |
|---|--|
| What is the nature of the ongoing information literacy skills programme at the University of Dar es Salaam?             | Interviews<br>Course materials for the ongoing programme<br>Literature about IL in Tanzania                  |
| What are the problems associated with students' information literacy skills?  | Interviews<br>Literature about IL in Tanzania and world widely   |
| What are the gaps in the literature that give reasons for the need to design a suitable information literacy programme? | Review of related literature   |
| What should an information literacy programme teaching model consist of?  | Review of related literature<br>Reflections by librarians and lecturers, Faculty of Education                |
| Which information literacy skills should be included in the course programme?   | Interviews<br>Review of related literature   |
| How should the information literacy course programme be implemented?  | Literature review<br>Interviews  |
| What should be covered in an information literacy programme?  | Review of related literature   |
| What are the appropriate methods of teaching information literacy?  | Review of related literature   |
| To what extent has the designed information literacy course programme enhanced students' information literacy skills?   | Diagnostic pre-tests/post-tests<br>Reflective sessions<br>Quizzes<br>Observations of IL course<br>Group work |
| What would facilitate the teaching and learning of information literacy in Tanzanian public universities?               | Interviews<br>Review of related literature<br>Discussions<br>Reflective sessions                             |
| How should public universities in Tanzania organise information literacy courses?                                       | Interviews<br>Review of related literature<br>Discussions<br>Reflective sessions                             |

Hipps (1993) suggests the use of triangulation between multiple sources of evidence. The qualitative method relies on a number of data collection methods, including open ended interviews, direct observation and review of documents. These three data collection methods are useful for the fact that knowledge derived from one method of enquiry is always only a partial approximation to the whole truth, thus using more than one technique (triangulation) increases the reliability of the overall findings. It proves to be a good weapon for exposing bias and provides the empirical control to prove validity (Mathison, 1988, 13-14). House (2000) noted that qualitative research relies on people to interview and things to observe. According to him these methods are more open ended and sensitive to context focusing on the explanations and judgments of participants to help explain the frames of meaning of

the actors and study the environment of action. However, the use of multiple sources imposes a big burden. The collection of data from multiple sources is more expensive than if data were just collected from a single source. Also researchers need to know how to carry out full variety of data collection techniques (Denzin & Lincoln, 1994).

This study used interviews, diagnostic tests, quizzes, group presentations, discussions, reflective sessions, online instant messaging and observations as main data collection methods. The above data collection techniques, especially diagnostic tests, and reflective sessions through exercises have been used in several other studies to collect data whose purpose were to assess the suitability of particular courses in order to answer the following questions: (1) what should students learn and (2) how well are they learning it?/have they learned it? Pausch & Popp (1997, 2) provide a list of a variety of assessment options as follows:

- tests-standardized, locally developed, and oral;
- performance appraisals, simulations, and other competency-based measures;
- self-reports or third-part reports-surveys, exit interviews, reports from employers;
- behavioural observations;
- portfolios of student work-these can include papers, assignments;
- classroom assessments;
- focus groups in which learners are asked about learning, attitudes, methods of teaching used;
- satisfaction surveys;
- learning logs or research diaries;
- self-assessment in which learners do a task and judge how well they feel they performed;
- capstone courses where students synthesize and apply what they know;
- case studies.

In this study diagnostic tests and reflective sessions through exercises, group presentations and discussions were used to collect data and helped to assess the course and the learning that took place. Secondary sources in the form of course

materials were also reviewed for factual data on the status of on-going information literacy courses. Each method is further explained below:

#### **4.7.4. Semi-structured interviews**

Semi-structured interviews involve a situation where although the interviewer has a list of issues which he would wish to obtain answers from respondents, he is willing to be flexible in terms of the order of question to which the respondents could answer. Some questions may be omitted or the order altered according to the context of the interview.

Due to the nature of this study, part of which was to examine the nature of information literacy courses at the University of Dar es Salaam and the appropriate design, implementation and evaluation of an information literacy programmes, the semi-structured interview approach was used to gather data from the following categories of respondents:

##### **4.7.4.1 Semi-structured interviews with teacher-librarians**

Semi-structured interviews were held with eight (8) teacher-librarians at the University of Dar es Salaam library to collect information on the requirements for students' information literacy education and expected skills gained. Appendix O provides the summary of dates and collections/sections where the respondents were solicited.

Questions focused on general issues such as:

- Their observations of students' information literacy skills when students go to the library to seek for information.
- The strengths and weaknesses of the on-going information literacy programmes that librarians teach or assist in teaching.
- The general and specific information literacy skills necessary for students' academic activities as a result of the observed weaknesses.
- Methods of delivering information literacy skills to students based on the suggested skills.
- Expectations with regards to improving students' academic activities.

Teacher-librarians provided information that reflected their experience in delivering information literacy skills to students. They highlighted how the information literacy programmes have been carried out with students during library orientation weeks and library drop-in sessions. Information provided focused on modules taught, contents and modes of delivery. They also gave their views on the strengths and weaknesses of the on-going programme in terms of course contents and modes of delivery. They further suggested additional information literacy skills that would enable students to identify what information is needed and the ability to locate, evaluate, and use information in solving problems and use these skills for life long learning purposes. Other library staff who were not involved in teaching information literacy programmes provided information related to their experiences in dealing with students' queries in the library which also reflected the kind of new skills necessary to improve students' information seeking skills.

#### **4.7.4.2 Semi-structured interviews with the faculty (lecturers)**

Semi-structured interviews with the faculty involved collecting information concerning lecturers' perceptions on students' information skills towards solving their academic related problems when working on assignments or research projects. Generally lecturers provided information related to the following:

- Their observations on students' information literacy skills when working on assignments or research topics.
- Lecturers' general awareness of the ongoing information literacy programmes.
- The strengths and weaknesses of the on going information literacy programmes that they teach or assist in teaching.
- General and specific information literacy skills necessary for students' academic activities as a result of the observed weaknesses.
- Methods of delivering information literacy skills to students based on the suggested skills.
- Expectations with regards to improving students' academic activities.

The plan was to interview a total of 12 faculty members who were to be solicited from the respective 9 faculties and 3 institutes at the University whose total

population was 500 faculty members. The faculties and institutes where respondents were to be solicited included the following: Faculties of Law, Arts and Social Science, Commerce and Management, Education, Civil Engineering and the Built Environment, Mechanical and Chemical Engineering, Electrical and Computer Systems Engineering, Science, and Aquatic Science and Technology. The institutes were Development Studies, Kiswahili Research, Journalism and Mass Communication.

However, only 6 faculty members were interviewed from the faculties of Arts and Social Sciences, Sciences, Education, Civil Engineering and the Built Environment, Commerce and management and Institute of Development Studies. This was because many lecturers were involved in academic activities, and also between May and early June 2005, they were involved in end of year examinations. Appendix O below provided dates and departments where these respondents were solicited.

Semi-structured interviews with lecturers gave indications on students' general information seeking skills and reflected on strengths and weaknesses of the ongoing information literacy courses. This gave room for considering the inclusion of general and specific literacy skills that would make students become more information literate. It also assisted in justifying the need to design an information literacy programme basing on the synthesis of information seeking behaviour models, information literacy skills and thinking skills to further improve students' information seeking skills.

Semi-structured interviews have been criticized for being too time consuming, a need for detailed data analysis, possibility of skipping important questions and/or asking additional irrelevant questions. They also require the researcher to possess the required interviewing skills and ability to code the text resulting from such interviews (Colwell, 1990; Kinnear & Taylor, 1996, Crandall, 2005). The researcher attempted to solve some of the weaknesses by consulting various literature, colleagues and specialists in social research at the University of Dar es Salaam to help develop the needed skills in conducting semi-structured interviews. In addition, the University of Dar es Salaam provided two research assistants who helped with data collection, coding and analysis.

#### **4.7.4.3 Information literacy diagnostic pre-test and post-test**

It is evident that pre-tests and post-tests have been used in several studies in pure sciences, humanities and social sciences. Erdner, Guy & Bush (1998) used pre-tests and post-tests to investigate the effects of using computer-assisted instruction on 85 readers in the first grade. The study included an experimental group and a control group, with each group containing similar numbers of boys and girls. Pre-tests and post-tests were administered in both groups. Pre-tests and post-test were also used in a study by Chang (2002) to explore the effects of teacher-centred versus student-centred multimedia computer-assisted instruction on the science achievements of tenth-grade students in Taiwan.

In information literacy research, pre-tests and post-tests have been used by Churkovich & Oughtred, (2002), Tucker & Palmer, (2004) to evaluate the quantitative effectiveness of information literacy training at Deakin University. Also, pre-tests and post-tests were used by Colaric (2001) to examine various instructional treatments to determine their effectiveness in aiding searchers to use a search engine on the World Wide Web. Andretta (2005) used diagnostic pre/post-tests to develop students' information literacy learning profiles and the consequent impact of the information literacy programme.

#### **4.7.4.4 Diagnostic pre-tests and post-tests to librarians in the first "pilot" implementation programme**

In the study at the University of Dar es Salaam, diagnostic pre-tests and post-tests were administered to sixteen selected librarians who participated in the pilot programme. The aim of the pilot programme was to fine tune the teaching materials and teaching/learning methods and also to determine whether the format of the programme could be run in the way it had been envisaged. It also aimed to equip librarians with information literacy knowledge and be able to transfer it to students.

Pre and post diagnostic tests enabled the researcher to see whether, following a post training diagnostic test, changes needed to be made to the course to improve learning for the Masters of Education students. It also served to pilot the diagnostic tests. Furthermore, the diagnostic test served the purpose of reinforcing the meaning of information literacy by showing the librarians that this was a serious course,



which required their maximum participation. The questions were derived from a combination of a diagnostic assessment tool based on Andretta's work (Andretta, 2005) and others that seemed relevant. Some changes were introduced to address the local needs. For example, questions concerning topics such as writing skills, essay writing, analysis, grammar and punctuation, which were covered by Andretta's diagnostic test to suit the learning needs of first year undergraduate students, were not included. Other questions that reflected the information seeking process (such as defining an information problem, synthesizing information, communicating and using information) were added. Details of specific questions asked in the diagnostic tests are elaborated in chapter 6.

The data obtained from this test helped to make adaptations to the course and the creation of relevant materials for the training of Masters Students from the Faculty of Education.

#### **4.7.4.5 Information literacy diagnostic pre-tests and post-tests to Masters of Education students**

A diagnostic pre-test and a post-test were given to students during the information literacy training. The tests enabled the researcher to see what they learned and whether changes needed to be made to the course to improve learning. Furthermore, the diagnostic tests served the purpose of reinforcing the meaning of information literacy by showing the students that this was a serious programme like any other academic programme in their respective courses. Hence serious involvement in the programme was the key to success for the acquisition of knowledge. The diagnostic tests reflected the subject nature of the students (educationalists) involved in the course.

The data obtained from these tests helped to indicate the change in students' knowledge and provided recommendations to improve the learning process.

#### **4.7.4.6 Quizzes**

Information literacy exercises in the form of quizzes are a common way of measuring students' competency in various information literacy skills. Various universities in the world have designed a number of exercises to determine students'

competence in various information literacy skills. For example, the University of Waikato, New Zealand administered exercises to first year students to familiarise them with various information literacy techniques (Graham & Parsons, 2003). The Passaic County Community College, Philadelphia administered exercises to first year students in order to determine students' familiarity with several online library resources, layout, functions and policies of the library (The Passaic County Community College, 2004).

#### **4.7.4.7 Quizzes for teacher-librarians**

In this study quizzes were administered to librarians to assist them to reflect on what they had learned and tested their understanding of what was taught. Questions in the quizzes focused on defining a research topic or problem, locating and accessing information and effective use of information.

The questions in the quizzes helped to provided data on librarians' understanding of various aspects covered in the programme. The questions also provided data on aspects that the librarians did not understand well. This data was useful in fine tuning the questions for the second implementation programme with Masters of Education students.

#### **4.7.4.8 Quizzes for students**

Quizzes were administered to students to encourage reflection on the previous learning, to test understanding and also to enhance learning by providing students with immediate feedback through discussions after each quiz.

The questions in the quizzes helped to provide data on students' understanding of various aspects covered in the programme. The questions also provided an indication of areas where the students lacked understanding. This data was useful in determining the knowledge transfer to students and the suitability of quizzes in teaching/learning information literacy programmes. It also provided an insight into possible improvements for future programmes.

#### **4.7.4.9 Group Presentations**

Both librarians and students presented what they had learned, in small groups, at the end of each module and they also made general presentations on the last day of the programme. The purpose of the presentations was to demonstrate what they had learned and the knowledge they acquired. The data obtained from presentations helped the researcher determine respondents' strength and weaknesses in applying the skills of what they learned. Chapters 6 and 7 below provide the details of the type of data that was collected from presentations. Presentations also facilitated group peer-to-peer learning as well as necessitating the formulation and communication of ideas about the information literacy process. The latter was felt to be an important part of the learning process (Steinert & Snell, 1999).

#### **4.7.4.10 Reflective sessions**

These consisted of reflective discussions and exercises. The purpose of these was to encourage both librarians and students to reflect on the various activities carried out in each session and to provide feedback on the overall programme. It was also meant to provide critical evaluation of the programme. Reflective discussions were carried out verbally between the facilitators and respondents, whereas exercises consisted of sets of questions which required them to individually reflect on what they went through in the course and were answered in a written form. Data obtained from reflective sessions helped the researcher to determine areas of the course that needed improvements and provided recommendations for future courses.

#### **4.7.4.11 Discussions**

The discussions with lecturer-librarians, the faculty and university authorities were held and enabled further adjustments and improvements in the programme. The discussions with the subject librarians helped to ensure that the content of the programme was relevant to the students in terms of the sources accessed. On the other hand, discussions with the faculty helped to provide concrete examples relevant to the students' discipline and studies.

#### **4.7.4.12 E-mails questions with students and lecturers**

The literature revealed that different types of email text messaging have been used as data collection methods in research (Clarke, 2000). For example, Young et al, (2000) conducted a study whose purpose was to provide a new perspective on Web-mediated instruction and learning which incorporates peer tutoring and peer assessment. In this study individual e-mail questions were sent to teachers to collect information about the organization, management and communication within their classes. Also personalized e-mail questions were sent to teachers to check if they had any problems in running courses on the Internet. This study found that e-mails could be effectively used as a tool for collecting data.

Taking on board these ideas, in the second implementation programme with students, the researcher used an asynchronous one-on-one e-mail text messages method to find out how the knowledge acquired in this programme was applied in students' thesis writing following the programme. To achieve the above, the researcher managed to contact six out of the 12 students, since other students were still collecting data and could not be contacted by e-mails. Similarly, e-mail messages were sent to nine lecturers asking them to comment whether the course had helped students in writing up their theses. The lecturers contacted were involved in supervising theses for all Masters Students in the programme, including the twelve who participated in the second implementation programme. However, only two lecturers agreed to respond to the questions asked while others were not able to do so. Reasons given by those who did not want to participate in the interviews included the fact that the University had not yet released official results of Masters theses hence it was not proper to discuss them. In addition, while others simply declined to comment on the results, several lecturers were not around at the University to respond to e-mails sent to them.

The e-mail messages approach was used in January 2006 when the researcher returned to the UK. It was not possible to use other methods of collecting detailed data such as face-to-face or telephone interviews due to distance between UK and Tanzania in terms of traveling and telephone costs. Data obtained from these messages helped to indicate various aspects of the course that were directly applied

while writing their theses and those that did not apply, together with an indication of whether or not the knowledge acquired was transferred to students who did not attend the course. Similarly, data obtained from lecturers helped to indicate improvements in students' literature searching and their awareness of the ethical use of information. Details of data obtained through e-mail messaging are elaborated in 7.6.2. below.

#### **4.7.4.13 Observations**

Observations were another category of data collection method in this study. The main purpose of observations was to see whether or not the specific learning objectives planned for the course participants had been met (that is, knowledge and understanding, enhancing key information literacy and practical skills). Another purpose of observations was to examine how the programme facilitators (teacher-librarians) aided the transfer of knowledge through various teaching methods used (lectures, discussions and provision of support in hands on activities).

Observations consisted of looking at the aspects of both teaching and learning. During the first "pilot" implementation programme, the observed data was derived from the visiting supervisor and research assistants. Observations aimed to determine key aspects of information literacy skills that the teacher-librarians seemed to be able to acquire. Data was recorded through audio recording, notes and video. This data helped to pinpoint programme aspects that needed modifications and improvements in order to produce an effective programme for Masters of Education students.

In the second implementation stage, the observations were made by the researcher and research assistants. Data was collected through note taking and audio recordings. The data helped to determine skills which students were able to comprehend and apply in their exercises, and noting possible difficulties that they faced during the course.

#### **4.7.4.14 Review of secondary sources**

Secondary sources were reviewed to gather data on the current status of information literacy programmes at the University of Dar es Salaam. These sources included

various course reports, course materials, brochures and the library Website. Secondary sources provided data on programme structure, modules taught, student enrolment and participation. This data helped to determine various aspects which could be adopted from the ongoing programme, such as information resources used, criteria to evaluate information and sources and bibliographic citations. Also data on enrolment indicated that the current Masters of Education students had not participated in the ongoing information literacy programme. Course reports provided a picture of what was being taught and problems experienced.

#### **4.8. Data analysis**

In qualitative research, the mass of words generated by interviews or observational data needs to be analysed and summarised. For the analysis of case study data, some analytical solutions have been provided by Yin (1999, 106) who suggests four analytic techniques as follows:

- **Pattern-matching:** a technique by which a group of characteristic properties of an unknown object is compared with the comparable groups of characteristics of a set of known objects, to discover the identity or proper classification of the unknown object.
- **Explanation-building:** this is an analysis based on stipulating a set of causal links about a phenomenon occurring in narrative form but usually reflecting some theoretically significant propositions.
- **Time series analysis:** involves hypothesizing the occurrence of a series of patterns over time based on an event.
- **Program logic models:** is a combination of pattern-matching and time-series analysis. The analysis stipulates a complex chain of events over time, covering the independent and dependent variables.

Miles & Huberman (2002, 91) propose three types of data analysis for qualitative research:

- **Data reduction:** the process of selecting, focusing, simplifying, abstracting, and transforming the data that appears in written up field notes or transcriptions for the sake of manageability and being intelligible in terms of the issues being addressed.

- **Data display:** this provides an organized, compressed assembly of information that permits conclusion drawing in the form of an extended piece of text or a diagram, chart, or matrix. This allows the analyst to extrapolate from the data enough to begin to distinguish systematic patterns and interrelationships.
- **Conclusion drawing and verification:** this involves stepping back to think about what the analyzed data mean and to assess their implications for the questions at hand.

This study followed Miles & Huberman’s proposal above and developed matrices for qualitative data generated from quiz feedback and discussions, group presentations, reflective sessions and some observations. An example of the matrices is shown in table 4-3 below:

**Table 4-3: An example of the analysis table matrices  
(Hands-on activity Day 3: describe your main search strategies)**

| <b>Groups</b> | <b>Major activities</b>  | <b>Possible problems</b>   | <b>Remedial measures</b>  |
|---------------|--|--|---|
| Group 1       | <ul style="list-style-type: none"> <li>• <i>Identify sources of information relevant to our topic</i></li> <li>• <i>Identify and familiarize with search tools</i></li> <li>• <i>Construct search strategies</i></li> <li>• <i>Use varieties of search techniques to perform searches, retrieve and review the searches</i></li> <li>• <i>Refine or modify searches</i></li> </ul> | <ul style="list-style-type: none"> <li>• <i>Sources may not be available,</i></li> <li>• <i>Search terms/words may not give anticipated results</i></li> </ul>   | <ul style="list-style-type: none"> <li>• <i>Seeking for assistance from librarians</i></li> </ul>   |
| Group 2       | <ul style="list-style-type: none"> <li>• <i>Develop search terms</i></li> <li>• <i>Identify possible sources</i></li> <li>• <i>Plan where to go to search</i></li> <li>• <i>Plan how to search and retrieve results</i></li> </ul>   | <ul style="list-style-type: none"> <li>• <i>Some locating tools may become user un-friendly</i></li> <li>• <i>Failure to access the sources due to authorizations</i></li> </ul>   | <ul style="list-style-type: none"> <li>• <i>Use familiar search tools</i></li> <li>• <i>Keep trying one resource after another</i></li> <li>• <i>Consult lecturers or librarians</i></li> </ul> |
| Group 3       | <ul style="list-style-type: none"> <li>• <i>Identify sources</i></li> <li>• <i>Familiarise with search tools</i></li> <li>• <i>Locate and access sources</i></li> <li>• <i>Actual information searching</i></li> </ul>   | <ul style="list-style-type: none"> <li>• <i>Internet low connection speed may hamper use some search tools such as Google and Yahoo</i></li> <li>• <i>Some search techniques might fail to produce better results</i></li> </ul> | <ul style="list-style-type: none"> <li>• <i>Use local resources such as printed pamphlets and reports as alternatives to those online</i></li> </ul>  |
| Group 4       | <ul style="list-style-type: none"> <li>• <i>Develop search terms</i></li> <li>• <i>Identify sources</i></li> <li>• <i>Plan the search</i></li> <li>• <i>Carry out search plan</i></li> </ul>   | <ul style="list-style-type: none"> <li>• <i>Developing search strategies may become too much time consuming</i></li> <li>• <i>Internet connection speed may delay searching for online sources</i></li> </ul>                    | <ul style="list-style-type: none"> <li>• <i>Start all over again until getting what is needed</i></li> </ul>  |

The main aspects of data analysis are elaborated below.

**Analysis for diagnostic tests:** Since the number of respondents for diagnostic tests was only 15 librarians and 12 students, statistical analysis was not an objective. However, the test scores for pre-tests and post-tests were obtained through compiling them on Microsoft Excel worksheets to obtain total marks for each question in order to determine respondents' increase/decrease in information literacy skills. Results were then tabulated on Microsoft Word to indicate differences in performances between pre-tests and post-tests.

**Analysis for interview questions, quizzes, observations, presentations and reflective sessions:** These methods generated qualitative data which were analysed by the method proposed by Miles & Huberman above. A summary of categories of analysis for each method is given below:

**Interview data:** Data from interviews was analysed by focusing on:

- Observations on students' information seeking skills.
- Evaluation of skills taught in information literacy programmes.
- Views regarding information literacy skills.
- General and specific information literacy skills.
- Recommended sources.
- Recommended course delivery methods.
- Expectations with regards students' information literacy skills once the course was improved.

**Quiz:** Data from quizzes was analysed by focusing on provision of the right answers and reasons for wrong choices (discussed during feedback). Data was analysed from the following aspects of the course:

- Defining a problem and information needs.
- Location and accessing information.
- Communicating and using information.

**Reflective sessions:** Data from reflective sessions was analysed through paying attention to the following aspects:

- Defining tasks and determining information needs.
- Locating and accessing information.



- Synthesising and evaluating information.
- Using information.
- Reflections about the entire course.

**Observations:** Data from observations was analysed by focusing on:

- Methods of teaching the skills.
- Participants' responses through asking/answering questions.
- Issues that emerged in group discussions and group reflections.
- Participants' applications of key information skills (through hands on activities).
- Indications of whether there was knowledge transfer.

**Presentations and discussions:** Data from presentations and discussions that followed was analysed by paying attention to the following aspects:

- Students' strength and weaknesses in presenting what was taught.
- Students' description of skills taught.
- Important skills gained and usefulness in the particular activity.
- Important skills acquired relevant for future assignments.
- Problems faced in the skills acquisition process.
- Strategies of solving problems/alternative solutions.
- Recommendations for future programmes.

**E-mail message with students and lecturers:** Data from e-mail messages collected from students were analysed based on the following key aspects:

- Skills which were particularly useful to theses writing.
- How these skills were applied to help shape the theses.
- Skills not applied and reasons for not doing so.
- Problems experienced when applying the skills and how they were solved.
- Different ways of applying the skills in future.
- Aspects of the acquired skills which were shared with other students.
- Usefulness of the shared skills.

In addition to above, data from e-mail messages collected from lecturers were analysed based on the following key aspects:

- Indications that students used information literacy skills into their work and information literacy skills that were applied.
- Comparisons of performance with other students.
- Comments on applying information literacy skills to improve learning.

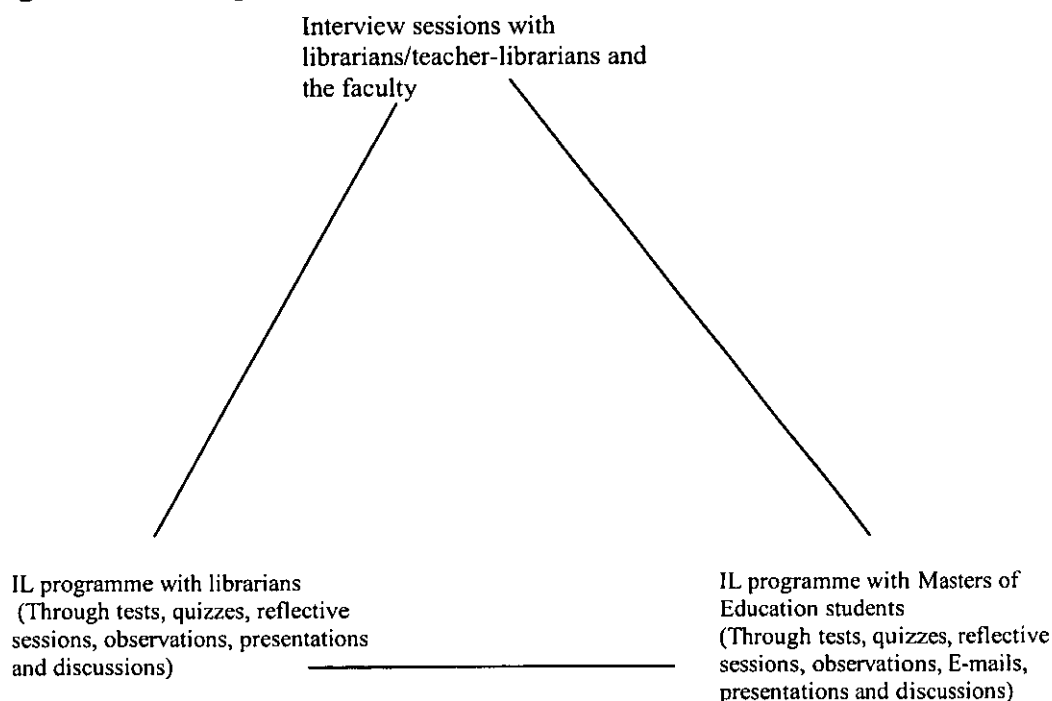
#### 4.9. Data quality control

Data quality control was used in order to ensure correctness of the information obtained from the respondents. The following data quality control techniques were used:

##### 4.9.1. Triangulation

Triangulation essentially involves the use of multiple data-gathering techniques to investigate the same phenomenon (Berg, 2004). It serves as a means of mutual confirmation of measures and validation of findings. Below is a diagrammatical representation of the methods used.

**Figure 4-3: Triangulation of data collection methods used**



##### 4.9.2. Pre-testing of research instruments

Before the actual field work, research instruments were tested at various points in order to establish their validity and reliability. Another reason was to determine if

the questions in the instruments met the needs and objectives of the study. Views and criticisms that were noted from the tests were incorporated into the instruments wherever it was seen necessary for improvements. Interview questions were tested at Loughborough University with a number of fellow research students. Tests and exercises for Masters of Education students were tried out on five Masters of Information Studies students at the University of Dar es Salaam.

#### **4.9.3. Ethical issues**

Prior to the interview sessions, interviewees were informed about the purpose of the study and assurance for maintaining confidentiality. However, all interviewees preferred anonymity therefore only their job positions and names of departments/institutions were used. During the pilot courses with UDSM librarians and later on with students, course participants were informed about the purpose of the courses. The researcher assured them that the information collected would be used for academic purposes and not otherwise.

#### **4.10. Summary**

This chapter has generally discussed theoretical issues regarding research in social sciences, that is, philosophical approaches to social science research. It further discussed the research design to be adapted in this study, issues of validity, reliability and generalization, which are significant in research. Also, the conceptual framework that this study adopted and methods employed in collection of data and analysis have been discussed.

## **5.0 CHAPTER FIVE: PROGRAMME DESIGN AND IMPLEMENTATION**

### **5.1 Introduction**

This study aimed to develop a course that inculcated information literacy, which could be taught by library staff from the University of Dar es Salaam library. This chapter provides details of the course programme; the design, first implementation, reflections, amendments, second implementation and reflections on what took place.

### **5.2 Course overview**

This study considered the teaching of information literacy to be an aspect of independent learning that depended on the use of secondary sources of information, such as books, articles, World Wide Web sites, and the tools to locate these resources. In this case information literacy did not include related skills that fall under the area of research skills such as gathering primary data through experimentation or survey. Information literacy in this regard was also defined as encompassing knowledge of the wider information landscape including people and organizations that may help provide data, information and knowledge and knowledge of the social context within which these resources are generated. These were considered to have a bearing on effective identification and use of such resources and provided a rationale for building on existing knowledge.

The context within which information literacy was to be taught was academic where people were expected to use a range of resources such as books, journal articles, online databases, online public access systems (OPACs), search engines, Web based resources as well as experts and authoritative bodies that may provide such resources and knowledge. In conjunction to the above, this implied the ability to use library systems and information and communication technology (ICT). Learners were expected to derive research questions, access resources that would help answer the research question and communicate their findings through a presentation. Hence this form of information literacy was described as academic information literacy.

In order to fulfil the above, the researcher conducted an extensive review of the literature relating to information literacy theory and practice, information behaviour, particularly that which related to students, and learning theory. The review helped to identify what should be covered in an information literacy programme and also how it should be taught. Following this, a pilot programme was designed and supporting teaching material was created (see under 5.3. below). This took place in the United Kingdom (UK) at Loughborough University in the Department of Information Science. Interviews were then undertaken with librarians and academic staff at the University of Dar Es Salaam in Tanzania. This helped to make sure that assumptions made about students' knowledge of information literacy and the kind of problems experienced by students were correct. This was important since the majority of the literature that was originally reviewed originated in "Western" countries. Results of interviews showed that there was a recognised need for information literacy and that similar problems, such as unfamiliarity with information sources and their use, were experienced in Tanzania (see details in chapter six under 6.2.5). This enabled the generic material created in the UK to be customised to take into account the local context.

The design of the programme took both a behaviourist and social constructivist approach to learning. A constructivist conception of learning was taken since it was a recognized fact that people were actively involved in creating meaning and that these meanings are mediated through communication (Vygotsky, 1978; Squires, 1994; Bruce, 1995; Fry et al., 1999; Race, 2001). The above factor necessitated the researcher to choose situated, problem-based approaches to course design (Biggs & Moore, 1993; Mayes & de Freitas, 2004). Furthermore the design of the course considered incorporating teaching and evaluation methods that stem from a behaviourist perspective including diagnostic tests and the teaching of specific skills that assumed that certain skills would be learnt and demonstrated. However group work, presentations and discussions put an emphasis on the communication and the sharing of ideas. Furthermore, in order to achieve the learning objectives, the incorporation of pedagogical practice such as reflective learning and the need to include key thinking skills associated with independent learning and creative thinking (Moseley et al., 2004) was thought to be important. It was also felt important to incorporate knowledge that originated from research into information

seeking behaviour as well as the work of other information literacy researchers. This was set within the broader Library and Information Science conceptions of information literacy (ACRL, 2000; Bundy, 2004; CILIP, 2005). The details of the three aspects are further elaborated in chapter two above.

### 5.3 Course design

The design of the course can be summarised by taking into account various aspects highlighted under 5.2 above and details provided in this section (5.3). As has been pointed out previously, the design and implementation of the course was an iterative process, and took into consideration users' knowledge and experiences. Table 5-1 below summarises course design aspects.

**Table 5-1: Summary of main activities carried out in the course design stages**

| ACTIVITY  | PURPOSE  | ACTORS  | PERIOD   |
|---|--|---|--|
| <b>FIRST PILOT IMPLEMENTATION STAGE</b>                 |  |   |  |
| Determining course structure and content (Loughborough) | <ul style="list-style-type: none"> <li>To see what should be taught and how to teach the course</li> </ul>   | <ul style="list-style-type: none"> <li>Researcher</li> </ul>  | June 2004 – February 2005                                      |
| Developing course materials (Loughborough)              | <ul style="list-style-type: none"> <li>To prepare course handouts, quizzes, diagnostic tests and reflective exercises</li> </ul>   | <ul style="list-style-type: none"> <li>Researcher</li> </ul>  | Mid-December 2004 to Mid January 2005                          |
| Conducting interviews (UDSM library)                    | <ul style="list-style-type: none"> <li>To confirm students' information seeking problems</li> <li>To establish the rationale for IL training</li> </ul>                                | <ul style="list-style-type: none"> <li>Researcher</li> </ul>  | March – May 2005   |
| Training assistants (UDSM library)                      | <ul style="list-style-type: none"> <li>To equip course assistants and researchers with the required course skills</li> </ul>   | <ul style="list-style-type: none"> <li>Researcher</li> </ul>  | March 2005   |
| Solicit course participants (UDSM library)              | <ul style="list-style-type: none"> <li>To recruit course participants and acquire permissions for them to participate</li> </ul>   | <ul style="list-style-type: none"> <li>Researcher</li> </ul>  | March 2005   |
| Acquire training facilities (UDSM library)              | <ul style="list-style-type: none"> <li>To organize and put in place course facilities (computers, laboratory, training room etc)</li> </ul>  | <ul style="list-style-type: none"> <li>Librarian</li> <li>Research assistants</li> <li>IT specialists</li> </ul>                                  | March 2005   |
| First "pilot" implementation programme (UDSM library)   | <ul style="list-style-type: none"> <li>To determine how the format of the course would work</li> <li>To evaluate the programme</li> <li>To teach librarians how to teach IL</li> </ul> | <ul style="list-style-type: none"> <li>Researcher</li> <li>Research assistants</li> <li>Visiting supervisor</li> </ul>                            | 5 <sup>th</sup> – 13 <sup>th</sup> April 2005                  |
| <b>SECOND IMPLEMENTATION STAGE</b>                      |  |   |  |
| Adjusting course content (UDSM library)                 | <ul style="list-style-type: none"> <li>To come up with brief but relevant course content and, relevant examples</li> </ul>   | <ul style="list-style-type: none"> <li>Researcher</li> <li>Visiting supervisor</li> <li>Librarians</li> <li>Lecturers<sup>1</sup> FoED</li> </ul> | May – June 2005  |
| Adjusting tests and quizzes (UDSM library)              | <ul style="list-style-type: none"> <li>To include more clear and meaningful questions</li> </ul>   | <ul style="list-style-type: none"> <li>Researcher</li> <li>Visiting Supervisor</li> </ul>   | 14 <sup>th</sup> -15 <sup>th</sup> April 2005<br>May-June 2005 |
| Addition of more course materials (UDSM library)        | <ul style="list-style-type: none"> <li>To have more course materials with relevant examples</li> </ul>   | <ul style="list-style-type: none"> <li>Researcher</li> <li>Librarians</li> <li>Lecturers</li> </ul>   | May – June 2005  |
| Training course facilitators (UDSM library)             | <ul style="list-style-type: none"> <li>To acquaint them with the course programme and their role as facilitators</li> </ul>  | <ul style="list-style-type: none"> <li>Researcher</li> <li>Research assistants</li> <li>Librarians</li> </ul>                                     | May – June 2005  |
| Second implementation programme (UDSM library)          | <ul style="list-style-type: none"> <li>To teach students IL skills</li> <li>To determine whether the course was successfully transferred to students</li> </ul>                        | <ul style="list-style-type: none"> <li>Course facilitators (librarians)</li> </ul>  | 4 <sup>th</sup> – 15 <sup>th</sup> July 2005                   |

<sup>1</sup> FoED: Faculty of Education

More details of design aspects of the course are provided below.

### **5.3.1 Materials used to support the course**

Effective information literacy programmes make use of various teaching aids and various supporting materials which could make teaching and learning easier (Rockman, 2002). However there is a lack of abundant and relevant teaching materials. The above factor was also realized by the Open University Library, Milton Keynes in the UK through its MOSAIC (Making Sense of Information in the Connected Age) short course on information literacy. To make sure that course materials were available for this course, MOSAIC made the material available on-line (cheaper to produce and easier to update than print), consisting of short pieces of text and graphics. These materials were supported by a number of information pages, that included a simple guide to working through the course materials, a glossary, help pages and a toolbox containing the course readings and details of the assessment (Parker, 2003).

The IL course at the University of Dar es Salaam used a combination of teaching aids and course materials. The initial preparatory stage for course materials was between mid December 2004 and mid January 2005 where course materials such as student handouts (PowerPoint presentations) were prepared. Also together with these, hands-on activity manuals, sample topics for librarians, timetables for course facilitator and participants, and exercises were other categories of course materials prepared. This was followed by another stage of making minor adjustments to course materials following comments raised by librarians such as the time-table, possible topics for librarians and information sources.

Further modifications to course materials were done following the input from interviewed librarians, the visiting supervisor, the evaluation of the pilot programme, interviews with the faculty and discussions with a few academicians in the Faculty of Education. Following that, materials like lists of relevant reference sources, useful resources for teachers, online search guides, guides in using MS Windows and PowerPoint presentation handbooks were added to the list of course materials. Also improvements to the course contents were done on aspects which were found to be too time consuming to be covered as stand-alone modules.

The source of contents for course materials was from the combination of information literacy guides from different libraries. Examples of libraries whose guides were used include Minneapolis Community and Technical College library (Minneapolis IL Guide, 2000), University of Wisconsin Park Side, US (Online IL tutorials, UW-Park Side, 2004), Waterford Institute of Technology Libraries online information literacy tutorials (WIT Libraries' information literacy tutorial, 2004), INFOLIT-Calico South Africa (INFOLIT-Calico, 2002) and University of Dar es Salaam information literacy course materials. A few specific skills were adapted from Binker, Jensen & Kreklau (1990), Harris's creative thinking step by step guide book (2002), Moon's theory and practice in reflective learning (1999), Mind Tools Newsletter online (Mind Tools, 2004), Bloom's taxonomy of cognitive skills (Bloom, 1956) and Loughborough University (DIS) online course materials (plagiarism, bibliographic citations, the introduction to information retrieval and search process). These course materials helped to create handouts for the course that were used during the implementation programmes.

#### **5.4 Course pre-implementation activities**

##### **5.4.1 Training IT specialists and research assistants**

During the second half of March 2005 course assistants, two IT specialists and two research assistants were trained to assist during the teaching sessions with librarians in the pilot programme and training students. The training consisted of familiarizing with the course content, relevant resources both print and non-print, and preparedness in handling various technical issues (such as Internet connectivity, computer failures, power supply and other technical and administrative aspects).

###### **5.4.1.1 Role played by IT specialists and research assistants**

Research assistants had several roles to play in helping the researcher in collecting data. They were responsible for making sure that the courses ran as planned by organizing for all administrative-related issues such as liaising with the University Computing Centre to ensure that Internet was available throughout the course. They liaised with the same for preparing all the required ICT related equipment such as computers, University Intranet, printers, photocopiers and others. Other activities research assistants were involved in included secretarial services, helping in



soliciting course participants and interviewees. During the programmes they helped the researcher to record all sessions and organize data in a manageable form. In the first “pilot” implementation stage, they helped the researcher to record what he was teaching and in the second implementation stage, they worked with the researcher to record the training sessions which were conducted by the two librarians. At a later stage, the two assistants helped the researcher in transcribing data which was recorded through audio and video tapes.

The two IT specialists worked hand in hand with research assistants in liaising with the University Computing Centre to ensure the availability of working facilities and Internet/Intranet connectivity. They helped course facilitators during hands-on activities to provide assistance to learners on using computers and accessing online resources. Furthermore, they helped students who required assistance on using ICT, whenever they failed to do so.

#### **5.4.2 Soliciting course participants, arrangements for classrooms, computer laboratory and course related facilities**

In conjunction with the above activity, arrangements were made with the library to provide a venue and facilities for the course. The venue consisted of a lecture room and computer laboratory. The library was also willing to provide free computers, printer, scanner, generator (for emergency power supply) and a data projector to facilitate the course. Also 15 librarians were granted permission by the library to attend the seven day information literacy pilot course programme. All the selected librarians were actively involved in the on-going information literacy programme run by the University library.

Students who participated in the course were picked from the Faculty of Education. Requests were made for students to voluntarily register on the course programme. Many students were at the point of preparing research proposals and therefore a total of 12 students were registered for the course. It was planned to register 20 students but due to limited number of computers the number of students was kept to 12.

## **5.5 Course implementation**

### **5.5.1 First implementation “pilot” programme for the librarians**

The period from 5<sup>th</sup> to 13<sup>th</sup> April 2005 was utilized for teaching the pilot course to librarians. Participants of the pilot programme were 15 staff from the University library at the University of Dar Es Salaam. It was facilitated by the researcher, assisted by two IT specialists. The two research assistants and visiting supervisor participated as observers and assisted the researcher to collect data. The first “pilot” presentation course helped to determine whether the format of the programme could be run in the way it had been envisaged. It also gathered feedback from library staff on the programme and from the visiting supervisor who observed the training and who had extensive knowledge of information literacy and training experience. In addition it later helped to determine whether the training course could be used to train librarians how to teach information literacy.

The course began by librarians thinking about and discussing the meaning of information literacy and the characteristics of an information literate person. This was to introduce them into participative, student-centred, problem based approaches to learning that the programme intended to follow and assisted to motivate them to actively take part into the programme. Furthermore, this approach was a new training style for the library and it was expected that librarians would adapt this new approach. Following the introduction, librarians performed a diagnostic test.

The course was structured according to the following information seeking process:

- Define a problem or research topic.
- Locate and access information.
- Synthesize and evaluate information.
- Communicate and use information.

In the first place, short lectures were used to familiarise librarians with various aspects that required clarification and/or theoretical elaborations. These included aspects such as knowing sources to familiarise with the topic, primary and secondary sources of information and locating tools such as online catalogues and search engines. Others included information retrieval concepts, capturing

information through scanning and skimming, criteria for evaluating information, the application of deductive and inductive thinking skills to information literacy, the mechanics of referencing and citation and the ethical and legal issues surrounding effective use of information. In addition to lectures, librarians discussed various aspects covered in each session in groups and with the facilitator during lectures. These were supported by group presentations which aimed to demonstrate what each group had learnt and to keep learning active. In addition, they completed quizzes and reflective exercises that were set partly to test individual understanding on what was covered in the course but also encouraged them to reflect on what they had learnt. Finally the same information literacy diagnostic test used at the beginning of the course was given to librarians to help determine changes in their knowledge over the period of the training course.

Table 5-2 below summarizes what was covered by demonstrating the applicability of an integrated information literacy model. Furthermore the table indicates reasons for teaching the skills and remarks on how the aspects were taught or modified/changed in order to improve on what was to be covered in the second implementation programme.

**Table 5-2: Pilot course for librarians**

| IL PROCESS                       | SKILLS TAUGHT   | OBJECTIVES  | REMARKS  |
|----------------------------------|---|---|--|
| Define problem or research topic | Knowledge of the topic  | To enable students to determine the subject matter surrounding a topic and general understanding of a topic   | No changes made  |
|                                  | Knowledge of the information needed                                       | To enable students to determine the purpose of information sought, the type of information, prior knowledge about the topic and information not known | No changes made  |
|                                  | Knowledge of sources/tools to find background information about the topic | To enable students to use the relevant sources to familiarize with the topic  | Additions were made to include reference tools such as encyclopedias and primary sources such as lecturers/subject experts |
|                                  | Sources character and behaviour relevant to defining information needs    | To introduce to students different characteristics and behaviour of sources   | Aspects within this module were later incorporated into the module on " <i>Sources to familiarize with the topic</i> "     |
|                                  | Affective (motivational) states when defining a topic                     | To create awareness to students on confusion arising when defining a topic  | No changes made  |
| Define problem (cont.)           | Creative thinking for defining a problem                                  | To enable students to use creative thinking when defining a problem   | Aspects within this module were later incorporated into the module on " <i>Defining information needs</i> "                |
|                                  | Concept formation in defining a problem                                   | To enable students to formulate concepts associated with defining a topic   | The term "Concept formation" was changed to " <i>Terms/words identification when defining a problem (Mind mapping)</i> "   |
|                                  | Concept map & organizing ideas  | To enable students to formulate concepts by using a concept maps and organize ideas resulted from the maps  | The term "Concept map & organizing ideas" was changed to " <i>Organize terms</i> "   |
|                                  | Reflective thinking during problem definition                             | To enable students to reflect on what they learned in defining task (through monitoring/reviewing their thinking on the course)                       | No changes made  |

| IL PROCESS                          | SKILLS TAUGHT  | OBJECTIVES   | REMARKS   |
|-------------------------------------|--|--|---|
| Locate & access information         | Knowledge of information generation and organization of knowledge        | To enable students know how information is generated in the society and how it is organized  | The aspect of organization of knowledge was later covered under " <i>Structure of databases</i> "                                 |
|                                     |  |  |   |
|                                     | Knowledge of the broad categories of information sources                 | To enable students to know a range of broad categories of information sources  | No changes made   |
|                                     | Knowledge of locating tools  | To enable students to know different tools used to locate information sources  | No changes made   |
|                                     | Knowledge of information retrieval systems and search strategies         | To enable students to know various search strategies and information retrieval systems to locate and access information  | No changes made   |
|                                     | Behaviour of information seeking to locate and access useful information | To introduce to students various actions performed when locating and accessing information (browsing, listening, asking, viewing, reading, consulting)         | The aspect of "behaviour of information seeking" was incorporated into " <i>Sources of information</i> "                          |
|                                     | Source character and behaviour   | To introduce to students various characteristics and behaviour of sources when locating and accessing information (accessibility, responsiveness and the like) | The aspect of "Source character" was incorporated into " <i>Sources of information</i> "  |
|                                     | Affective states in locating and accessing information                   | To create awareness to students on confusions and uncertainties arising when locating and accessing information  | No changes made   |
| Locate & access information (cont.) | Problem solving in locating and accessing information                    | To enable students to use problem solving approaches in locating and accessing information   | The term "Problem solving in locating and accessing information" was changed to " <i>Applying locating and accessing skills</i> " |
|                                     | Creative thinking in locating and accessing information                  | To enable students to use creative thinking when searching (refine search, choice of alternative terms, sources, search technique)                             | This aspect was incorporated under " <i>Knowledge of information retrieval systems and search strategies</i> "                    |
|                                     | Reflective thinking in locating and accessing information                | To enable students to reflect on what they learned locating and accessing information (through monitoring/reviewing their thinking on the course)              | No changes made   |

| <b>IL PROCESS</b>                       | <b>SKILLS TAUGHT</b>   | <b>OBJECTIVES</b>   | <b>REMARKS</b>  |
|---|--|---|---|
| Synthesis and evaluate information      | Knowledge of various organizational techniques of information          | To enable students to know various ways of organizing information accessed  | Additions included <i>"Ways of capturing information from sources"</i>  |
|   | Knowledge of criteria to evaluate sources and information from sources | To enable students to know criteria to evaluate information and sources   | Additions included <i>"dimensions of critical thought"</i> (Kreklau et al), <i>"logical fallacies in educational theory"</i>                      |
|   | Creative thinking in synthesis and evaluation of information           | To enable students to use creative thinking in synthesis and evaluation of information  | These skills were incorporated within <i>"Knowledge of various techniques of synthesizing information"</i>  |
|   | Reflective thinking in locating and accessing information              | To enable students to reflect on what they learned in synthesis and evaluation of information (through monitoring/reviewing their thinking on the course) | No changes made   |
| Communicate and use information         | Knowledge of communicating (presenting) and using information          | To enable students to know how to communicate (present) information   | No changes made   |
|   | Knowledge of ethical and legal use of information                      | To enable students to know ethical use of information   | No changes made   |
|   | Behaviour exhibited when communicating and using information           | To enable students to determine actions involved when using information (hearing, reading, viewing and so on)   | The term "Behaviour exhibited when communicating and using information" was changed to <i>"Ways of using information"</i>                         |
| Communicate and use information (cont.) | Problem-solving in communicating and using information                 | To enable students to use problem solving skills when communicating and using information   | The term Problem-solving in communicating and using information" was changed to <i>"Applications of information communicating and use skills"</i> |
|   | Reasoning in communicating and using information                       | To enable students to use reasoning skills in using information   | No changes made   |
|   | Reflective thinking in locating and accessing information              | To enable students to reflect on what they learned in communicating and using information (through monitoring/reviewing their thinking on the course)     | No changes made   |

### 5.5.2 Adaptations made on course materials and contents

Following observations made during the pilot programme, a number of adjustments were made to the course materials and content. These included the following:

**Adjusting course content:** Several aspects were either modified or integrated within other modules as indicated in the table above. Reasons for changes/adjustments were as follows:

- Certain aspects such as *“behaviour in information seeking”* (reading, browsing, hearing, and viewing) were meant to be actions involved when approaching sources to familiarise with a topic, primary and secondary sources and different ways of using information. Hence these behaviours were taught or covered in these respective areas where it was easier to demonstrate how to practically apply them. This also helped to save time to teach these “behaviours” as independent skills. This applied also to other aspects such as “Creative thinking” in which case activities such as refining a search through narrowing, broadening or thinking about alternative search terms or approaches could be demonstrated more “creatively”. Hence the “Creative thinking” aspect was found to apply directly in such situations.
- Several terminologies such as *“Problem solving”, “Concept formation”* *“Behaviour”* and the like were changed to terms that could well be understood by learners. It was realised that by using familiar terms, learners would be able to understand what was being discussed. Some terms such as “Concept” had more than one meaning and were considered to be confusing to learners.
- It was realized that reasoning skills, which included deductive and inductive approaches to problem solving could well be applied in “communicating and using information”. Deductive and inductive reasoning skills were covered in this area to teach how to use data (evidence) so as to generate theories/ ideas (information) or to use established theories/ideas (or available information) in order to acquire evidence that would eventually prove a case being argued. Therefore, applying these skills provided a rationale for collecting data and information in order to solve an information problem.

Note should be taken however, that despite changing (or replacing) several terms and incorporating others such as “source character and behaviour” to “sources to

familiarize with the topic”, the context of these aspects (as described in the model) remained the same. For example, while teaching students about “sources to familiarize with the topic” they were learning about different “behaviours” (or physical activities) involved in finding information to familiarize with the topic (through reading, viewing, browsing or asking).

**Adjusting tests and quizzes:** Several questions were modified to enable students’ understanding. Modifications made to quizzes included questions that would require learners to determine the type of information made available from specific sources such as journals, reference sources and discussion lists. Other changes made to quizzes included ways of using information, importance of using reasoning skills and formats for presenting information. Changes made in diagnostic tests questions included the removal of several aspects such as “Abridged/unabridged dictionaries” and the structure of the Internet. These aspects were not covered in the course, partly due to insufficient time to cover them in detail and some questions were inappropriate because of the nature of local systems.

**Addition of more course materials:** More course materials, that seemed important, were added to the course, to suit information literacy training needs for education students. These include lists of sources to enable familiarization with the topic, useful online resources for teachers (such as UNESCO Educational Thesaurus, discussion forum for educators and other related materials). Others included online search guides, a guide to using MS Windows, how to use the Internet and PowerPoint presentation manuals.

**Inclusion of more relevant examples for Masters Students:** Relevant examples were solicited relevant to education students and used during the student course.

It should be noted that the changes made above were meant to enable learners to understand what was being taught and apply the same in the real situations. For example, the aspect “creative thinking” would have been well understood if it was taught in conjunction with a practical activity such as information search, where narrowing or broadening searches required a substantial amount of creative thinking. Other aspects such as reasoning would have a meaningful application in situations



where learners were involved in activities such as evaluating and using information, in which case reasoning was thought to help learners draw conclusions from data or information accessed.

### **5.5.3 Training course facilitators**

Two librarians who participated in the first “pilot” implementation literacy programme were selected (among the 13 others) to work as facilitators in the second implementation programme. They were given a brief training course by the researcher, assisted by other librarians who participated into the same programme. The two librarians were chosen based on their background in both information science and education owing to the fact that the second implementation programme involved Masters of Education students. Aspects covered in the brief training included their role in facilitating teaching and learning including time management and pedagogical issues such as encouraging students to ask/answer questions, managing groups, initiating reflections and other related activities.

### **5.5.4 Second implementation of the course: information literacy training for Masters of Education students and collecting data**

The period from 4<sup>th</sup> to 15<sup>th</sup> April 2005 was utilized for teaching information literacy course to Masters of Education students. The course ran for seven days. Two librarians who participated in the first “pilot” implementation course facilitated the course, assisted by two IT specialists. Both the researcher and two research assistants participated in the programme as observers and collecting data through recording the teaching/learning process. The course used a similar structure to that given to the librarians. However, a few modifications in terms of what was taught and course delivery were made as discussed earlier.

The programme consisted of short lecture presentations during which brief introductions and definitions of various concepts were made. During lecture sessions, questions were asked to students to determine their prior knowledge of what was being covered. Lectures were followed by hands-on sessions which expanded further aspects which were covered in lectures. In addition, quizzes, group presentations and reflective sessions helped to facilitate teaching and learning.

The structure of the course followed an information seeking process summarised below:

**Define a problem or research topic:** Students held discussions on defining research problems and derived questions based on their chosen topics. They defined their long term information seeking goals and determined how they could use information to fulfil those goals. Students identified what they already knew about their topics and information needed to address issues highlighted in their topics. These activities were carried out in groups. An example of a presentation snapshot on defining a topic is given below:

- GROUP 2 PRESENTATIONS
- what the topic is about:
  - Girls' attitude towards maths
  - Girls performance in Maths
  - what information is needed:
  - Define attitude, performance, rural & urban schools
  - Detailed knowledge: acquire general knowledge about girls' attitude towards maths globally
  - Figures about performance statistics  
Boys & girls in selected areas
  - Evidence: - thru observing job vacancies whether or not girls having employed in Maths related jobs
    - Fewer girls in Maths A level schools
  - Information already known
  - Attitude of girls towards maths is -ve
  - Girls performance in Maths in Tanzania is low
  - Information not known: Factors Contributing to negative attitudes towards Maths
  - Possible sources for background information:
    - MOEd reports, FAWE, T.E.A, T.I.E.

**Figure 5-1: Flip chart presentation group two: Define a topic**

Students were introduced, through a lecture presentation, to a wide ranges of sources to familiarise with their topics and mind mapping to identify and organize suitable terms that related to their topics. Group presentations on information needs and mental maps of their topics were also carried out. An example of a presentation snapshot on mind mapping is given below:

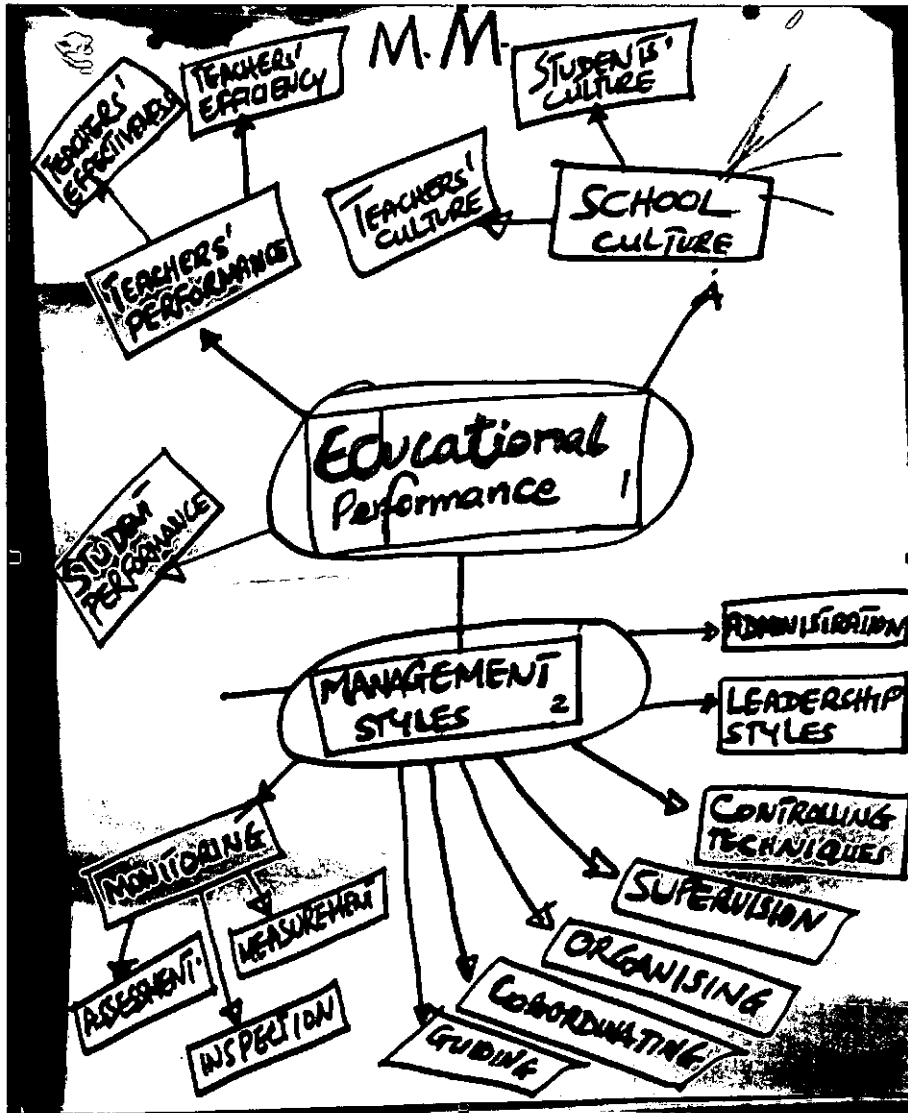


Figure 5-2: Flip chart presentation group four: Mind map

In addition, they completed a quiz with multiple choice and filling in type of questions. Samples of questions asked included the following:

One of the most difficult aspects of writing a research paper is determining how narrow to focus your topic.

- True
- False

One way to help define your topic is to ask yourself what the topic is all about. What are other questions you could ask yourself before you begin your assignment or research?.....

Quizzes were set partly to test individual understanding of defining a problem and to encourage them to reflect on what they had learnt. Also the quiz assisted students by providing immediate feedback to help ensure that, individually, they were on track. This was followed by a reflective exercise with questions such as:

Give a brief explanation of what you did in lessons 1 and 2

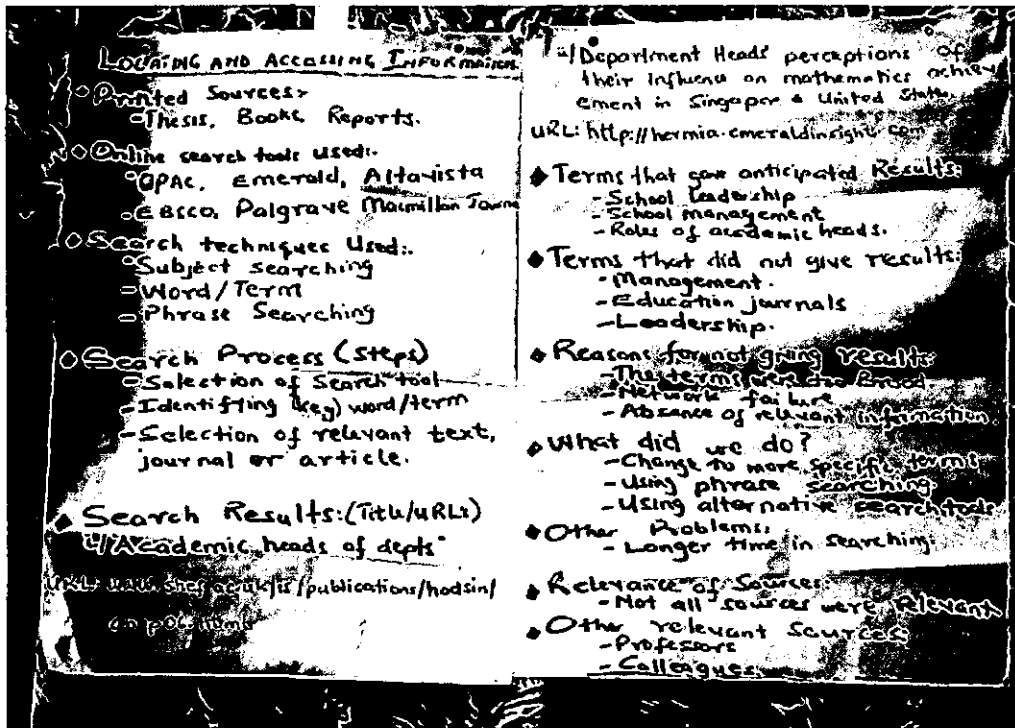
Which new skills did you gain in this lesson?

What happened after being taught all the skills in lessons 1 and 2? Were you able to apply the skills to your work? Provide your answers with a brief explanation on how the skills gained assisted you to define your topic or research problem.

Exercises aimed to encourage reflections and help students identify possible problems and solutions in order to develop a deeper understanding of the process that they were undertaking in defining problems.

**Locate and access information:** covered various aspects associated with locating and accessing information and the tools that are available. Students learned through lectures/discussions about how knowledge is generated in society and the forms it could take, to inform them about the wider information landscape. This method further alerted them to the range of sources that are available. The same teaching/learning method was used to introduce them to the structure of information sources and an introduction to search strategies. The latter included how to use fields, controlled vocabulary and how the structure of sources could be used to broaden and narrow a search. Students were also made conscious of the affective states associated with information retrieval and wider research process (as contended by Kuhlthau, 1993). This included the feeling of uncertainty at the start of the process. In their groups students applied search and retrieve knowledge to

identify tasks and processes that they experienced. They then applied this knowledge, through running searches, to capture information and then presented their search results in groups. An example of a presentation snapshot is given below:



**Figure 5-3: Flip chart presentation group three: Search results**

Students also completed a quiz on locating and accessing information which included questions such as:

Give three reasons why the Internet may NOT be the best or easiest way to find information on a topic

Which of the following statement is true?

- a. By using Boolean operator AND you can broaden your search
- b. By using Boolean operator NOT, you make your search more specific
- c. By using Boolean Operator OR, you can narrow your search

Quizzes served to consolidate learning, provided feedback, and also helped to determine whether the teaching had been effective. In addition, a reflective exercise was carried out to reflect on the process and the activities involved in locating and accessing information.

**Synthesize and evaluate information:** This involved discussion about various techniques for identifying and capturing information including scanning, reading headings, summaries and conclusions in order to capture the essence of materials used. The discussions also covered aspects of inductive and deductive approaches to problem solving as a rationale for collecting data and information. Lecture/discussions concerning evaluation and the use of criteria such as reliability, validity, authority, and timeliness were also carried out. They also carried out group presentations about their evaluation process and how they had applied evaluation criteria. An example of a presentation snapshot is given below:

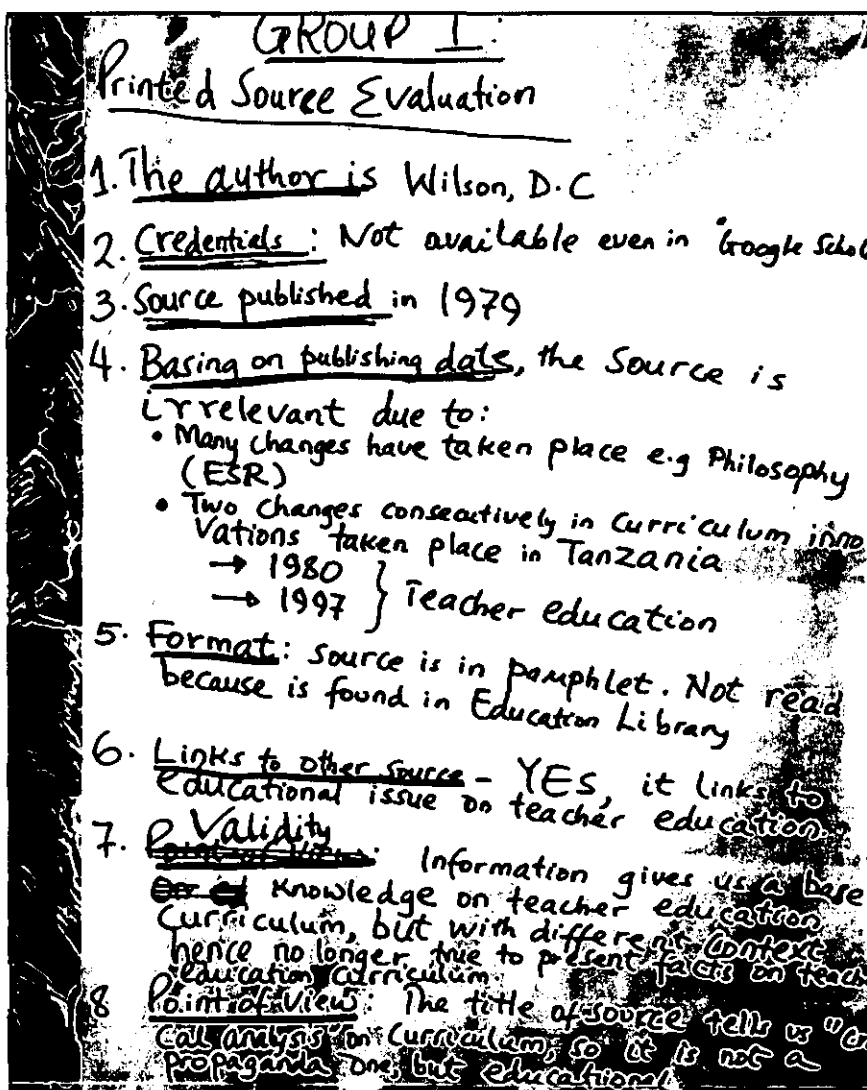


Figure 5-4: Flip chart presentation group one: Evaluating information

Presentations were followed by group reflection and an exercise that tested student learning, encouraged individual reflection on specific aspects related to synthesizing and evaluating information, and the recognition of common problems and solutions.

**Communicate and use information:** Students discussed their previous knowledge of, and different approaches, to presenting information. In addition, discussions on reasoning skills in relation to inductive and deductive work were carried out. Lectures/discussions on the mechanics of referencing and citation and the ethical and legal issues surrounding effective use of information, including the topic of plagiarism also took place. Students completed a quiz which had questions such as:

List two reasons for using citations in your research work.

- (i).....
- (ii).....

The following are examples of plagiarism:

- (a) Cut and paste information from the web or other resources without acknowledging the source.
- (b) Copying lists of citations/references at the end of an article or of a book without citing them in a work.
- (c) Genuinely forgetting that you had downloaded or otherwise copied the material and thought you'd come up with the text yourself.
- (d) All of the above.

Reflective exercises were done to test understanding and to help embed learning. The last part of the programme was devoted to students' presentations, in which an opportunity was provided for them to present their findings on their research questions. This was followed by the same information literacy diagnostic test used at the beginning of the course to help determine changes in the student knowledge over the period of the training course. Finally there was a reflective group discussion, followed by a brief individual exercise that looked back at the entire course. Questions in the exercises were as follows:

- What were the major activities that you performed in this course?
- After having studied all the lessons in the information literacy course, have you acquired any skills? State briefly the most important skills that you have acquired in this course.

- To what extent do you think that the skills taught in this course assisted you to meet your information seeking goals?
- State what your major achievements resulting from attending this course are by referring to the activities carried out in your group.
- What do you consider to be the gaps in your knowledge that made some parts of the course difficult to understand? What solutions are there?
- Do you think that you have acquired enough skills to solve any information related problems in your future assignments or academic work? State briefly what you would consider to be the most important and relevant skills to use in your future activities
- In general what were the major problems that you encountered in this course?
- Has the course met your expectations? State briefly your expectations for this course and indicate whether or not they have been met
- What are your general comments about this course, what could be done to improve it?

The exercise, therefore, encouraged students to reflect on the entire course and what they had learnt. In addition it provided information that could be used to improve the training course. Furthermore it helped to encourage the students to understand and appreciate how they could apply their new knowledge both in the present and the future.

Table 10 below summarizes what was taught and reasons for teaching the skills. The time table (programme framework) for the second implementation stage is included in appendix K.



**Table 5-3: Course programme with Masters of Education students**

| <b>IL PROCESS</b>                | <b>SKILLS TAUGHT</b>  | <b>OBJECTIVES</b>   | <b>REMARKS</b>  |
|----------------------------------|---|---|---|
| Define problem or research topic | Knowledge of the topic  | To enable students to determine the subject matter surrounding a topic and general understanding of a topic   | Taught/discussed but more time was needed                             |
|                                  | Knowledge of the information need   | To enable students to determine the purpose of information sought, the type of information, prior knowledge about the topic and information not known | Taught/discussed but more time was needed                             |
|                                  | Defining goals for information seeking process                            | To enable students to determine their desired long time end product in information seeking activity   | Taught/discussed but more time was needed                             |
|                                  | Knowledge of sources/tools to find background information about the topic | To enable students to know the relevant sources to familiarize with the topic   | Taught/discussed but low Internet band width and more time was needed |
|                                  | Applying the skills of defining information needs                         | To enable students to plan to practice skills gained in the task definition activity  | Done as planned but more time was needed                              |
|                                  | Terms/words formation in defining a problem or research topic             | To enable students to know different ways to formulate terms/words, synonyms by using mind maps   | Taught/discussed as planned, however more time was needed.            |
|                                  | Organize terms/words in defining tasks                                    | To enable students to know various ways to organize terms/words formulated  | Taught/discussed as planned   |
|                                  | Reflective thinking during defining task                                  | To enable students to reflect on what they learned in defining task (through monitoring/reviewing their thinking on the course)                       | Done as planned   |
| Locate and access information    | Knowledge of broad categories of sources of information                   | To enable students to know how information is generated and broad ranges of information sources   | Taught/discussed as planned   |
|                                  | Knowledge of locating/finding tools                                       | To enable students to know different tools used to locate information sources   | Taught/discussed as planned   |
|                                  | Knowledge of structure of Databases                                       | To enable students to know how information in databases is structured   | Taught/discussed as planned   |
|                                  | Knowledge of information retrieval systems and search strategies          | To enable students to know various search strategies and information retrieval systems to locate and access information                               | Taught but more time was needed                                       |
|                                  | Affective states in locating and accessing information                    | To create awareness to students on confusions and uncertainties arising when locating and accessing information                                       | Taught/discussed as scheduled   |

| <b>IL PROCESS</b>                     | <b>SKILLS TAUGHT</b>  | <b>OBJECTIVES</b>  | <b>REMARKS</b>  |
|---------------------------------------|---|--|---|
| Locate and access information (cont.) | Applying locating and accessing skills to locate and access information Presentations | To enable students to plan how to practice skills gained in locating and accessing information session   | Done as planned   |
|                                       | Information search  | To enable students to practically search for information relevant to their topics  | Done as planned despite low bandwidth and time was limited                              |
|                                       | Reflective thinking during locating and accessing information                         | To enable students to reflect on what they learned in locating and accessing information (through monitoring/reviewing their thinking on the course) | Done as planned   |
| Synthesis and evaluating information  | Ways of capturing information from sources  | To enable students to know different ways of capturing relevant information from sources retrieved   | Taught/discussed as planned   |
|                                       | Knowledge of various techniques of combining (synthesizing) information               | To enable students to know various ways of combining information from different sources  | Taught/discussed as planned   |
|                                       | Knowledge of evaluation criteria of information                                       | To enable students to know various criteria for evaluating information and sources   | Taught/discussed as planned   |
|                                       | Applying synthesis and evaluation skills  | To enable students to plan to practice skills acquired in synthesis and evaluating information   | Taught/discussed as planned but more time was needed                                    |
|                                       | Reflective thinking during synthesis and evaluation of information                    | To enable students reflect on what they learned in locating and accessing information (through monitoring/reviewing their thinking on the course)    | Done as planned   |
| Communicating and using information   | Knowledge of presentation techniques of information                                   | To enable students to acquire techniques of presenting (communicating) information   | Taught/discussed as planned but more time was needed                                    |
|                                       | Ways of using information   | To enable students to know various ways of engaging in information (hearing, viewing, discussing, reading etc)                                       | Taught/discussed as planned   |
|                                       | Reasoning skills in communicating and using information                               | To enable students to know ways of utilizing reasoning skills in using information deductively or inductively  | Taught/discussed as planned   |
|                                       | Thinking skills in using information  | To enable students to know ways of applying critical thinking skills in using information  | Taught/discussed as planned   |
|                                       | Bibliographic citations   | To enable students to know citation methods in their work  | Taught but more time was needed   |
|                                       | Knowledge of ethical and legal issues of using information                            | To create awareness to students on plagiarism and its effects in their academic work   | Taught/discussed, however time was insufficient to cover aspects such as copyright etc. |

| IL PROCESS                                  | SKILLS TAUGHT  | OBJECTIVES   | REMARKS         |
|---|--|--|-----------------|
| Communicating and using information (cont.) | Reflective thinking during communicating and using information | To enable students to reflect on what they learned in presenting and using information (through monitoring/reviewing their thinking on the course) | Done as planned |

Table 5-3 above demonstrates how various aspects from the integrated model (see figure 2-10 above) were applied by reflecting on the requirements of this particular group of students, which was different from the librarians in the first implementation “pilot” programme. Furthermore, the second implementation stage indicated how the model of the process of teaching IL programme (see figure 8-2) worked. The model was effective in guiding the programme facilitators on how best to implement and reflect on the programme based on the teaching environment, what was taught and how it was taught. Apart from saving time in integrating several aspects such as creativity, reasoning and problem solving, to some extent this helped to make students understand how to apply these skills in a more practical sense. For example students were able to creatively assimilate terms relevant to their research topics on day two and use these to find background information about their topics. They used problem-solving skills when planning search strategies by thinking about the process, anticipated problems and how they would overcome them. In addition, aspects such as “behaviour in locating information” were understood clearly when they learned about various forms of plagiarism (through watching a video presentation on plagiarism) and were able to answer questions raised by the course facilitator at the end of the session. More evidence of the usefulness of the modifications as reflected in the first pilot by the librarians have been highlighted in chapter eight, for example under 8.2.5 (about reasoning skills) and 8.2.6 (problem-solving).

## 5.6 General problems encountered in implementing the course and measures taken

Problems encountered during data collection exercise included the following:

### 5.6.1 Time limitations

Time limitations were the major constraint in running IL courses. More time was needed for students to prepare group presentations, group activities and discussions. Also a number of lecture/discussion sessions such as mind mapping, information

searching, communicating information and bibliographic citations needed more time to cover all aspects.

In order to accomplish activities planned for each session, students opted to work in the evenings (after the course programme) on their hands-on group assignments. Furthermore, start time for the programme was adjusted to 8.00am instead of 9:00am to provide more time for afternoon sessions.

### **5.6.2 Internet bandwidth problems**

The programme with Masters of Education students experienced erratic low bandwidth which affected Internet and online resources usage. To overcome the above problem, Internet and online resources (including search interfaces) were downloaded prior to the start of each session for demonstration purposes. Students were advised to carry out information search tasks in the evenings when Internet usage was low by most of the university community.

### **5.6.3 Problems with course facilities**

Facilities such as computers were very limited and students had to share the few that were working. Only seven computers out of 12 available in the training room were operating fully. Five computers were malfunctioning due to electricity problems (low voltage) which forced them to be shut down. Other alternative computer rooms were being used for other academic purposes. To overcome the above problem, students had to work from The Faculty of Education computer room and the University Computing Centre.

## **5.7 Summary**

This chapter discussed the implementation stage of the information literacy course at the University of Dar es Salaam. It analyzed the structure and content of the course, sources of course materials, preparations and actual course programme, problems and solutions adopted to solve them.

## **6.0. CHAPTER SIX: FINDINGS FROM THE INFORMATION LITERACY FIRST IMPLEMENTATION “PILOT” PROGRAMME**

### **6.1. Introduction**

This section gives results of findings from the information literacy first implementation “pilot” programme for librarians, which took place on 5<sup>th</sup> to 13<sup>th</sup> April 2005. The first “pilot” implementation programme was facilitated by the researcher, who was helped by two IT specialists. The two research assistants and visiting supervisor participated as observers and assisted the researcher to collect data. The first “pilot” implementation programme aimed to determine whether the format of the programme could be run in the way it had been envisaged. This was achieved by “testing” to see what worked and what did not and enabled “fine-tuning” of teaching materials and the course programme. Furthermore, the ultimate aim of the programme was to equip librarians with the knowledge of teaching information literacy. This section intends to provide results from various data collection methods, which include interviews, diagnostic pre-tests and post-tests, quizzes, presentations, reflective sessions and observations.

### **6.2. Interview results from librarians**

Seven librarians and six lecturers were interviewed on various aspects of information literacy.

The set of individual questions were divided into four major areas:

- a. Observations on students’ literacy skills.
- b. Strengths and weaknesses of the ongoing information literacy programme.
- c. General and specific information literacy skills necessary for students’ academic activities.
- d. Information literacy delivery methods and expected outcome.

Individual questions under the above main headings are in appendix A. The details of areas where specific questions were focused, and answers provided by respondents are explained below.

### 6.2.1. Observations about students' information literacy skills

Respondents were asked to give their views on students' information literacy skills. Questions in this section aimed to reaffirm or otherwise assumptions made about students' knowledge of information literacy and the kind of problems experienced by students. Most of the research studies, which originated in the West, assumed that students demonstrated problems associated with lack of knowledge of information literacy skills (Ellis & Salisbury, 2004; Johnston & Webber, 2003; Zinn, 2000; Pejova, 2002; Karelse, 2000). Skills examined included students' ability to demonstrate information needs, identify potential sources of information, applications of wide ranges of search tools, analysis, selection, synthesis and evaluation skills, working with one another in information problem solving, awareness of ethical issues and problems in locating and accessing information.

Responses from librarians revealed that students lacked the skills to articulate an information problem and their information needs.

*"Students only say what books they want, what journals they want but not what they want it for. Some students just say they want a book that covers a certain subject area but they seem not to know what they really want". (Librarian, EAF<sup>1</sup> collection).*

*"Since I have worked in this library, my experience tells me that students do not know exactly what they want. They just come to the library, ask you whether the library has a book on "solid waste management", then when the book is found, they try to see if it has anything related to what the question says". (Librarian, Social Sciences collection)*

*"Once you give them an assignment, they rush to the library to find information from books or Internet. Very few would pose to digest a question to identify and define key issues associated with the questions". (Lecturer, Faculty of Education)*

With regard to students' ability to determine the extent of information needed to answer a particular question or assignment, responses indicate that students' ability for the above was limited:

*"Very few students demonstrate the extent to which they needed information for a particular use". (Librarian, Social Science collection)*

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<sup>1</sup> EAF – East Africana

*"In most cases students depended on lecturers to tell them what the question is all about and determine how much information they would need for a particular problem". (Lecturer, Department of Sociology)*

*"Librarians give clue as to what amount of information students would need for particular work". (Librarian, Law collection)*

*"Students always request us to clarify questions or topics. We provide guidance on what the topic or the question is about, information needed, type of information needed and where to obtain relevant information for the question or topic". (Lecturer, Faculty of Science)*

Respondents were asked to give their views on students' ability to identify potential sources of information to use in their work. The following quotations from interviewees indicated that most students did not possess such skills:

*"Very few do so, and those who do it rely very much on assistance from librarians or other students who have gone through the same process before". (Librarian, Social Sciences collection)*

*"They do so through guess work or being told by their friends". (Librarian, Reference section)*

*"Some of them do try-and-error on Google or OPAC but they are always not perfect". (Librarian, Reference section)*

*"About 85% do not do it. Librarians have to give assistance". (Librarian, Science and Engineering collection)*

*"Many students lack relevant skills for locating and accessing information from wide ranges of sources both online and printed. They rely on us to be able to do so". (Lecturer, Commerce and Management)*

*"Students heavily use printed sources such as books, journals, theses and dissertations, reports, handouts and pamphlets that are produced by us but very few use the Internet, online resources and other digital resources such as CD-ROM". (Lecturer, Faculty of Education)*

Respondents were asked to provide their opinion with regard to students' ability to utilise a wide range of search tools such as conventional card catalogues, OPAC or other web tools. Responses indicated that students did not possess the skills of using such tools.

*"Several students ask for assistance from librarians or fellow students who had used similar tools in the past". (Librarian, Reference collection)*

*“Despite the availability of manuals and guides on user instructions for various search tools such as the library catalogues and web tools, users do not use them”. (Librarian, Arts and Social Sciences collection)*  
*“Even if guidelines are provided on search manuals, students can not use them, they come to us”. (Librarian, Law collection)*

*“The library guides for using library OPAC and special collections contain satisfactory information but in most cases students’ failure to use them is due to the fear of using the available facilities without somebody being there to guide them”. (Lecturer, pCOET<sup>2</sup>).*

On the necessity for librarians and lecturers to provide guidance to students, respondents commented as follows:

*“Students do not possess information searching skills. We have to help them otherwise they can not make use of available services”. (Librarian, Reference collection)*

*“Some library collections have got access restrictions. We always take our students there to show them what they would use”. (Lecturer, Commerce and Management)*

*“Due to the nature of some courses, several students do not visit the library for information, when we ask them to do so, we have to guide them where and how to access documents since they know nothing about using the library”.(Lecturer, pCOET)*

*There are so many students than what our information literacy programme could teach them. We have to offer assistance to make them able to benefit on what the library has”. (Librarian, Science collection)*

Respondents were asked to provide their views on students’ ability to analyse and evaluate information and sources. Responses from librarians indicated that students did not possess such skills.

*“Students lack these skills because sometimes I hear lecturers complaining that students use information that was based on peoples’ opinion such as tabloid news papers which contain full of propaganda”. (Librarian, East Africana collection).*

*“Many students do not analyse and evaluate information they find, especially on the Internet and newspapers”. (Lecturer, Faculty of Education)*

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<sup>2</sup> pCOET: Civil Engineering and the Built Environment



*Students do not possess skills of analysing and evaluating information. This is caused by lack of proper courses dealing in such skills".*  
(Lecturer, Faculty of Science)

*Students do not possess analysis, synthesis and evaluation skills because lecturers are the ones to determine relevance of a particular journal paper or book, how can a student evaluate such a source then?*  
(Librarian, Reference collection)

*"When we see many of them coming for the same book or article copy, we try to recommend other similar titles but they tell us that if they did not use the one recommended by their lecturers, then they would fail the assignment".* (Librarian, EAF collection)

Respondents were asked to provide their views on students working with one another in information problem solving activities. Most respondents indicated in their answers that students worked together when dealing with questions or assignments that demanded information seeking activities. They came up with several comments:

*"I see students come here, search on the OPAC or Internet, then they seat together and discuss what they obtained".* (Librarian, Reference section)

*"Students share resources they obtain from the library or on the Internet that is why most of them end up coming to the library to request for the same book or article".* (Librarian, Arts and Social Sciences collection)

*"Students work in groups for information problem solving tasks especially when asked to find important articles to answer questions".*  
(Lecturer, Sociology Department)

*"Students collaborate with each other but they lack initiatives to work towards solving their information problems due to their heavy reliance on lecturers who always initiate problem solving activities".* (Lecturer, Commerce and Management)

The information from respondents indicated that despite students' lack of necessary information skills, they were able to work in groups, which would create a favourable environment for successful information literacy.

Respondents were asked to provide their views on students' awareness on ethical use of information such as plagiarism, copyright and other legal and ethical issues

surrounding information use. Answers from most respondents indicated that many students were not aware of the above:

*"Many students come to the library, read books, journals, theses and dissertations then do massive photocopying. This is an indication that most of them are unaware of legal and ethical use of information".* (Librarian, East Africana collection)

*"The library experience serious cases of vandalism for library materials, which imply that students do not adhere to legal and ethical uses of information".* (Librarian, Law collection)

*"The whole University is crying about students' highest degrees of plagiarism. This can be clearly seen in students' work through direct copying without quoting sources and indications of false reference lists".* (Lecturer, Faculty of Education)

*"Very few students know how to quote sources used. Majority of the students do not know how to do so".* (Lecturer, pCOET)

Respondents were asked to provide their comments on problems that students encountered when locating and accessing information in the library and from other places. Most respondents mentioned a number of problems as follows:

*"Students lack the skills for articulating information problem, they do not know how to identify sources of information, construct search query and perform searches by using various search tools to access useful information".* (Librarian, Reference collection)

*"Students' failure to use the available search tools is attributed by their lack of relevant IT skills such as computer key board skills, and Internet".* (Lecturer, Faculty of Education)

*"Students are unable to plan for information search strategies, search for information and get the results, they do not know how to organise information, to evaluate and use it properly".* (Librarian, Science collection)

*"Many students are unaware of categories of sources of relevant information and how to access it".* (Lecturer, Faculty of Science)

*"Due to students' heavy reliance on lecturers to tell them where to go for information, and by preparing reading lists, they lack the most vital skills of information searching".* (Lecturer, Commerce and Management)

*"The teaching and learning system at the University is responsible for making students rely on teachers and librarians in information seeking activities. Lecturers decide everything for students, who just follow*

*what they are told. Some of them do not even know what is available in the library in terms of resources and services". (Librarian, Social Science collection)*

In summary, this section provided information that was used to highlight problems experienced by students, the need for information literacy training to reflect on the relevant structure and content of such a course.

### **6.2.2. Strengths and weaknesses of the on-going information literacy programmes**

Respondents were asked to give their views on the strengths and weaknesses or challenges facing the on-going information literacy programme. The main purpose of questions in this section was to find out particular skills taught in the on-going courses and those that were not. This information helped to determine the type of additional skills needed for the new course and modification or adoption of the currently taught ones. It was expected that since the majority of University academic units were aware of the on-going programmes, the faculty would be in a position to provide an opinion on the strengths and weaknesses of the programme. However, several lecturers interviewed indicated lack of awareness of the programme. For those who were aware, including librarians the following comments were typical:

*"The ongoing course does not take on board several skills such as articulating information problem/topic, sources to find background about a topic, synthesising information, presentation skills and ethical/legal issues of information". (Librarian, Law collection)*

*"The course content does not consider information literacy competencies such as those recommended by ACRL, which include thinking skills". (Librarian, Reference collection)*

*"Skills taught into on-going courses include using the library and its facilities such as the OPAC, how to access online journals, Internet resources and it teaches students various citation skills". (Lecturer, Faculty of Science)*

*"The course teach the following skills: tools to locate information through library OPAC, search engines and information gateways and the UDSM library virtual library; sources of information such as PERI online journals and databases, current awareness services and inter library loan services". (Librarian, Science collection)*

*"The course teaches the basics of Internet and using E-mails".*  
(Lecturer, Sociology department)

Respondents were asked to provide their opinion on the strengths of the on-going information literacy courses. Responses indicated that skills acquired in the on-going courses made students aware of ranges of information sources, criteria to use information and citation skills:

*"The course teaches students how to locate and access sources found both within the library and outside, such as Internet sources".*  
(Librarian, Reference collection)

*"This course teaches students how to evaluate information and sources, both print and online".* (Librarian, Social Sciences collection)

*"The course teaches students various referencing skills such as MLA, APA and Chicago. Few students who know how to cite report that they acquire these skills from the IL course run by the library".* (Lecturer, Faculty of Education)

Respondents pointed out shortfalls/challenges facing the on-going information literacy courses including lack of subject specialty, failure to meet the curriculum requirements, lack of integration with the curriculum, programs were too few and covered fewer aspects. Examples of comments by respondents included:

*"The courses' fails to meet the requirements of University curriculum since the content covers general skills with little or no subject specialities".* (Librarian, Arts and Social Sciences collection)

*"This course is not organised according to curriculum's subject specializations. For example, a cohort of students from different disciplines may register for the same information literacy module with little regard to differences in subject backgrounds, hence failing to apply particular skills taught due to lack of relevant examples to their subject areas".* (Librarian, East Africana collection)

*"The course lacks course programme in that, there are no guidelines on what skills to teach, it also lacks proper course material for teaching".* (Librarian, Reference collection)

*"The course does not meet the requirements set by various standards such as ACRL, ANZIL and others because skills taught assumed that students know how to define their information needs and that they were aware of their information problems".* (Librarian, Science collection)

*"The course is not taught to all students on campus. Many students who attend such courses are the ones from Science, Arts and education disciplines, mostly postgraduates". (Lecturer, Faculty of Science)*

*"The courses are occasional; most courses are taught during the orientation programme after which the frequency of teaching the courses always decreases". (Lecturer, Sociology department)*

*"The courses are run without liaison with faculties; liaison is vital for inclusion of more relevant skills and examples to particular subject fields". (Lecturer, Faculty of Education)*

*"Students are just taught to familiarise with what is available in the library with less consideration on sources available worldwide such as freely available Internet sources". (Lecturer, pCOET)*

*"These courses do not motivate students and academics for participation. Several trainers do not indicate the essence of the skills towards achieving various academic goals such as teaching, learning and research". (Lecturer, Commerce and Management)*

*"This course lacks appropriate pedagogy that would encourage independent learning". (Librarian, Reference collection)*

*"The course is not well taught due to higher students' enrolment at the University, which makes it difficult for the library to accommodate many students due to lack of facilities". (Lecturer, Faculty of Education)*

*"Some trainers are not equipped with necessary pedagogical skills to deliver information skills to students in an effective manner". (Lecturer, Faculty of Education)*

*Lack of hands-on activities and assessment mechanisms for the acquired skills contribute to failure by course organisers to determine course effectiveness". (Lecturer, pCOET)*

The above comments indicate that there were more stated weaknesses for the course than strengths.

### **6.2.3. General and specific information literacy skills necessary for students' academic activities**

Respondents were asked to give comments on their views regarding students' most suitable information literacy skills and relevant sources to students.

Answers from respondents suggested that students should possess several skills, including IT skills relevant to teaching and learning information literacy courses, thinking skills related to analysis, selection, interpretation, evaluation and making inference on information gathered. Other skills proposed by respondents included subject specific information literacy skills designed for a particular course programme such as archaeology, theatre arts and so on, meta-cognitive skills such as self assessment, comprehension and others, and skills recommended by various bodies such as ACRL, SCOUNL and others.

The importance of the proposed skills, according to answers provided by the librarians were as follows:

*“IT skills will make students cope with the dynamic nature of information and developments in science and technology with regard searching, retrieving, storing and using information”.* (Lecturer, Faculty of Science)

*“Skills recommended by ACRL, SCOUNL and others would make students independent long life learners since these associations came up with set of skills that students can apply them even after finishing their studies”.* (Librarian, Science collection)

*“Meta-cognitive skills would make students manage their own information seeking activities by knowing their own information seeking process and be able to assess them, whereas critical thinking skills would make them seek evidence of issues surrounding their subject domains”.* (Lecturer, Faculty of Education)

*“Subject specific skills are responsible in making students more conversant with their subject specific information seeking activities and products”.* (Librarian, Reference collection)

*“Students need standardised information skills that will create a sense of independent learning. This will help to minimise students’ dependence on their lecturers for information-related problems”.* (Lecturer, Commerce and Management)

On specific categories of information sources relevant to students, respondents commented as follows:

*“Students need to know about government sources such as archival materials kept at the National Archives, National Museum, National Central Library, parliamentary reports, legislatures and others*

*produced and kept by various ministries". (Librarian, East Africana collection)*

*"Students require to be conversant with sources produced by institutions such as government agencies, public and private both in country and international such as Engineers Registration Board, National Construction Council, Tanzania Institute of Quantity Surveyors, Institute of Civil Engineers and associations like Association of Engineers Tanzania, American Association of State Highway and Transportation and others". (Lecturer, pCOET)*

*"Since ours is a poor country, with erratic electric power cuts, students need to know how to access and use low cost sources, which require minimal use of electricity such as radio broadcast on a particular subject matter such as HIV, newspapers especially feature articles which in many cases are subject-specific, locally published magazines, oral literature and artefacts". (Lecturer, Sociology department)*

*"Students will need to be taught subject-specific, online index and abstract databases, such as biological (BIOME database) educational (ERIC databases), medicine (MEDLINE), agricultural (citations index AGRICOLA) and others". (Librarian, Reference collection)*

*"Librarians are quite aware that the University library houses vital research materials and has subscribed to a range of subject-specific online journal databases. They should design a course that will make students use the available resources optimally by meeting their subject-specific information demands". (Lecturer, Commerce and Management)*

#### **6.2.4. Information literacy skills delivery methods and expected outcome**

Respondents were asked to provide their views on better ways of delivering information literacy skills to students.

Results from responses indicated that the courses would best be delivered in the following ways:

*"For maximum effectiveness, information literacy courses should be run as part of taught University courses, incorporated within the university curriculum like what it is for other courses such as communication skills, development studies, computer skills and library education for Bachelors degrees in the Faculty of Education". (Lecturer, Faculty of Education)*

*"The course can be run either as a drop in session or as part of orientation programme at the beginning of each academic year, but at the end of it, students should write examinations and those who fail*

*should not be allowed to graduate. This will make this course more serious". (Lecturer, Commerce and Management)*

*"This course should be run as a refresher course at the beginning of each academic year on compulsory basis". (Lecturer, pCOET)*

*"The course should be run as it is now (drop in sessions) but the style of teaching and learning has to change to reflect students' information needs". (Librarian, Science collection)*

*"This course should be introduced at secondary school level as a compulsory one. Then at higher levels such as University, students could take it on a voluntary, drop- in style". (Librarian, Reference collection)*

Respondents were asked to provide their views on who should run information literacy courses. Responses were as follows:

*"Subject librarians would be in a better position to run the programmes because of their subject specializations". (Librarian, Science collection)*

*"Librarians can teach this course well if they liaise with the computing centre staff, who are well acquainted with relevant IT and Internet skills". (Lecturer, Commerce and Management)*

*"This course will run effectively if librarians liaised with academic staff who would prepare specific aspects to teach, also lecturers know the applications of the acquired skills into particular subject settings". (Librarian, East Africana collection)*

*Librarians are best placed to run the courses because they have the required information skills". (Lecturer, Sociology department)*

*"Librarians may conduct the courses in conjunction with staff at the Centre for Continuing Education (CCE) since the two have a wide coverage/reach for student groups". (Lecturer, Faculty of Education)*

Respondents were asked to provide their opinion on the impact of the acquired skills on students and the immediate effects on their academic work. Respondents gave the following comments:

*"When students gain the skills, they will be independent in determining their information problem and selecting suitable sources and be able to search for information with minimum assistance from librarians or lecturers". (Librarian, Arts and Social Science collection)*



*"The acquired skills will make students able to be more knowledgeable with specific issues within subjects because they will be able to explore widely available sources and use the information to gain relevant knowledge". (Librarian, Reference collection)*

*"When students become information literate, they will acquire more marks from their lecturers as a result of excellent performance". (Lecturer, Sociology Department)*

*"Students will improve their self learning, self expressions and analysis of ideas". (Lecturer, Commerce and Management)*

*"Students will gain critical thinking skills that will help them analyze, evaluate and use information". (Lecturer, Faculty of Education)*

Similarly, respondents were asked to give their opinion on long term expectations with regard students' acquired information literacy skills. Answers from respondents were as follows:

*"In the long run, after becoming information literate, students will become independent life long learners". (Lecturer, Sociology department)*

*"Students will increase their information literacy levels through making maximum use of available resources and be able to explore more resources available outside the University". (Librarian, Arts and Social Science collection)*

*"Students will possess skills in articulated writing based on using wider ranges of sources". (Lecturer, Faculty of Science)*

*"This sort of training will equip students with research skills that can be applied elsewhere, and they will be able to use information for problem solving in their day-to-day endeavors". (Librarian, Reference collection)*

*"Information literacy skills will make students acquire relevant critical thinking skills for problem based learning, these skills are vital both in academic life and beyond". (Lecturer, Faculty of Education)*

Both types of impact for the course to students have been summarised by Doyle (1992) and ACRL (2000). According to Doyle (1992, 2) information literacy skills enables a person to *"...implement an information process"*. This is to say that a person will be able to determine when the information is needed, locate, access, evaluate and use it. ACRL (2000, 1) comments as follows: *"Information literacy*

*people are prepared for life long learning*". This happens when such people utilize the acquired information literacy skills throughout their lifetime

Respondents were asked to point out factors that would facilitate a successful information literacy programme at the University or hinder it. Responses indicated that the factors included availability of physical and human resources; seriousness of students and the faculty; trained personnel to run the programme; well designed information literacy programme, ideal to Tanzanians; liaison between the library and the University community and awareness of the programme:

*"The course would not run well if there were no funds, well trained personnel, computers, tools and equipment related to ICT and training materials such as handouts, exercises and others". (Librarian, East Africana collection)*

*"For the training to run successfully, both students and trainers need to be serious about the programme. This necessitates the introduction of examinations at the end of it in order to make this course serious". (Librarian, Science collection)*

*"Students need to be motivated to attend these programmes by being aware of its presence and the essence of having it at the University". (Lecturer, Commerce and Management)*

*"We need a well designed information literacy programme that encompasses all necessary skills as proposed by ACRL, SCONUL and other pioneers of information literacy worldwide. This programme should reflect Tanzanian environment, making the use of available sources of information". (Librarian, Reference collection)*

*"Such a course will run successfully if there is a liaison between well trained librarians and staff from the Centre for Continuing Education (CCE), who will also cooperate with the academic staff". (Lecturer, Faculty of Education)*

On the other hand, respondents pointed out factors that would deter the development of a successful information literacy programme at the University:

*"A poor or ill-prepared programme like the one we have now will not give us anything tangible". (Lecturer, Sociology department)*

*"The programme may not run effectively if there is lack of resources such as money, IT facilities, work space, electricity, trainers with*

*relevant skills, and relevant skills by students themselves such as IT and using Internet". (Librarian, Law collection)*

*"Factors responsible for bogging down the programme, among others, include lack of commitment by the students, librarians and lecturers, lack of awareness of the programme and lack/poor support from the University". (Librarian, Science collection)*

*"If the library works in isolation by designing courses that do not meet the University curriculum, these programmes will be a waste of time because no one will spend time going for something useless". (Lecturer, Faculty of Education)*

Town (2003) provided a summary of the above aspects by proposing Critical Success Factors for successful information literacy courses, which include competent library staff; sufficient organizational resources; identifiable students' outcomes; effective multi-dimensional partnership; institutional strategic framework and sustained pedagogical quality.

Respondents were asked to comment on the role that the University should play to facilitate the acquisition of information literacy by students. This was because most suggestions made by respondents on specific skills, sources and delivery methods would work if the University had created a conducive environment for the programme and supported it morally and materially. This information would further provide various ways by which the University would motivate staff by recognition and appreciation of efforts by the librarians and academics to impart information skills to students.

Responses indicated the following:

*"The University has the role to facilitate the preparations of course materials and tests for the courses". (Librarian, Reference collection)*

*"The University has a role to support the incorporation of the course into the curriculum and/ or make it a mandatory programme for the entire academic community". (Lecturer, Faculty of Science)*

*"The role of the University is to facilitate with ICT facilities, provision of more space to students for orientation weeks and drop in sessions". (Librarian, Law collection)*

*“The role of the University administration for implementation of information literacy courses is to foresee the development of information literacy programme in liaison with the library, CCE and the faculty”.* (Lecturer, Faculty of Education)

#### **6.2.5. Summary of main issues from interview sessions**

Interview results above revealed information literacy skills gaps and lack of individual learning among students. The students relied heavily on assistance from lecturers and librarians for guidance. Hepworth (1999) also made the same observations in a study of information literacy skills for undergraduate students. In this study, it was found that students operated in situations where teachers were best placed to define information problems for students.

In addition, the interviews revealed that both librarians and lecturers valued information literacy and supported the need to have the integrated information literacy programme and possible skills support courses such as IT and Internet. They indicated the need for an institutional and cross-disciplinary approach to information literacy programmes for the University of Dar es Salaam. They also recognised librarians’ role in delivering the programmes, in liaison with the faculty. Haycock & Jopson (1999) made the same observations. According to these authors, a well-structured information literacy programme should consist of teacher-librarians collaborating with other teachers to design, implement and evaluate a plan for teaching information skills. Other researchers who made the same observations are Ivey (2002), Tucker & Palmer (2004) and Smith & Martina (2004).

However, the views of librarians in terms of the outcomes of students’ information literacy skills differed slightly with the lecturers. Librarians’ conceptions of information literacy were similar to observations by CILIP (2005), Bundy (2004) and ACRL (2000), who envisage information literacy as a set of skills responsible for recognizing a need for information, identifying sources, searching, analyzing, evaluating and using information ethically. On the other hand, lecturers emphasized the thinking skills associated with independent learning (Moseley, et al, 2004) and subject context in teaching information literacy courses.

The results of interviews helped to contextualise initial ideas based on desk research that reflected views of “Northern” librarians and lecturers as found in the literature.

Therefore, in view of the above, the interviews reinforced the need for an information literacy programme that took into account problem areas and suggestions made by librarians and lecturers. In addition, suggestions made in the interviews enabled the generic material created in the UK to be customized to take into account the local context.

### **6.3. Diagnostic pre-test/post-test results for librarians**

#### **6.3.1. Introduction**

This section gives an outline of results of the diagnostic pre-tests and post-tests that were assigned to librarians before and after the course. The pre-tests/post-tests were based on the work of Andretta (2005), although some changes were introduced to address the local needs. For example, questions concerning topics such as writing skills, essay writing, analysis, grammar and punctuation, which were covered by Andretta's diagnostic test to suit the learning needs of first year undergraduate students, were not included. The tests served to determine whether the format of the questions could suitably be applied to Masters of Education students. In addition, tests helped to demonstrate to librarians the need to reinforce the meaning of information literacy to the students. This implied that students should treat diagnostic tests the same way as other mechanisms used in academic programmes to evaluate their knowledge (such as end of programme tests). Furthermore, tests enabled the researchers to determine changes in the librarians' knowledge over the period of the training course and see whether, following a post training test, modifications were made to the course.

Pre-tests/post-tests were administered to fifteen librarians who participated in the pilot course. The nature of the questions was multiple-choice and students were asked to select [Yes/No/I do not know] or [True/False/No comment]. The questions covered the aspects of participants' personal particulars, levels of access to computers and skills questions categorized as follows:

- Microsoft Windows and Internet Web browsers.
- Internet resources.
- Internet searching.

- Information sources.
- Library and database searching.
- Evaluating information and sources.
- Referencing.
- Synthesizing information.
- Information presentation.

The diagnostic test showed a dramatic increase in librarians' knowledge. It should be noted that several librarians were relatively new to the job and only had basic training in librarianship. Less than a half of the librarians (six out of fifteen) provided incorrect answers to all the questions in the pre-tests. However, a larger majority of the librarians (twelve out of fifteen) provided correct answers to all post-test questions. Since the number of librarians was only fifteen, statistical analysis of these results was not appropriate. In order to record results for both tests, librarians' test scripts were marked by numbers, preceded by an identifier "Librarian" (such as Librarian01, Librarian02, Librarian03 and so on) since they did not provide their ID numbers or names. Below are the details of each category of questions and number of responses for each stage (i.e. pre-test and post-test).

### 6.3.2. Personal particulars

Each respondent was asked to indicate a department or work station where he/she was working. Respondents were taken from various sections as follows:

**Table 6-1: Various sections/collections from which Librarians were drawn**

| <b>Name of section/collection</b> | <b>Participants per section/collection</b> |
|-----------------------------------|--|
| East Africana                     | 3  |
| Arts and Social Sciences          | 2  |
| Acquisitions                      | 2  |
| ICT                               | 2  |
| Law                               | 2  |
| Sciences and Engineering          | 2  |
| Reference and document delivery   | 2  |
| <b>TOTAL</b>                      | <b>15</b>                                  |

### 6.3.3. Access to computers and Internet

All respondents indicated that they had access to computers. The following were the areas for computer applications:

**Table 6-2: Use of computer applications by Librarians**

| Areas of computer application   | Responses |
|---|-----------|
| Access to Internet  | 15        |
| Word processing   | 15        |
| Access to library resources such as University online catalogues (OPAC) and other databases | 11        |
| Using e-mail  | 10        |
| Online chatting   | 8         |
| Online learning   | 8         |
| Entertainment (music, sports, games etc)  | 6         |
| Database creation & Management  | 4         |
| Web design  | 4         |
| Desk top publishing   | 4         |
| Online buying and selling   | 2         |
| Computer aided design   | 1         |

The table above reveals that librarians used computers heavily to access the Internet and for sending/receiving e-mails through Web based free e-mail services. They used the Internet to access the online catalogue (OPAC) and other databases. They also used computers for word processing purposes (using MS Word and Excel), online charting (through MSN and Yahoo Messenger) and the Blackboard/TEIL system for teaching/learning purposes. Very few of them used computers for database management services, Web design and desktop publishing. The use of computers for design and e-commerce purposes were minimal.

Out of 15 respondents, eight reported to have access to computers at home but none of them had access to Internet at home. In addition, respondents reported to have access to computers and Internet from other places as follows:

**Table 6-3: Other access points for computers and Internet for Librarians**

| Access Points                          | Computers | Internet |
|--|-----------|----------|
| University library computer laboratory | 15        | 15       |
| Internet café                          | 12        | 12       |
| Office                                 | 14        | 12       |
| University computer laboratories       | 6         | 6        |

The table above indicates that most librarians had access to computers in other places such as in the University library computer laboratory (15 respondents), who also had access to computers in their offices or workstations. They used these access points to access the Internet. Others (12 respondents) had access to computers in the Internet cafes, six respondents had access to computers located in various computer laboratories available in the university.

#### **6.3.4. Skills of Microsoft Windows and Web browsers**

All librarians indicated that they were familiar with various features of Microsoft Windows such as opening a window, minimize and maximize a window, managing folders, formatting floppy disks, attaching files to e-mail messages, copying files to folders, copying files to floppy disks, copying from/to another floppy disk, using word processing software and printing word processing documents.

Similarly, all librarians indicated their familiarity with the following features of Internet web browsers: navigation tools and processes, using e-mails, using favourites, saving and printing pages retrieved.

The above responses indicated that most librarians who attended the course were quite conversant with the use of the above listed features of Windows and Internet Web browsers partly due to the nature of their daily routine activities. Other reasons for the above was the fact that most librarians who were selected to participate in this course (like other librarians at UDSM library), had undergone computer training programmes run regularly by the library's ICT section, in which most of the above operations were taught.

#### **6.3.5. Internet resources**

Librarians were asked to indicate their skills with using different Internet resources. Questions asked in this section centred on the description and characteristics of various aspects of the Internet, World Wide Web and search engines. The answers from pre-test results indicated that the maximum score was seven (out of 8) questions asked in this section whereas the minimum was one mark. Post-test results indicated that the maximum score was eight (which was scored by more than half the librarians) whereas the minimum score was five. This indicated that



generally, librarians' skills in Internet resources had improved after they attended the course. The scores for individual librarians and questions for this section are summarized in table 6-4 below

| No.                    | Librarian ID | Questions (see the key below) |           |          |           |          |           |           |           |          |           |           |           |          |           |          |           |                 |            |
|------------------------|--------------|-------------------------------|-----------|----------|-----------|----------|-----------|-----------|-----------|----------|-----------|-----------|-----------|----------|-----------|----------|-----------|-----------------|------------|
|                        |              | 1                             |           | 2        |           | 3        |           | 4         |           | 5        |           | 6         |           | 7        |           | 8        |           | Total/librarian |            |
|                        |              | Pr                            | Po        | Pr       | Po        | Pr       | Po        | Pr        | Po        | Pr       | Po        | Pr        | Po        | Pr       | Po        | Pr       | Po        | Pr              | Po         |
| 1                      | Librarian 09 | ■                             | □         | ■        | □         | ■        | □         |           | □         | ■        | □         | ■         | □         | ■        | □         | ■        | □         | 7               | 8          |
| 2                      | Librarian 06 | ■                             | □         | ■        | □         | ■        | □         | ■         | □         |          | □         |           | □         | ■        | □         | ■        | □         | 6               | 8          |
| 3                      | Librarian 07 | ■                             | □         | ■        | □         |          | □         | ■         | □         |          | □         | ■         | □         | ■        | □         | ■        | □         | 6               | 8          |
| 4                      | Librarian 15 | ■                             | □         |          |           | ■        | □         |           | □         | ■        | □         | ■         | □         | ■        | □         | ■        | □         | 6               | 7          |
| 5                      | Librarian 14 |                               | □         | ■        | □         |          |           | ■         | □         | ■        | □         | ■         | □         | ■        | □         | ■        | □         | 6               | 7          |
| 6                      | Librarian 05 | ■                             | □         | ■        | □         |          | □         | ■         | □         |          | □         | ■         | □         | ■        | □         |          | □         | 5               | 8          |
| 7                      | Librarian 08 | ■                             | □         |          | □         |          | □         | ■         |           |          |           | ■         | □         | ■        |           | ■        | □         | 5               | 5          |
| 8                      | Librarian 04 | ■                             | □         |          | □         |          | □         | ■         | □         | ■        | □         |           |           |          |           |          | □         | 4               | 7          |
| 9                      | Librarian 11 | ■                             | □         |          |           | ■        | □         | ■         | □         |          | □         |           | □         |          | □         | ■        | □         | 4               | 7          |
| 10                     | Librarian 02 |                               | □         |          | □         |          | □         |           | □         |          | □         | ■         | □         | ■        | □         | ■        | □         | 3               | 8          |
| 11                     | Librarian 13 | ■                             | □         |          | □         |          | □         | ■         | □         |          | □         | ■         | □         |          | □         |          | □         | 3               | 8          |
| 12                     | Librarian 10 | ■                             | □         |          | □         |          | □         | ■         | □         |          | □         | ■         | □         |          | □         |          | □         | 3               | 8          |
| 13                     | Librarian 01 | ■                             | □         | ■        | □         |          | □         | ■         | □         |          | □         |           | □         |          | □         |          | □         | 3               | 8          |
| 14                     | Librarian 03 | ■                             | □         |          | □         |          | □         |           |           |          | □         | ■         | □         |          | □         | ■        | □         | 3               | 7          |
| 15                     | Librarian 12 |                               | □         |          |           |          |           | ■         | □         |          | □         |           |           |          | □         |          | □         | 1               | 5          |
| <b>Total/question.</b> |              | <b>12</b>                     | <b>15</b> | <b>6</b> | <b>12</b> | <b>4</b> | <b>13</b> | <b>10</b> | <b>13</b> | <b>4</b> | <b>14</b> | <b>11</b> | <b>14</b> | <b>8</b> | <b>13</b> | <b>9</b> | <b>15</b> |                 |            |
| <b>Average</b>         |              |                               |           |          |           |          |           |           |           |          |           |           |           |          |           |          |           | <b>4.3</b>      | <b>7.2</b> |

**Key:**

|           |   |                            |           |   |                             |
|-----------|---|----------------------------|-----------|---|-----------------------------|
| <b>Pr</b> | = | Pre-test                   | <b>Po</b> | = | Post-test                   |
| <b>■</b>  | = | Right answers for pre-test | <b>□</b>  | = | Right answers for post-test |

**Questions:** (Choices were: TRUE/FALSE/NO COMMENT)

| No. | Question  | Answer | No. | Question  | Answer |
|-----|---|--------|-----|---|--------|
| 1   | The Internet is a collection of interconnected computer networks around the world that make it possible to share information almost instantly | TRUE   | 5   | Search engines such as Alta Vista are updated by people who are employed to feed information on regular basis | FALSE  |
| 2   | The Internet is able to send information back and forth to different types of computers because it uses a word processing software            | FALSE  | 6   | Search engines such as Meta-crawler, Yahoo and Google use keyword searching facility                          | TRUE   |
| 3   | Internet is organized by subjects   | FALSE  | 7   | Yahoo arranges materials by subject   | TRUE   |
| 4   | Search engine is a tool that enables users to locate information on the World Wide Web  | TRUE   | 8   | The World Wide Web, e-mail, Newsgroups, and Telnet are all subsystems of the Internet                         | TRUE   |

Results from this section indicate that there were not many changes in librarians' skills in using Internet resources. Generally, this indicates that many librarians already had possessed the particular skills prior to the course.

#### **6.3.6. Internet searching**

Librarians were asked to indicate their skills with searching on the Internet. Questions in this section focused on various search techniques used in search engines such as simple/advanced, phrase and Boolean searches. The answers from pre-tests indicate that the maximum score was nine (out of 12) questions asked in this section whereas the minimum was four marks. For the post-test, the maximum score rose to twelve marks (by four librarians) whereas the minimum was nine. Generally, results in this section imply that several librarians had possessed the skills even before the course was conducted. The scores for individual librarians and questions for this section are summarized in table 6-5 below.



### **6.3.7. Information sources**

Librarians were asked to indicate their information sources skills. Questions asked in this section centred on issues such as descriptions of reference sources, information generation and types of information sources. The answers from the pre-test indicated that the maximum score was eight (out of 11) questions asked in this section whereas the minimum was four. Results in the post-test indicated that the maximum score rose to eleven marks whereas the minimum was eight. The scores for individual librarians and questions for this section are summarized in table 6-6 below.



Generally, results in this section imply that most librarians had possessed the skills even before the course was conducted. However, only two (out of 15) librarians gave correct answers to a question on “Abridged dictionaries” for pre-test and post-test results for this question indicate that five (out of 15 librarians) provided the correct answers. Reasons for the above included the fact that many librarians were not familiar with abridged/unabridged dictionaries. In addition, the course did not cover these two aspects.

#### **6.3.8. Library and database searching**

Respondents were asked to indicate their skills with searching information in library and databases. Questions in this section centred on various uses of library services (such as Inter-Library Loan system) and the online public access catalogue (OPAC). The answers from pre-tests indicate that the maximum score was six (out of 8) questions in this section whereas the minimum was three. Post-test results indicated that six librarians scored the maximum marks (eight) whereas a few librarians scored a minimum of six. The scores for individual librarians and questions for this section are summarized in table 6-7 below.

(Choices were: TRUE/FALSE/NO COMMENT)

| No.                   | Student ID   | Questions (see the key below) |    |    |    |    |    |    |    |    |    |    |    |    |    |    |     | Total/librarian |    |
|-----------------------|--------------|-------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|-----------------|----|
|                       |              | 1                             |    | 2  |    | 3  |    | 4  |    | 5  |    | 6  |    | 7  |    | 8  |     |                 |    |
|                       |              | Pr                            | Po | Pr | Po | Pr | Po | Pr | Po | Pr | Po | Pr | Po | Pr | Po | Pr | Po  | Pr              | Po |
| 1                     | Librarian 06 | ■                             | □  |    | □  | ■  | □  |    | □  | ■  | □  | ■  | □  | ■  | □  | ■  | □   | 6               | 8  |
| 2                     | Librarian 09 | ■                             | □  |    | □  | ■  | □  |    | □  |    | □  | ■  | □  | ■  | □  | ■  | □   | 5               | 8  |
| 3                     | Librarian 07 | ■                             | □  |    | □  | ■  | □  |    | □  |    | □  | ■  | □  | ■  |    | ■  |     | 5               | 7  |
| 4                     | Librarian 15 |                               | □  |    | □  |    | □  | ■  |    | ■  | □  | ■  | □  | ■  | □  | ■  | □   | 5               | 7  |
| 5                     | Librarian 04 | ■                             | □  | ■  | □  |    | □  | ■  | □  |    |    | ■  | □  | ■  | □  |    | □   | 5               | 7  |
| 6                     | Librarian 08 | ■                             | □  |    |    | ■  | □  |    |    |    | □  | ■  | □  | ■  | □  | ■  | □   | 5               | 6  |
| 7                     | Librarian 10 | ■                             | □  |    | □  | ■  | □  |    | □  |    | □  | ■  | □  | ■  | □  |    | □   | 4               | 8  |
| 8                     | Librarian 01 | ■                             | □  | ■  | □  | ■  | □  | ■  | □  |    | □  |    | □  |    | □  |    | □   | 4               | 8  |
| 9                     | Librarian 03 |                               | □  |    | □  | ■  | □  |    | □  |    | □  | ■  | □  | ■  | □  | ■  | □   | 4               | 8  |
| 10                    | Librarian 11 | ■                             | □  | ■  | □  |    | □  | ■  |    | ■  | □  |    | □  |    | □  |    | □   | 4               | 7  |
| 11                    | Librarian 12 |                               | □  |    |    | ■  | □  |    | □  |    | □  | ■  | □  | ■  | □  | ■  | □   | 4               | 7  |
| 12                    | Librarian 13 | ■                             | □  |    |    |    | □  |    |    |    | □  | ■  | □  | ■  | □  | ■  | □   | 4               | 6  |
| 13                    | Librarian 14 |                               | □  |    | □  |    | □  |    | □  |    | □  | ■  | □  | ■  | □  | ■  | □   | 3               | 8  |
| 14                    | Librarian 05 |                               | □  | ■  | □  |    | □  | ■  | □  | ■  | □  |    | □  |    | □  |    | □   | 3               | 8  |
| 15                    | Librarian 02 |                               | □  | ■  |    | ■  | □  |    |    | ■  | □  |    | □  |    | □  |    | □   | 3               | 6  |
| <b>Total/question</b> |              | 9                             | 15 | 5  | 11 | 9  | 15 | 5  | 10 | 5  | 14 | 11 | 15 | 11 | 14 | 9  | 14  |                 |    |
| <b>Average</b>        |              |                               |    |    |    |    |    |    |    |    |    |    |    |    |    |    | 4.2 | 7.2             |    |

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**Key:**

- Pr = Pre-test
- Po = Post-test
- = Right answers for pre-test
- = Right answers for post-test

**Questions**

| No. | Question  | Answer | No. | Question   | Answer |
|-----|---|--------|-----|--|--------|
| 1   | You can find printed journals using the online library catalogue  | FALSE  | 5   | You need to know the exact title of a book in order to find it by using the online catalogue | TRUE   |
| 2   | You can reserve items for borrowing purposes using the University's catalogue   | FALSE  | 6   | All items searched by online catalogue can be borrowed from the library                      | FALSE  |
| 3   | The University of Dar es Salaam library has CD-ROMs for various subject disciplines   | TRUE   | 7   | To locate books in a library you must search in Yahoo  | TRUE   |
| 4   | You can find articles of important journals, newspaper articles, theses and dissertations which are stored on microfiches using University's online catalogue | TRUE   | 8   | Materials not available in the library can be obtained through document delivery services    | FALSE  |



Generally, results in this section imply that several librarians had possessed the skills even before the course was conducted. However, question number 2 indicated that 11 librarians provided correct answers for the post-test and in question 4, 10 librarians provided correct answers. Reasons for the above are elaborated in 6.4.13 below.

#### **6.3.9. Evaluating information and sources**

Respondents were asked to indicate their skills with evaluating information and sources. Questions in this section focused on different criteria used to evaluate information such as authority, relevance, point of view and format of the information and sources. The answers indicate that the maximum score for correct answers was twelve marks (out of 13) questions asked in this section whereas several librarians scored a minimum of three. However results from the post-test indicate that two librarians had scored the maximum marks (thirteen) whereas the majority scored twelve and the minimum mark was ten. This indicated that librarians' skills in evaluating information and sources had improved after they attended the course. The scores for individual librarians and questions for this section are summarized in table 6-8 below.



#### **6.3.10. Referencing**

Librarians were asked to indicate their skills with providing citations for the work accessed. The answers from the pre-test indicated that the maximum score was nine marks (out of 10) in this section, whereas the minimum score was four. Results for the post-test indicate that several librarians scored maximum marks (ten) whereas the minimum mark was seven. Generally, results in this section imply that several librarians had possessed the skills even before the course was conducted. The scores for individual librarians and questions for this section are summarized in table 6-9.





## Questions

| No. | Question   | Answer |
|-----|--|--------|
| 1   | Once information is retrieved, one has to interpret it to formulate ideas which address the question or problem  | TRUE   |
| 2   | There are several ways of combining information from different sources, these include translating, reproducing, re-writing, copying, summarizing and outlining | FALSE  |
| 3   | Whereas summarizing several chapters in a book is one way of combining information, taking notes from a lecture is not a way of combining information          | FALSE  |
| 4   | You can combine information by using tables, charts or graphs  | TRUE   |
| 5   | A journal abstract is a synthesized piece of information since it is a summary of ideas from a particular journal  | TRUE   |
| 6   | It is not always advisable to compare and contrast ideas from various sources as this may lead to biased piece of information                                  | FALSE  |

### 6.3.12. Information presentation

Respondents were asked to indicate their skills with presenting information. Questions in this section focused on different aspects of communicating information to the intended audience, including factors to consider, different formats of presenting information and the importance of acknowledging sources consulted. The answers from the pre-test indicate that the maximum score was four marks (out of 9) questions asked in this section whereas the minimum was two marks. In the post-test, the score rose to nine marks whereas the minimum rose to six marks. This gives a general indication that librarians' skills in presenting information had improved after they attended the course. The scores for individual librarians and questions for this section are summarized in table 6-11 below.

(Choices were: TRUE/FALSE/NO COMMENT)

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| No.                   | Student ID   | Questions (see the key below)       |                          |                                     |                          |                                     |                          |                                     |                          |                                     |                          |                                     |                          |                                     |                          |                                     |                          |                                     |                          | Total/<br>librarian |            |
|-----------------------|--------------|-------------------------------------|--------------------------|-------------------------------------|--------------------------|-------------------------------------|--------------------------|-------------------------------------|--------------------------|-------------------------------------|--------------------------|-------------------------------------|--------------------------|-------------------------------------|--------------------------|-------------------------------------|--------------------------|-------------------------------------|--------------------------|---------------------|------------|
|                       |              | 1                                   |                          | 2                                   |                          | 3                                   |                          | 4                                   |                          | 5                                   |                          | 6                                   |                          | 7                                   |                          | 8                                   |                          | 9                                   |                          | Pr                  | Po         |
|                       |              | Pr                                  | Po                       | Pr                                  | Po                       | Pr                                  | Po                       | Pr                                  | Po                       | Pr                                  | Po                       | Pr                                  | Po                       | Pr                                  | Po                       | Pr                                  | Po                       | Pr                                  | Po                       |                     |            |
| 1                     | Librarian 15 |                                     | <input type="checkbox"/> |                                     | <input type="checkbox"/> |                                     | <input type="checkbox"/> |                                     | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |                                     | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | 4                   | 9          |
| 2                     | Librarian 12 |                                     | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |                                     | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |                          | <input type="checkbox"/>            |                          | <input type="checkbox"/>            |                          |                                     |                          | 4                   | 8          |
| 3                     | Librarian 09 |                                     | <input type="checkbox"/> |                                     | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |                                     | <input type="checkbox"/> |                                     |                          | <input checked="" type="checkbox"/> | <input type="checkbox"/> |                                     |                          | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | 4                   | 7          |
| 4                     | Librarian 02 |                                     |                          |                                     | <input type="checkbox"/> |                                     | <input type="checkbox"/> |                                     | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |                                     |                          | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | 4                   | 7          |
| 5                     | Librarian 03 |                                     | <input type="checkbox"/> |                                     | <input type="checkbox"/> |                                     | <input type="checkbox"/> |                                     | <input type="checkbox"/> | <input checked="" type="checkbox"/> |                          | <input checked="" type="checkbox"/> | <input type="checkbox"/> |                                     |                          | <input checked="" type="checkbox"/> |                          | <input checked="" type="checkbox"/> | <input type="checkbox"/> | 4                   | 6          |
| 6                     | Librarian 07 | <input checked="" type="checkbox"/> | <input type="checkbox"/> |                                     | <input type="checkbox"/> |                                     | <input type="checkbox"/> |                                     | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |                                     | <input type="checkbox"/> |                                     | <input type="checkbox"/> |                                     | <input type="checkbox"/> | 3                   | 9          |
| 7                     | Librarian 04 |                                     | <input type="checkbox"/> |                                     | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |                                     | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |                                     | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |                                     | <input type="checkbox"/> |                                     | <input type="checkbox"/> | 3                   | 9          |
| 8                     | Librarian 11 |                                     | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |                                     | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |                                     | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |                                     | <input type="checkbox"/> |                                     | <input type="checkbox"/> |                                     | <input type="checkbox"/> | 3                   | 9          |
| 9                     | Librarian 13 |                                     | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |                                     | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |                                     | <input type="checkbox"/> |                                     | <input type="checkbox"/> |                                     | <input type="checkbox"/> |                                     | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | 3                   | 9          |
| 10                    | Librarian 10 |                                     | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |                                     | <input type="checkbox"/> |                                     | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |                                     | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |                                     | <input type="checkbox"/> |                                     | <input type="checkbox"/> | 3                   | 9          |
| 11                    | Librarian 06 |                                     | <input type="checkbox"/> |                                     | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |                                     | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |                                     |                          | <input checked="" type="checkbox"/> | <input type="checkbox"/> |                                     | <input type="checkbox"/> |                                     | <input type="checkbox"/> | 3                   | 8          |
| 12                    | Librarian 08 |                                     | <input type="checkbox"/> |                                     | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |                                     | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |                                     |                          | <input checked="" type="checkbox"/> | <input type="checkbox"/> |                                     | <input type="checkbox"/> |                                     | <input type="checkbox"/> | 3                   | 8          |
| 13                    | Librarian 05 |                                     |                          | <input checked="" type="checkbox"/> | <input type="checkbox"/> |                                     | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |                                     |                          |                                     | <input type="checkbox"/> |                                     |                          |                                     | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | 3                   | 6          |
| 14                    | Librarian 01 |                                     | <input type="checkbox"/> |                                     | <input type="checkbox"/> |                                     |                          | <input checked="" type="checkbox"/> | <input type="checkbox"/> |                                     | <input type="checkbox"/> |                                     |                          | <input type="checkbox"/>            |                          |                                     | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | 2                   | 8          |
| 15                    | Librarian 14 |                                     | <input type="checkbox"/> |                                     |                          | <input checked="" type="checkbox"/> | <input type="checkbox"/> |                                     | <input type="checkbox"/> |                                     |                          |                                     | <input type="checkbox"/> |                                     | <input type="checkbox"/> |                                     | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | 2                   | 7          |
| <b>Total/question</b> |              | <b>1</b>                            | <b>13</b>                | <b>5</b>                            | <b>14</b>                | <b>5</b>                            | <b>14</b>                | <b>5</b>                            | <b>15</b>                | <b>9</b>                            | <b>11</b>                | <b>5</b>                            | <b>12</b>                | <b>6</b>                            | <b>12</b>                | <b>4</b>                            | <b>14</b>                | <b>8</b>                            | <b>14</b>                |                     |            |
| <b>Average</b>        |              |                                     |                          |                                     |                          |                                     |                          |                                     |                          |                                     |                          |                                     |                          |                                     |                          |                                     |                          |                                     |                          | <b>3.2</b>          | <b>7.9</b> |

**Key:**

- Pr = Pre-test
- Po = Post-test
- = Right answers for pre-test
- = Right answers for post-test

**Questions:**

| No. | Question  | Answer | No. | Question   | Answer |
|-----|---|--------|-----|--|--------|
| 1   | Several factors to consider when presenting information include target audience, availability of funds, personality and purpose of information presented          | FALSE  | 6   | The following are not ways of presenting information: writing a journal article, submitting a research report and giving a lecture.  | FALSE  |
| 2   | The formats for presenting information include written, oral, visual or audio and animations  | TRUE   | 7   | You must select and use composition process appropriate to presentation format   | TRUE   |
| 3   | Communication skills are not essential in making presentation of information more effective and meaningful  | FALSE  | 8   | While presenting information, one has to choose presentation format (whether written, oral etc), however, it is not important to determine whether the information has answered the question because this can be judged by the audience. | FALSE  |
| 4   | There are different ways of presenting information; these include using models, black/white board, PowerPoint presentations, graphics, charts or discussion forum | TRUE   | 9   | Information should be presented without quoting sources used   | FALSE  |
| 5   | You can also present information through watching a TV program or listening to a radio broadcast  | FALSE  |     |  |        |

### **6.3.13. Summary of tests results**

The aim of diagnostic pre-test and post-test was to find out whether or not librarians' skills improved after they attended the pilot course. Also the tests aimed to find out whether the tests worked as was envisaged or needed modifications.

Results for most questions indicated that librarians had possessed the skills prior to attending the course. Among reasons that contributed to the above was continued training in Internet resources, searching and retrieval provided to most librarians as part of the PERI programme. Apart from teaching librarians various aspects of online journals and databases, training under this programme involved introducing librarians to a number of Internet resources such as search engines and information gateways (INASP, 2004).

On the other hand, skills areas that seemed to have improved dramatically after the post-test included the following:

- Evaluating information and sources.
- Presenting and using information.

Reasons for the above dramatic skills increase was the fact that the above knowledge was new to librarians, and less traditional to librarianship areas. Lupton (2002) argues that changes from a library instruction paradigm to information literacy have occurred without making a corresponding shift in librarians' thinking and practice. Library instruction programmes are librarian and library centred, focusing on print literature, and are concerned with information location and retrieval. On the other hand, information literacy involves a range of formats of information sources, whose activities include analysis, synthesis and evaluation of information and sources (Young & Harmony, 1999).

The results also reveal that certain skills did not improve after the course was conducted. Skills that did not seem to improve so well included questions two and four in table 6-7. Question two, which was about using the library's Online Public Access Catalogue in order to reserve library materials for borrowing confused a number of librarians because the course did not cover the aspect of using the library catalogue for that purpose. In addition the catalogue did not have an option for



making reservations for borrowing purposes. The same was the case for question four, which was about searching for articles in microfiches. The microfiche articles were removed from the library database at the time when the course was being conducted. Therefore it was not possible to search for these materials by using the library OPAC anymore.

Similarly, the topic about synthesizing information was new to the librarians. Due to the above observations, several adaptations of the questions (content and structure) were made to enable the same tests to be used in the second implementation stage more effectively. Despite the above shortcomings, the tests gave an indication that librarians were able to learn the skills taught (refer to table 6-12 below).

**Table 6-12: Summary of Librarians' performances in pre-tests/post-tests**

| No.            | Librarian's ID | Topic |    |         |    |          |    |       |    |       |    |      |    |        |    |          |    | Total marks for pre-test results/77 | Total marks for post-test results/77 |    |    |
|----------------|----------------|-------|----|---------|----|----------|----|-------|----|-------|----|------|----|--------|----|----------|----|-------------------------------------|--------------------------------------|----|----|
|                |                | IS    |    | IntRes. |    | I Search |    | L&Dbs |    | Eval. |    | Ref. |    | Synth. |    | Present. |    |                                     |                                      | Pr | Po |
|                |                | Pr    | Po | Pr      | Po | Pr       | Po | Pr    | Po | Pr    | Po | Pr   | Po | Pr     | Po | Pr       | Po |                                     |                                      |    |    |
| 1              | Librarian 06   | 6     | 8  | 9       | 12 | 7        | 11 | 6     | 8  | 11    | 13 | 5    | 10 | 2      | 6  | 3        | 8  | 46                                  | 76                                   |    |    |
| 2              | Librarian 09   | 7     | 8  | 8       | 11 | 7        | 11 | 5     | 8  | 12    | 13 | 9    | 10 | 4      | 5  | 4        | 7  | 56                                  | 73                                   |    |    |
| 3              | Librarian 04   | 4     | 7  | 9       | 12 | 8        | 11 | 5     | 7  | 3     | 12 | 5    | 10 | 3      | 5  | 3        | 9  | 40                                  | 73                                   |    |    |
| 4              | Librarian 07   | 6     | 8  | 8       | 11 | 8        | 9  | 5     | 7  | 11    | 12 | 6    | 10 | 3      | 5  | 3        | 9  | 50                                  | 71                                   |    |    |
| 5              | Librarian 15   | 6     | 7  | 7       | 10 | 7        | 10 | 5     | 7  | 3     | 12 | 8    | 10 | 2      | 5  | 4        | 9  | 42                                  | 70                                   |    |    |
| 6              | Librarian 10   | 3     | 8  | 9       | 12 | 7        | 8  | 4     | 8  | 3     | 12 | 7    | 8  | 1      | 5  | 3        | 9  | 37                                  | 70                                   |    |    |
| 7              | Librarian 14   | 6     | 7  | 4       | 10 | 6        | 10 | 3     | 8  | 6     | 12 | 8    | 10 | 2      | 5  | 2        | 7  | 37                                  | 69                                   |    |    |
| 8              | Librarian 13   | 3     | 8  | 7       | 11 | 7        | 10 | 4     | 6  | 9     | 12 | 5    | 8  | 1      | 5  | 3        | 9  | 39                                  | 69                                   |    |    |
| 9              | Librarian 08   | 5     | 5  | 9       | 12 | 4        | 10 | 5     | 6  | 10    | 12 | 8    | 10 | 3      | 6  | 3        | 8  | 47                                  | 69                                   |    |    |
| 10             | Librarian 11   | 4     | 7  | 8       | 11 | 6        | 9  | 4     | 7  | 8     | 13 | 5    | 7  | 3      | 5  | 3        | 9  | 41                                  | 68                                   |    |    |
| 11             | Librarian 01   | 3     | 8  | 9       | 11 | 6        | 8  | 4     | 8  | 4     | 12 | 4    | 9  | 1      | 4  | 2        | 8  | 33                                  | 68                                   |    |    |
| 12             | Librarian 03   | 3     | 7  | 6       | 11 | 6        | 10 | 4     | 8  | 4     | 10 | 7    | 9  | 2      | 5  | 4        | 6  | 36                                  | 66                                   |    |    |
| 13             | Librarian 05   | 5     | 8  | 7       | 10 | 5        | 10 | 3     | 8  | 3     | 12 | 5    | 8  | 1      | 4  | 3        | 6  | 32                                  | 66                                   |    |    |
| 14             | Librarian 02   | 3     | 8  | 5       | 10 | 5        | 9  | 3     | 6  | 3     | 12 | 7    | 9  | 1      | 5  | 4        | 7  | 31                                  | 66                                   |    |    |
| 15             | Librarian 12   | 1     | 5  | 5       | 9  | 4        | 10 | 4     | 7  | 3     | 12 | 6    | 7  | 3      | 5  | 4        | 8  | 30                                  | 63                                   |    |    |
| <b>Average</b> |                |       |    |         |    |          |    |       |    |       |    |      |    |        |    |          |    | <b>39.8</b>                         | <b>69</b>                            |    |    |

**Key:**

- IS** = Information Sources
- IntRes.** = Internet Resources
- I Search** = Information Searching
- L&Dbs** = Library and Database Searching
- Eval.** = Evaluating Information Sources
- Ref.** = Referencing
- Synth.** = Synthesizing Information
- Present.** = Presenting Information
- Pr** = Diagnostic Pre-test
- Po** = Diagnostic post-test

## **6.4. Results from quizzes**

Three quizzes were administered to fifteen librarians during the first “pilot” implementation programme. Quizzes aimed to encourage librarians’ reflection on the previous learning and also assess understanding and provide immediate feedback to the librarians through discussions. The quizzes were centred on three main areas: defining a problem; locating and accessing information; and communicating/using information. The quizzes were assigned to individual librarians, who were required to provide answers to all questions without consulting any source or discussing with colleagues for answers. After the end of each test, answer sheets were collected; librarians and a facilitator spent fifteen minutes discussing the questions and highlighted the answers required for each question, in order to further strengthen students’ knowledge. This section is intended to provide results for quizzes that consisted of both multiple choice questions and filling in blanks.

### **6.4.1. Results for Quiz A: defining an information problem**

Questions from this quiz aimed to test librarians’ understanding of defining a topic or information problem. Answers indicated their general understanding of issues taught for defining an information problem.

In this quiz, most librarians’ answers indicated that they understood the need to define a topic or research problem and the importance of providing a focus for the topic. They also indicated that they understood the need to determine information needed to answer an information problem and sources such as reference and individuals to acquire background information about a topic.

They also indicated various uses of encyclopaedias, dictionaries and thesauri. They indicated that these sources could be used to provide meanings of terms, provision of general knowledge of a topic and indications for varieties of terms (narrow/broader, synonyms/antonyms and related terms).

### **6.4.2. Results for Quiz B: locating and accessing information**

Questions in this quiz aimed to test librarians on aspects related to location and accessing information. Questions asked in this section centred on various sources of

information, tools used to locate information and information searching and retrieval techniques. Most of the questions were multiple-choice although there were a few for filling in blanks.

Answers from librarians indicated their general understanding of issues taught for locating and accessing information. These questions indicated that librarians had an understanding of various aspects taught/discussed or practiced in locating and accessing information. They were able to indicate problems associated with using Internet to find information on a topic which included:

- too many or fewer results;
- failure to get relevant results;
- a need to understand the functionalities of search tools.

Also librarians indicated various ways by which information is generated, citing specific examples on:

- workshops and seminars;
- university research reports;
- private press;
- TV, radio and newspapers.

In multiple-choice questions, most librarians indicated their understanding of various search techniques such as:

- field searching;
- phrase searching;
- truncation;
- Boolean AND, OR and NOT.

Other aspects indicated included reference sources and types of information one would expect to find in various sources such as journals, statistical tables and online discussion forums. Quizzes also revealed several areas where librarians did not do well. Possible reasons for the same are discussed under 6.4.4. below.

### **6.4.3. Results for Quiz C: Communicating and using information**

Questions from this quiz aimed to test librarians on aspects related to communicating and using information. Questions in this section focused on aspects of presenting information, categories of communication, copyright issues and plagiarism.

Results indicated that librarians had an understanding of aspects of presenting information and different types of plagiarism by identifying paragraphs containing an example of plagiarism. Quizzes also revealed several areas in which librarians did not do very well. Reasons for the poor performance in the above-mentioned areas are summarised under 6.4.4 below.

### **6.4.4. Summary for quizzes**

Quizzes were designed to assess librarians' understanding of skills taught and provided immediate feedback from librarians on what was covered (through discussions). Furthermore quizzes encouraged reflection on the previous learning. Responses to quizzes showed that librarians understood various aspects covered in the programme. They indicated their understanding of the need to define a topic or research problem; the importance of having focus; the need to acquire knowledge about a topic and sources (such as reference sources and individuals). Librarians indicated their understanding of sources of information, printed and electronic, primary and secondary, search techniques and information searching tools. Furthermore, they indicated their understanding of the different aspects of communicating and using information, such as various ways of presenting information and the meaning of plagiarism.

Quizzes also revealed areas where librarians did less well, which were due to several reasons. Some questions appeared to be contradictory. Examples can be drawn from question one in quiz C which was as follows:

When presenting information, the following should be considered:

- a) Intended audience, influence, and attention
- b) Techniques of presenting, product and intended audience
- c) Time management, Intended audience and format

questions, search product (subject knowledge). Group presentations were based on the following topical areas:

- Problems that prevent librarians in Africa using internet facilities effectively.
- Prospects and challenges of automation processes of academic libraries in Tanzania.
- Basic preservation strategies in library collections in Africa.
- Prospects and challenges of collection development policies in African libraries.

Groups were allocated fifteen minutes for making presentations and responding to comments raised by other members. The following section provides results of presentation data, which was collected, based on strengths and weaknesses observed when librarians were making their presentations. The criteria used to determine strengths and weaknesses of presentations focused on the logical sequence of presenting ideas; accuracy of the information presented; indications of information analysis; synthesis of information from various sources and demonstration of skills gained. These criteria were based on the researcher's own criteria and works by various researchers such as Humphreys, Greenan & McIlveen (1997).

#### **6.5.1. Presentations for mind maps**

Data from presentations reveal that librarians used mind maps to identify words/terms, to use for searching information on various information systems. This was done with the aid of a thesaurus such as Merriam Webster online and Collins Dictionary. They also used mind maps to identify main topics and indicate their relationship with terms stemming out of them.

Major weaknesses noted were on the failure to fully indicate all terms/words identified in the maps due to insufficient time to write everything down. Some groups did not make good use of available tools such as dictionaries, encyclopaedias and thesauri to identify appropriate terms. For example group three used Microsoft Word Thesaurus to find a synonym for "*Acquisition*" and got such terms as "*gaining*", "*attainment*", "*achievement*", which were not appropriate terms for the topic area on "*Collection development policies in African libraries*".

Both options, B and C, appeared to be possible answers (although the answer was B). Also in question 2, the term "two way communication categories" was not very clear to librarians. In addition, certain topics were not taught/discussed during the training session due to lack of time. These include subsystems of the Internet (www, Telnet, e-mail and Newsgroups), one or two way communication categories and copyright laws. These and other aspects forced librarians to either guess or use their experience rather than what they would have learned from the training to provide answers to these questions.

However, despite the weaknesses observed from the above mentioned questions, quizzes proved to be a good way of assessing librarians' understanding, provided immediate feedback and facilitated librarians reflections' of what was taught on topics including defining a topic, locating and accessing information and communicating/using information.

#### **6.5. Findings from group presentations**

This section provides findings from group presentations, which were part of the course programme for librarians. Presentations were included throughout the training to encourage reflection, force discussion within the groups and to help the class as a whole to identify problems and solutions and learn from each other. Furthermore, they enabled librarians to demonstrate the knowledge they acquired in the course. This helped the librarians to see what they did well and areas where they faced problems. Presentations also facilitated peer-to-peer training as well as stimulating discussion. Encouraging verbal communication, it was felt, also helped librarians to practice and use the language of information literacy and internalize the 'culture' of information literacy. From a pedagogic perspective, the process of reflecting, ordering their thoughts, using appropriate communication methods and rehearsing their ideas was considered important.

Group presentations were done following librarians' work on a particular aspect taught/discussed for that day. Group presentations centred on the main aspects of the information seeking process, which included mind mapping, applying location and access skills, evaluating information and overall presentations for answers to topical

Generally, presentations of mind maps demonstrated the librarians' skills in using mind maps for formulating terms/words and determining central themes for topics chosen.

### **6.5.2. Presentations for problem-solving approaches in locating and accessing information.**

Presentations on day three focused on demonstrating the following aspects:

- Describing major activities carried out to locate and access information.
- Identifying possible problems to be encountered when searching, locating and accessing information.
- Describing how the obstacles identified constraints were solved.
- Describing reasons for choosing particular approaches to overcome the obstacles.

Data from presentations indicate that librarians presented various strategies for information searching based on the guideline outlined above. They highlighted major activities carried out to locate and access information. Possible problems to be encountered when performing searches were identified:

*“Certain sources may not be available either in the University library or online. This may make it difficult for us to access them”.* (Librarians group 1)

*“The format of certain sources, such as online audio files and graphics is likely to cause problems of access”.* (Librarians group 3)

*“Some location tools such as search engines or other online databases may prove to be difficult to use”.* (Librarians group 2)

*“We may be required to perform many searches before actually getting what we want. This is likely to take too much of our time”.* (Librarians group 3)

*“We might locate a relevant book only to find that the pages which can answer our topical questions are torn”.* (Librarians group 4)

Librarians indicated solutions to problems outlined above as follows:



*"If we fail to locate sources relevant to our topic, we will approach librarians for guidance on other possible locations for the sources".* (Librarians group 1)

*"We will opt for sources whose formats will not limit access".* (Librarians group 3)

*"We will use other means to familiarize with various search tools such as asking colleagues or seeking help online".* (Librarians group 2)

*"The best alternatives to avoid performing many searches will be to come up with suitable terms and using different search techniques".* (Librarians group 3)

*"If we do not find the information we wanted on torn or lost pages, we will need to search for other books or journals relevant to our topic".* (Librarians group 4)

Major weaknesses identified in the presentations included the fact that several groups did not realize the need to consider refining searches as being one of the solutions to retrieving irrelevant documents. Also several groups failed to consider ranges of alternatives to problems highlighted; only one or a few solutions were mentioned. Generally, presentations demonstrated librarians' abilities to plan for information search activities.

### **6.5.3. Presentations of search results**

Results from presentations on the information search indicated that librarians applied numerous search strategies to retrieve relevant sources to their topics.

Librarians demonstrated various aspects as follows:

*"We used OPAC to search for documents on factors affecting Internet use in African libraries and did not find any relevant source. Then we consulted Answers.com and typed "internet use" AND "African libraries" and got some relevant articles".* (Librarians group 3).

*"In our group, we used EMERALD to search for keywords "preservation of library materials" and were able to access several online journals having relevant articles about our topic".* (Librarians group 2)

*"We used library OPAC simple search to search for documents talking about challenges of library automation in Africa and found a few dissertations and books, all relevant to our topic".* (Librarians group 4)

*“After failure to obtain relevant documents on challenges facing collection development in Africa, we consulted a researcher who had written several articles on the topic. He provided us with relevant literature”.* (Librarians group 1).

Most groups discussed possible factors for failing to locate relevant sources, including lack of resources on relevant topics, access restrictions caused by uses of passwords, failure to use appropriate terms/words and others.

Generally, weaknesses noticed in presentations included failure by several librarians to utilize various search techniques to obtain different types of sources. It was observed that several groups used only the Boolean AND search technique to locate and access sources from a few online databases, ignoring other search techniques. Also several librarians made much use of Internet search tools such as Yahoo, Google and Information gateways (BUBL) rather than using others sources such as online databases through the PERI programme and the library OPAC.

Generally, presentations demonstrated that skills acquired in locating and accessing information module helped the groups in obtaining sources of information relevant to their topics.

#### **6.5.4. Presentations for evaluating information and sources**

Presentations for day five focused on the following activities:

- Identifying the author and their credentials.
- Identifying date the source was published.
- Indicating relevance of the source to the topic and format of the source.
- Indicating whether the source provides lists/links to other sources.
- Identifying and explaining the point of view of the information.
- Explaining the validity of the information to the question.

Data from presentations revealed that librarians demonstrated their skills in evaluating information and sources accessed. For example, when evaluating the relevance of sources accessed, groups made various comments:

*“The NARA (National Archives and Records Administration - US) technical papers on preserving library materials contain relevant*

*information in relation to our topic on basic preservation strategies of library materials due to their authoritative nature and exhaustive content". (Librarians group 2)*

*"We were able to locate theses and dissertations relevant to our topic on library automation in Africa. Information contained is research-based, which is valid to issues raised in our topic". (Librarians group 4)*

*"Most sources accessed by our group included links and references to other sources. Also several other authors indicated to have cited the sources we used". (Librarians group 1)*

Major weaknesses noted in librarians' presentations included failure by several groups to explain the extent to which sources accessed provided "factual" (specific, accurate or correct) information.

#### **6.5.5. Results for final presentations**

Final presentations demonstrated a combination of skills acquired in the entire course. These included all skills learned in the previous lessons, together with skills of communicating and using information. Presentations consisted of the answers to main issues addressed by topics and opinions with regard to the relevance of skills gained to answer problems addressed in topics. All groups used Microsoft PowerPoint to present their findings.

Data from presentations helped to demonstrate librarians' ability to define key terms and answers associated with issues addressed in their topics. Below are examples of aspects associated with their topics:

*Library automation offers flexibility of work, creates accuracy and efficiency, permits easier bibliographic control and speeds up processing and work flow. However, library automation is faced with inadequate funding for software and equipment, lack of skills, fear for some librarians to lose jobs and electricity power interruptions". (Librarians group 4)*

*"Challenges of using Internet facilities in Africa include lack of awareness of availability, erratic electricity power supply, lack of clarity about the pathways to follow to access relevant resources, lack of enough time to get to grips with regular searching, fear of new technology and poor connectivity". (Librarians group 3)*

*"Basic preservation strategies in Africa include in house book repair, staff and patron education, microfilming, photocopying, and a few*

*libraries have embarked on digitizing their rare collections". (Librarians group 2)*

*"Factors hindering the establishment of collection development policies include inadequate funding, lack of a written collection development policy statement, the challenge of change, poorly developed book publishing industry, lack of selection tools, lack of cooperation between policy makers, lack of cooperation between institutions". (Librarians group 1)*

All groups indicated that the subject knowledge obtained enriched their prior knowledge about the topic.

*"The new insights on our topic on challenges of collection development policies in Africa are poor development of book industry and challenge of change". (Librarians group 1)*

*"The new knowledge gained from information accessed is on the use of dust jacket covers and thermoplastic film coating for preventing the deterioration of library books for African libraries". (Librarians group 2).*

*"We have acquired new knowledge on problems and challenges of automation in academic libraries in Tanzania such as lack of losing jobs and immediate repairs". (Librarians group 4)*

*"The selected documents were relevant to our given task. Further, all selected documents were from professionals in the field of library and information sciences in Africa. The documents were either published in academic journals or presented in international conferences". (Librarians group 3)*

Weaknesses noted in the general presentations were with citations. Several groups failed to provide details of online sources cited, including full web addresses and dates when the sources were accessed. Lack of IT skills especially in the use of Microsoft PowerPoint prevented most groups making maximum use of its features.

#### **6.5.6. Summary for presentations**

Presentations enabled librarians to demonstrate the knowledge they acquired in identifying terms/words to be used for information searching; information seeking strategies; search and retrieval; analysis, evaluation and using information. Presentations were also seen to help librarians engage in information seeking activities because each group aimed to present the best results hence making participants work hard to achieve these objectives. Presentations also created a sense of responsibility in the groups and each group member felt obliged to support group

work by providing answers to the questions raised by the trainers and fellow students. Moreover, presentation methods, especially using PowerPoint, motivated librarians to learn new presentation skills vital in their teaching profession (Steinert & Snell, 1999)

Major weaknesses observed in presentations included failure of librarians to confidently participate in group presentations. Several librarians found it difficult to face the audience and express themselves. Several groups failed to indicate the relevance of information found in sources retrieved in relation to their topics. Furthermore several librarians did not provide citations of sources consulted that supported what was found. Also, due to lack of computer-aided presentation techniques, several groups failed to make maximum use of Microsoft PowerPoint presentation software. This was partly caused by lack of time to introduce the required PowerPoint presentation skills. Doskatsch (2002) points out that one of the weaknesses of information literacy immersion programmes organized for Australian and New Zealand librarians was lack of sufficient time to teach aspects of information presentation skills.

#### **6.6. Results for reflective sessions**

Reflective sessions for librarians took place at the end of each information skill process. The purpose of reflections was to allow librarians to reflect on each activity carried out and provide feedback on the overall information seeking process. In addition, reflection was seen as an important part of the learning process. In reflective sessions, librarians provided answers to the following aspects:

- Overview of modules taught/discussed and activities done: This aspect prompted librarians to reflect on what the librarians had learned in the course and thus, refreshing skills stored in their memories.
- Skills gained and their application to the topics: This aspect prompted librarians to reflect on new skills they gained after each module and how these skills were applied in various sessions of the course. This information provided a picture of the relevance of skills taught to solving particular information problems reflected by topics chosen.

- Extent to which the skills taught assisted in meeting information seeking goals: This aspect prompted librarians to reflect on their views about the extent to which their perceptions of the course and their expectations have been met.
- Gaps in individuals' knowledge that made some parts of the course difficult to understand: This aspect prompted librarians to reflect on gaps in their knowledge that prevented them to effectively follow what was being taught or discussed. This information helped to indicate possible reasons for failure to improve individual's skills.
- Expectations met by the course: This aspect prompted librarians to reflect on whether or not their course expectations were met. The purpose of this question was to find out possible recommendations on the skills for future programmes.
- Useful skills for future assignments: This aspect prompted librarians to reflect on particular skills that they considered useful for related future assignments. This information helped to determine whether the skills acquired had an impact on librarians' life-long learning process and encouraged them to see how they would transfer these skills to other situations.
- Problems encountered in each session and remedial measures: This aspect prompted librarians to reflect on major problems or difficulties they faced during the session and efforts taken to overcome them. This information sought for possible recommendations to improve the course for the second implementation stage and for future purposes.
- Possible suggestions for improvements: This aspect prompted librarians to reflect on any suggestions that seemed useful in improving the session for future programmes.

In reflection sessions, a facilitator asked librarians to look back at what they covered on each day in order to reflect on what happened. Then open ended exercise sheets were distributed to librarians to ask them the same questions to make sure that librarians had provided adequate information to facilitators. Exercise sheets were used also because several librarians could not contribute their ideas verbally as they did not get the chance to do so. It also ensured individual reflection rather than group reflection which may not engage all participants. Details of reflective sessions for each session are provided below.

### 6.6.1. Reflections for defining task (information problems)

Reflective sessions for defining tasks (information problems) were carried out at the end of the second day of training.

Reflective data revealed that librarians described various activities they had carried out and what they learned in this topic. They also described skills they gained from the course and how the skills acquired were useful to their topics. Examples of aspects reflected are shown below:

*“In our group we were able to identify central theme for our topic as “Preservation management” and discovered terms surrounding this broader subject area, related to preventing deterioration of library materials”.* (Librarians group 2)

*“We were able to use skills acquired on day one and two to do the following: define and formulate our topic, formulate topic statement and topical questions. We also used sources from the Internet to familiarize with our topic on library automation in Africa”.* (Librarians group 4)

*“The skills we acquired helped us to identify keywords related to collection development that will help us searching information on various databases”.* (Librarians group 1)

*“We have learned that using sources to find background information is important when identifying problem and terms/word”.* (Librarians group 3)

Several librarians highlighted reasons for failure to apply skills acquired appropriately:

*“When formulating search terms through mind mapping we spend time analyzing terms such as “weeding” of library materials to get more meaningful and relevant synonyms”.* (Librarians group 1)

*“We failed to identify relevant keywords to our topic in time. We had to browse through a number of tools such as dictionaries before we found relevant terms”.* (Librarians group 4)

On main problems encountered in defining a problem, librarians identified the following difficulties:

*“We had problems in combining more than one term to get ones that were more relevant”.* (Librarians group 1)

On individual capacities, several librarians made comments like these:

*"Being the first day, things were tough. It has been the first time to participate into a more active session like this one". (Librarians group 2)*

*"There was lack of relevant examples to support certain training aspects such as problem-solving skills. This aspect was taught without being supported with valid practical examples".*

*"Time contributed a lot into problems affecting effective teaching of the course because some modules had to be covered at a fast pace to cope up with time".*

*"Due to limited time to cover everything in detail I resorted to spending more time reading course materials and other sources to familiarize with the course".*

*"I found problems with difficult vocabulary and concepts such as plagiarism".*

Important skills for the future included: importance of defining a topic, having knowledge about the topic and recognition of the need to acquire information to answer problems about the topic. Other skills were using mind mapping, identifying search terms and the use of thinking skills when defining a problem.

A few librarians expressed their unmet expectations:

*I expected that this course would teach other skills such as using Internet resources to familiarize with the topic and evaluating sources used to familiarize with the topic.*

*"Since several of us did not have research skills, I expected this course would introduce a brief outline of what is research to compare it with information search".*

Librarians gave suggestions on the main features that they considered most useful in making the course more successful:

*"We recommend more subject-specific examples, which would facilitate better understanding of lessons taught". (Librarians group 2)*

*"Defining a topic involves applying thinking skills because through thinking process, one would be able to identify, shape, describe and gain an understanding of values and attributes surrounding a topic". (Librarians group 3)*

Individual librarians made the following comments:



*“These skills should be taught in a wider community since they are necessary in knowledge creation”.*

*“IT skills are a prerequisite for information literacy skills due to increased use of IT related tools to facilitate locating and accessing information”.*

In general, the reflection session in defining a topic gave a picture of the skills that librarians acquired. The librarians realized that the skills were significant in solving their problems.

### **6.6.2. Reflections for locating and accessing information**

Reflective sessions for locating and accessing information were carried out at the end of the third day of the course.

Librarians described what they learned and various activities carried out in locating and accessing information. These included information generation, varieties of sources of information, information search and retrieval, information finding tools, capturing sources and emotional aspects associated with locating and accessing information.

They also indicated various ways the skills were applied in their work:

*“We were able to identify constraints for searching and accessing information and remedial measures”.* (Librarians group 2)

*“We were able to consult a librarian for information on “Collection development policies”.* Librarians group 4)

Individual librarians made the following comments:

*“By using concepts I had defined on day 2, I was able to formulate a search, I used Boolean operator AND to search for “Library automation initiatives” AND “Africa” in Google and got a very important article about the same topic for Sub Saharan Africa, which provided lists and important links to other relevant sources”.*

*“I knew the benefits of using various search techniques”.*

Librarians indicated skills that they could not apply, including reasons for not doing so:

*“Some search techniques could not be used effectively for every search tool. For example the library OPAC has a default truncation function, we could not use other truncation symbols”.* (Librarians group 1)

*“Failure to apply several skills has been a result of poorly defining our main topic”.* (Librarians group 3).

*“Information searching became difficult because we did not make good use of terms identified through our mind map”.* (Librarians group 4).

Problems encountered in locating and accessing information included the following:

*“Some databases were not user friendly and others only provided abstracts and full text was missing”.* (Librarians group 2)

*“Some search engines such as Google did not prove useful since the information was too general to use for our topic”.* (Librarians group 3)

*“Some keywords when used did not yield relevant results. We had to identify other terms in order to search for more relevant sources”.* (Librarians group 4)

*The Internet was slow; certain pages took long to open up”.* (Librarians group 2)

*“Time was so limited that broader handson activities became difficulty”.* (Librarians group 3)

One librarian commented as follows:

*“Due to limited time, I failed to acquire wider knowledge of sources and search tools and many keep changing”.*

On useful skills for future purposes, librarians made the following statements:

*“Capturing sources from search tools by copying and pasting on word processing software or a similar application is important since one may lose the details needed at a later time”.* (Librarians group 1)

*“Information retrieval techniques are a key to effective information seeking at all times”.* (Librarians group 3)

*“Knowledge of ranges of information sources and how this information is produced is useful even in future since most of these agents of information generation are within our societies”.* (Librarians group 4).

Librarians gave various recommendations in order to improve the course:

*"Users' should be made aware of ranges of information sources".* (Librarians group 1)

*"More time should be allocated for locating and accessing information sessions".* (Librarians group 2)

*"More time should be allocated for hands on activities".* (Librarians group 2)

*"The course should integrate some basic IT skills associated with information searching".* (Librarians group 4)

One librarian gave the following recommendations:

*"There is a need to emphasize on students working independently and not relying on lecturers/IL instructors in information searching".*

Generally, reflections in locating and accessing information revealed that there was a need for providing relevant examples to support topics taught/discussed.

### **6.6.3. Reflections for synthesis and evaluation of information and sources**

Reflections for synthesis and evaluation of information were carried out on the fifth day of the course.

Data obtained from reflection session indicated that librarians were able to summarize what they learned and various activities carried out, which included: scanning and skimming, synthesizing and evaluating information and sources They also indicated new knowledge acquired and how they applied it:

*"After synthesis and evaluation of sources and information, we were able in our group to make some useful changes in our topic because we found similar topics which had more relevant sources".* (Librarians group 3)

*"The skills we got enabled us to sort out information and judge if it was useful for our topic".* (Librarians group 4)

The following comments were made by individual librarians:

*"I was able to combine information from various sources to produce a single document".*

*"I was able to evaluate a journal article submitted to me for publication into our library journal".*

*" I was able to integrate the knowledge gained in the previous lessons into effective synthesis and evaluation of information".*

On problems encountered in this session, librarians pointed out the following:

*“Some sources were very promising but we failed to evaluate them due to absence of some details such as dates, publishers, authorship etc”.* (Librarians group 1)

*“Time was not enough for hands on activities especially in evaluating many documents. This forced us to evaluate few documents for presentation purposes”.* (Librarians group 2)

*“We found it difficult to gain access to several electronic PERI resources due to lack of provision of passwords and IP addresses”.* (Librarians group 3)

*“Failure to retrieve sufficient information sources resulted into evaluating very few ones”.* (Librarians group 4)

One librarian gave the following statement:

*“Several topics taught (such as using annotations) missed clear and detailed examples to support the application of skills taught”.*

Important skills in similar future assignments included: criteria for evaluating information and sources for academic writing, synthesizing information, evaluating electronic (Internet) information and sources and thinking skills associated with synthesis and evaluation of information.

Librarians made several suggestions in order to improve the course.

*“More hands-on activities should be carried out to consolidate skills acquired”.* (Librarians group 1)

*“Relevant examples are necessary to provide more meaningful approaches to skills taught”.* (Librarians group 2)

The following suggestions were made by individual librarians:

*“For future programmes, I think that various information sources recommended to students by the librarians and lecturers need evaluation since many of them are less relevant to the current University curriculum”.*

*“Time is an important factor in making the modules taught in this session more successful”.*

Generally, reflections for this session revealed librarians' acquired skills and their applications, and the importance of critical thinking skills for evaluating information.

#### 6.6.4. Reflections for communicating and using information

Reflections for communicating and using information were carried out on the sixth day of the course.

Librarians provided a summary of what they learned and activities carried out including presenting information, plagiarism, bibliographic citations, information use and reasoning skills. They prepared PowerPoint presentations to present the results of the search process according to topics chosen. They highlighted new skills acquired and how they were applied:

*"We were able to prepare a presentation by using skills gained in PowerPoint presentation techniques". (Librarians group 1)*

*"We could identify phrases that indicated examples of plagiarized text in the quiz given". (Librarians group 2)*

*"Skills gained in information use assisted us in getting what we wanted from information presented through reading, listening and asking questions". (Librarians group 3).*

Librarians highlighted a number of problems encountered in the session:

*"Time was not sufficient to grasp certain aspects taught in the course such as different presentation techniques, citation styles, plagiarism and using information". (Librarians group 2)*

*"Citation skills were not adequately addressed, several styles were mentioned but details of use were not demonstrated". (Librarians group 3).*

*"We lacked the important skills of applying essential features found in the Microsoft PowerPoint". (Librarians group 4)*

Librarians identified important skills useful for future similar assignments, including PowerPoint presentation, citation styles, considerations for presenting information and plagiarism. On suggestions for various ways to improve the course future, librarians made the following comments.

*"More time be allocated for teaching the skills and hands-on activities especially presenting information". (Librarians group 2).*

*"Bibliographic citation skills and issues associated with plagiarism should be given much emphasis since the University authorities*

*mentioned plagiarism to be one of major academic problem". (Librarians group 4).*

Individual librarians made the following comments:

*"Students should learn different ways by which they can make something out of information presented".*

*"Presenting information should be considered an important area for students who are doing research".*

In general, reflections in this section revealed that librarians realized the need to acquire and apply presentation skills, the importance of citation skills and aspects of plagiarism.

#### **6.6.5. Reflections for the entire course**

Reflections session for the entire course took place on the seventh day, at the end of the programme, on 13<sup>th</sup> April 2005.

Data from reflections for this session indicated that librarians described various activities carried out throughout the course and what they learned during the course. They also indicated how skills acquired during the course were applied:

*"We were able to use all the skills to prepare and do our PowerPoint presentations". (Librarians group 1)*

*"We were able to work as a group and in so doing, we shared ideas and presented our findings to others". (Librarians group 3)*

One librarian made the following comment:

*"I have applied some skills I acquired here to students who came to request for help while I was on duty".*

Librarians outlined several problems and difficulties encountered during the course:

*"Time was not sufficient to cover all aspects taught and hands-on activities". (Librarians Group 1)*

*"The course lacked relevant examples to support aspects taught or discussed". (Librarians group 2)*

*"Most of sources taught in the "locating and accessing information" module consisted of those that the library had in its stock whereas other*

*sources outside the library such as Internet, institutional and in remote locations were not covered". (Librarians group 3).*

*"Due to varying educational levels for most course participants; those with lower levels of education like me did not feel confident to participate actively into the groups".*

Librarians pointed to the significance of skills taught for future use as follows:

*"All skills are important because one has to go through all the process before concluding whether or not the source is relevant, before presenting it". (Librarians group 1)*

Individual librarians made the following comments:

*"These skills are relevant to me because I am a researcher, before planning what to search, the most important skills I have gained here are defining a topic, identifying search terms, planning search and knowing how information is generated and organized before approaching a system to search for it".*

*"These skills are all very useful in future but another important thing here is to look for information in a problem based approach, this is very important".*

*"All skills taught will be relevant in future for me or for students. I deal with students' queries here all the time, I can teach them to be more focused and know what they want before coming to me again".*

*"This course provided me with a training guide and course materials which I can use in the information literacy courses here at the University".*

Furthermore, librarians made various suggestions to improve the course for future programmes.

*"Information literacy courses should consider teaching the disabled (especially the visual impaired) how to become information literate since this programme paid little attention to this group of people". (Librarians Group 1)*

*"Information literacy course should be more subject-focused". (Librarians Group 2).*

*"More time should be allocated for topics covered and hands-on activities". (Librarians group 3)*

*“All IL course participants should possess IT skills; these should be a prerequisite for participation into IL courses”. (Librarians group 4)*

Two librarians made the following suggestions:

*“Students need to know wide ranges of information sources, not only the ones available at the University library because information literacy courses prepare students to use the same skills even after finishing their studies from the University”.*

*“The course should focus on local academic situations in a more problem-based approach”.*

#### **6.6.6. Summary for reflective sessions**

The purpose of reflective sessions was to encourage librarians to reflect on the various activities carried out in each session as well as to provide feedback on the overall course. It was also meant to provide critical comment on the course. The summary of reflective sessions is provided in table 6-13 below.



**Table 6-13: Summary of Librarians' reflections**

| <b>Main questions asked in reflections</b>            | <b>Responses given by the librarians</b>  |
|---|---|
| What did you learn/do in this course?                 | <ul style="list-style-type: none"> <li>• Defining an information problem</li> <li>• Determining information needed to solve a problem</li> <li>• Identify terms to be used for information searching;</li> <li>• Identify sources</li> <li>• Develop search strategy and carry out search</li> <li>• Synthesize and evaluate information</li> <li>• Communicate and use information in ethical manners</li> <li>• Preparing and making presentations</li> <li>• Emotional issues when seeking information at all stages</li> </ul>                                |
| What new skills have you gained?                      | <ul style="list-style-type: none"> <li>• How to focus a topic</li> <li>• How to identify central theme of a topic</li> <li>• Importance of background information about a topic</li> <li>• Mind mapping</li> <li>• Identification of ranges of sources</li> <li>• Various search techniques such as phrase, keyword and Boolean searches</li> <li>• Information synthesis, evaluation, skimming and scanning</li> <li>• Presenting information through black board, power point</li> <li>• Working in groups to share ideas</li> <li>• Thinking skills</li> </ul> |
| How did you apply the skills acquired?                | <p>Skills were applied to various activities during the course by:</p> <ul style="list-style-type: none"> <li>• Constructing mind maps</li> <li>• Planning the search</li> <li>• Performing searches through the use of numerous search techniques</li> <li>• Sharing ideas through lectures, discussions and presentations</li> </ul>  |
| What problems did you encounter?                      | <ul style="list-style-type: none"> <li>• Time was not enough for course and hands-on activities, presentations and coverage of modules</li> <li>• Awareness of sources</li> <li>• Lack of relevant examples</li> <li>• Sources taught many were for UDSM</li> <li>• Educational levels for librarians differed</li> </ul>   |
| What are the relevant skills for similar future work? | <ul style="list-style-type: none"> <li>• The librarians recommended that all skills could be applied in the future.</li> </ul>  |
| Give your general comments for improvements           | <ul style="list-style-type: none"> <li>• IL courses should consider the disabled</li> <li>• The programme should be more subject focused</li> <li>• IL courses should be preceded by basics of IT related to IL</li> <li>• Time is needed to do more hands-on activities</li> <li>• The course programme should be localised and made more problem based</li> <li>• Students should be introduced to wider ranges of sources</li> <li>• Facilities for teaching IL courses should be improved</li> </ul>  |

Reflective sessions helped the researcher in the following ways:

- Provided information on what the librarians learned, new skills acquired and ways by which skills acquired were applied to particular activities during the course.

- Indicated whether or not librarians' expectations were met and what they achieved out of the course.
- Identified problems or difficulties encountered during the course (in terms of teaching materials and activities such as hands-on activities)
- Identified important skills for future applications.
- Solicited suggestions from librarians on improvements to the course for future programmes

Also, apart from the above, reflection sessions provided a good way to keep librarians engaged and on track throughout the course.

### **6.7. General observations**

Observation methods were used to collect data from aspects of the course such as teaching and learning, hands-on activities, presentations and reflection sessions. Observations also consisted of looking through course materials, course programme, schedule, facilities and related aspects. All the above aspects of observations helped to provide additional information to indicate whether the course ran as was envisaged. Observations further helped to provide a picture of the learning process: whether the librarians had acquired the information literacy knowledge, and how the knowledge was applied to various tasks in the course. This provided an indication of whether these librarians would be able to teach information literacy to students.

Observations were made by the following categories of people:

- Research assistants: Recorded various aspects of day-to-day teaching/learning in the first implementation "pilot" programme. The information helped to determine various areas of the course which showed strengths and weaknesses.
- Visiting supervisor: Recorded the course process: structure, programme and teaching/learning methods. The data was used to make recommendations on rectifying several aspects of the course that showed weaknesses.
- Librarians and lecturers: Provided suggestions on various aspects of the course that indicated weaknesses, including structure, teaching materials and teaching methods.

Details of observation for each module are indicated below.

### 6.7.1. Observations for defining tasks

In this session, observations involved watching the learning process, the way librarians responded to questions/aspects raised by the course facilitator and the facilitator's course delivery process.

Librarians selected topics of interest for their groups, defined research problems, formulated problem (theses) statement and questions. Several examples of research questions formulated were as follows:

*"What collection development policies exist in African libraries; how have these policies prospered? What problems do they face?"*. (Group 3)

*"What is a preservation strategy? What are the causes of deterioration of library materials, what measures should be taken to prevent deterioration of library materials in Africa?"*. (Librarians group 1)

*"In what areas in libraries are automation activities carried out; what are different library automation projects carried out in Africa; what are the potential problems of automating library services in Africa?"* (Librarians group 4)

Observations showed that the course facilitator taught/discussed with librarians different aspects of defining a topic, information needs, sources to find background information on a topic - their behaviour and characteristics, creativity, reasoning and mind mapping. The course facilitator asked librarians various questions in order to determine their prior knowledge about certain aspects. Examples of answers made by librarians when asked about information needs related to their topics included the following:

*"The information is needed to answer questions about different methods of preserving library collections"*. (Librarians group 2)

*"We will need information on the current status of collection development policies in Africa and challenges facing them"*. (Librarians group 1)

*"Information needed for our topic will address issues on achievements and challenges for library automation in African libraries"*. (Librarians group 4).

Furthermore librarians worked in groups to construct mind maps to identify terms relevant to the topics chosen. The course facilitator and his assistants provided them with guidance.

Observations also served to reveal librarians' failure to demonstrate general knowledge about the topics they chose, type of information needed, what they knew about their topics and what was needed to answer issues that emerged in their topics. Due to lack of relevant examples, librarians failed to envisage the application of creative and reasoning skills to define their topics. In addition, too much time was spent by the facilitator "lecturing" instead of allowing participants to discuss several issues raised during the session and also failure to keep time according to the time table.

#### **6.7.2. Observations for locating and accessing information**

In this session, course facilitators taught and discussed with librarians various skills involved in locating and accessing information.

Librarians were able to provide descriptions of certain issues covered such as databases, records, fields, information sources and finding tools. They gave an outline of search strategies they could employ to find information relevant to their topics:

*"Knowing what information is required and how to get it".*

*"Approach a system such as library or Internet".*

*"Determine suitable information search technique".*

*"Search and retrieve results".*

Librarians worked in groups to search for sources of information relevant to topics chosen. They made use of a combination of different search techniques including phrase search, truncation and used Boolean commands AND, OR and NOT. One group of librarians, after their failure to locate relevant sources related to collection management, consulted a librarian whose area of research was in that discipline and got a list of relevant sources.

Major weaknesses observed included librarians' failure to use a range of search tools to look for information relevant to their topics apart from Google, Yahoo, OPAC and a few databases for online journals.

### **6.7.3. Observations for synthesis and evaluation of information**

In this session, the course facilitator taught and discussed the various skills involved in the synthesis and evaluation of information.

Librarians contributed to the teaching aspects by indicating several ways of combining and evaluating information and sources. Many librarians possessed prior knowledge of various criteria used to evaluate information since this was one of areas covered in the ongoing information literacy training and which they teach. Librarians worked in groups, guided by the course facilitator and his assistants to combine and evaluate information and sources searched. They made presentations on the different criteria used to evaluate information and sources they retrieved.

Major weaknesses observed in this session included librarians' failure to evaluate online information. Most of them based their evaluation on printed sources despite having enough electronic sources to evaluate. In addition, the session lacked a demonstration of how to use scanning and skimming methods, the facilitator outlined these methods without showing librarians how to scan and skim.

### **6.7.4. Observations for communicating and using information**

In this session, course facilitators taught and discussed with librarians various skills involved in communicating and using information.

Librarians defined plagiarism ("*Desa*" as it is commonly known at the University of Dar es Salaam) as follows:

*"Copying someone's work, as it is (Xeroxing) and presenting as course work or examination paper".*

*"Asking someone to do an assignment (or writing examination paper) on your behalf".*

*"Copying someone's work without permission (except for use in academic work)".*

They worked in groups to prepare presentations with PowerPoint under the guidance of the facilitator and his course assistants.

Major weaknesses in this session included the librarians' failure to indicate a high level of knowledge of computer-aided presentation techniques such as PowerPoint, Websites and discussion groups. Also due to lack of specific examples, librarians failed to indicate different ways of using information and providing citations for sources used in the work presented.

#### **6.7.5. Observations from librarians and lecturers**

During and after the first "pilot" implementation programme, the researcher met with several librarians and lecturers to discuss the best ways to implement the second iteration of the course. The course programme and materials were circulated to librarians and lecturers to gather their views.

Observations made by the above-mentioned two categories of people helped to reveal that the time for the start of the course had to be 8am instead of 9am in the morning to 5pm (instead of 3pm). Participants could work better on assignments that required the use of Internet after 3pm due to the decrease in Internet usage by the University community after that time.

On course materials, observations revealed that relevant examples were needed to support what was covered in each session. Due to this, several lecturers in the Faculty of Education volunteered to provide the following:

- A sample education-related topic and its relevant examples for demonstration purposes (since topics for use in groups were to be chosen by students themselves).
- Sample mind maps.
- List of online resources for educators.
- Evaluation criteria for educational materials.
- Examples of inductive and deductive thinking in relation to information science.
- Assessment methods for presentations.

Librarians observed that the programme should cover a wide range of sources of information relevant to students' current information needs. Both lecturers and

librarians observed that several questions in tests and quizzes were not clear and needed amendments. They further proposed that students decide their own topics rather than preparing a list of suitable ones from which to select. Lecturers in the Faculty of Education had further observed that the teaching style for information literacy courses at the university were teacher-led and recommended a student-centred approach, which would facilitate student-to-student shared learning and an active learning environment.

#### **6.7.6. Summary of observations**

Librarians' attempts to demonstrate what they acquired from the training through actively participating in the learning process were observed. This was done through responding to questions/issues raised, learning from one another and participation in groups' activities. In addition, the course facilitator kept librarians active through discussions and question and answer sessions throughout the course.

Major weaknesses observed included the facilitator spending a considerable amount of time "teaching" instead of allowing librarians to actively participate in the learning process. This was partly because of the "time pressure" in that several topics had to be taught to include them during the time allocated. To some extent, this made the librarians "passive" learners hence, failing to effectively apply a problem-based approach to defining information needs, locating and accessing sources, synthesizing, evaluating, communicating and using information. Some course materials, tests and quizzes needed adaptations of new/appropriate aspects to make them more relevant to topics covered. Also it was observed that to some extent, the course lacked relevant examples to support what was being taught or discussed.

#### **6.8. Implications of the first implementation "pilot" programme**

As stated in the introduction, the purpose of carrying out a first "pilot" implementation programme with librarians was to "fine-tune" the course content, teaching materials and programme test for a successful implementation of the same to Masters of Education students. This section provides a summary of implications the course has for the implemented information literacy course to Masters of Education students.

### **6.8.1. Implications of interview results on the first implementation “pilot” programme**

Interviews were carried out to make sure that assumptions made about students' knowledge of information literacy and the kind of problems experienced by students were correct. This was important since the majority of the literature that was reviewed originated in developed countries. These interviews showed that there was a recognized need for information literacy and that similar problems, such as a lack of familiarity with information sources and their use, were experienced in Tanzania. In addition, results from interviews enabled the generic material created in the UK to be customized to take account of the local context. This followed interviewees' recommendations with regard to general and specific information literacy skills relevant to students at the University.

### **6.8.2. Implications of diagnostic pre-tests and post-tests**

Despite the success indicated by the increased information literacy levels before and after the course, diagnostic pre/post tests helped to reveal that several questions were not clear. Examples of these included several questions under the sub-heading of Internet searching, skills of library and database searching and presentation skills. As a result, these questions were replaced with more meaningful and well-understood ones. Comments raised by librarians following the nature of diagnostic test questions indicated that the course did not teach certain aspects, which appeared in the questions. These included types of dictionaries (abridged and unabridged), domain names and using various fields in databases such as the library OPAC. This prompted the researcher to ensure that all aspects (such as the ones mentioned above) should be taught during the course.

Furthermore, in order to give students “the feel for the information seeking process”, the researcher changed the arrangement of main headings of questions to look as follows:

- defining a topic or research problem;
- skills of using information sources;
- information searching skills;
- skills of evaluating information and sources;



- referencing skills;
- information using skills.

The above arrangement further helped in the process of analyzing the data by providing a logical order of themes.

### **6.8.3. Implications of quizzes**

Much as quizzes assisted to assess librarians' understanding and allow them to reflect on what was covered, they also helped to reveal several weaknesses, including questions that were unclear. For example in Quiz C questions one and two appeared unclear (see the details in the appendix G Quiz C). During the second implementation programme with Masters of Education students, these two questions were replaced with clear and relevant ones. Other aspects noted included the absence of feedback immediately after each quiz. Immediate feedback was seen to be necessary in order to enhance librarians' understanding of what was taught or discussed through discussions between them and the facilitator. In order for the students to provide immediate feedback, the researcher ensured that during the second implementation programme quizzes were followed by discussions during which students provided feedback from questions asked. This helped to evaluate their understanding and enhanced their skills on aspects covered in each session.

### **6.8.4. Implications of presentations**

Presentations helped further to identify anomalies which to some extent affected what the librarians presented in each session. These included librarians' failure to provide relevant details and examples to support what they were presenting. For example, several of them indicated that sources accessed were "factual" or "relevant" without explaining how. Furthermore, several groups failed to use tools to identify terms for mind maps and provided very short lists of sources retrieved.

Due to the above weaknesses, the researcher prepared guidelines on particular aspects for presentation to make students present in more focused and meaningful ways. These included guidelines on presenting topics and information needs, mind maps, search strategies, search process and results, synthesis and evaluation of information.

The time table was adjusted in such a way that students would get more time preparing their presentations in the afternoon.

#### **6.8.5. Implications of librarians' reflections**

Reflections helped to reveal lack of relevant examples to support aspects covered in the course. In addition, time for teaching, hands-on activities and presentations were limited. On specific aspects of the course, most sources taught were the ones based at the University of Dar es Salaam library and the course did not put emphasis on widely available sources including institutions and people. Furthermore, reflections from librarians indicated that access to Internet was a problem in the morning when most people on campus were using it.

In light of the above, the researcher liaised with several lecturers in the Faculty of Education who provided various examples for aspects taught, related to education. The time for the course was changed from 9.00am – 3.00pm to 8.00am – 5.00pm to provide more room for teaching, hands-on and presentations. It was also planned to encourage students to utilize afternoon hours for Internet access. Emphasis was put on allowing students to familiarize themselves with wide ranges of information sources other than the ones available in the library.

#### **6.8.6. Summary of implications for the first implementation “pilot” programme**

As mentioned above, the first “pilot” implementation programme provided a platform on which the course with Masters of Education students was organized and run. The programme indicated that the course duration of seven days was ideal for the implemented course although the number of working hours had to be increased from 42 to 56 to provide more time for discussions, hands-on and presentations.

With regard to course materials, results from the first “pilot” implementation programme revealed that several changes had to be made to improve it. This included the addition of new aspects such as critical thinking skills by Paul et al (1990), information searching experience (Hepworth, 2004), structure of databases and more relevant examples to support teaching. Teaching/learning styles should further support

independent learning by making students actively participate in the programme in a problem-based way.

## **7.0. CHAPTER SEVEN: FINDINGS FROM THE INFORMATION LITERACY SECOND IMPLEMENTATION PROGRAMME**

### **7.1. Introduction**

This section provides the findings from the second implementation of the information literacy programme where Masters of Education students were the trainees. This took place on 4<sup>th</sup> to 15<sup>th</sup> July 2005. The programme was carried out to determine whether the programme enabled students to acquire information literacy knowledge. Furthermore, the implementation programme by the librarians would indicate whether the programme could be used to teach information literacy trainers since trainers from the previous programme, i.e. two librarians were chosen to teach/facilitate the programme. This section provides results of diagnostic tests, quizzes, presentations and reflective sessions, e-mail messages and observations.

### **7.2. Diagnostic pre-test/post-test results for students**

#### **7.2.1. Introduction**

This section gives an outline of results of the diagnostic pre-tests and post-tests that were administered to students before and after the course (see the diagnostic test questions in Appendix F). The tests were administered to 12 students who participated in the course. The tests served the purpose of reinforcing the meaning of IL, showing the students that this was a 'serious' enterprise and enabled the researchers to see whether, following a post training diagnostic test, change had taken place. The nature of questions was multiple-choice and students were to select [Yes/No/I don't know] or [True/False/No comment]. The test covered the following aspects:

- Personal particulars;
- Using Microsoft Windows environment;
- Using Internet Explorer;
- Defining a problem or research topic;
- Information sources;
- Internet resources;
- Internet search;

- Library and database searching;
- Evaluating information and sources;
- Referencing;
- Synthesizing information and;
- Information presentation.

The results of diagnostic post-tests showed a dramatic increase in students' knowledge. However, as there were only twelve students, percentage increases seemed less important. Nevertheless, in the pre-test the maximum score was 46 marks (out of 80) questions whereas the minimum score was 21. In the post-test, the maximum score rose to 76 marks (out of 80 questions) and the minimum score rose to 55 marks. This implied that most students had scored more than half of the total marks for all questions.

In addition, contrary to the pilot study in which individual librarians did not provide registration numbers, the second implementation stage managed to record individual students' marks for each test. This became possible since students printed their registration numbers on answer sheets, which helped to identify each student individually. General results from individual students indicate that in the diagnostic pre-test, more than half of the students did not provide correct answers to half of the 80 questions asked. However, the post-test results indicate that most students provided correct answers to most questions. Exceptional cases were three students (Foed/Med/05/01, Foed/Med/05/03 and Foed/Med/05/07, see table 7-2 below) who performed poorly in the pre-test but managed to score more than 50 marks in the post-test. Most areas of the questions in which the above students did not perform well include those that were concerned with the use of ICT (Internet resources, information searching) and synthesizing information. Possible reasons for performing poorly in the areas mentioned above have been summarized under 7.2.14 below. Furthermore, two students (Foed/Med/05/12 and Foed/Med/05/04) had attended previous information literacy programmes offered by the library which covered several aspects such as information sources, searching, evaluating information and bibliographic citations. However, despite attending the courses, the total number of correct questions in the pre-test indicates that they did not perform

better than several who did not attend this course. The table below summarizes each individual student's total number of correct answers to questions asked in both tests.

**Table 7-1: Summary of students' performances in pre-tests/post-tests**

| No.            | Student ID Number | Topic |    |    |    |         |    |          |    |       |    |       |    |      |    |        |    |          |    | Total marks for pre-test results/80 | Total marks for post-test results/80 |
|----------------|-------------------|-------|----|----|----|---------|----|----------|----|-------|----|-------|----|------|----|--------|----|----------|----|-------------------------------------|--------------------------------------|
|                |                   | DE    |    | IS |    | IntRes. |    | I Search |    | L&DBs |    | Eval. |    | Ref. |    | Synth. |    | Present. |    |                                     |                                      |
|                |                   | Pr    | Po | Pr | Po | Pr      | Po | Pr       | Po | Pr    | Po | Pr    | Po | Pr   | Po | Pr     | Po | Pr       | Po |                                     |                                      |
| 1              | Foed/Med/05/11    | 3     | 5  | 6  | 10 | 5       | 7  | 7        | 9  | 4     | 8  | 7     | 13 | 6    | 10 | 3      | 6  | 5        | 8  | 46                                  | 76                                   |
| 2              | Foed/Med/05/10    | 2     | 5  | 5  | 10 | 4       | 6  | 5        | 9  | 3     | 8  | 5     | 12 | 5    | 9  | 2      | 6  | 4        | 8  | 35                                  | 73                                   |
| 3              | Foed/Med/05/06    | 3     | 5  | 6  | 10 | 5       | 7  | 7        | 8  | 5     | 8  | 6     | 11 | 5    | 10 | 3      | 6  | 4        | 7  | 44                                  | 72                                   |
| 4              | Foed/Med/05/05    | 3     | 5  | 5  | 10 | 4       | 6  | 5        | 8  | 3     | 8  | 5     | 12 | 5    | 10 | 2      | 5  | 5        | 8  | 37                                  | 72                                   |
| 5              | Foed/Med/05/08    | 2     | 5  | 5  | 10 | 4       | 6  | 4        | 10 | 3     | 8  | 4     | 12 | 4    | 9  | 1      | 4  | 3        | 8  | 30                                  | 72                                   |
| 6              | Foed/Med/05/12    | 3     | 5  | 5  | 10 | 4       | 6  | 6        | 8  | 4     | 8  | 6     | 12 | 5    | 8  | 2      | 6  | 5        | 8  | 40                                  | 71                                   |
| 7              | Foed/Med/05/09    | 2     | 5  | 5  | 10 | 4       | 6  | 5        | 7  | 3     | 8  | 6     | 12 | 5    | 9  | 2      | 6  | 4        | 8  | 36                                  | 71                                   |
| 8              | Foed/Med/05/04    | 2     | 5  | 4  | 10 | 3       | 5  | 3        | 9  | 2     | 8  | 4     | 12 | 4    | 9  | 1      | 5  | 4        | 7  | 27                                  | 70                                   |
| 9              | Foed/Med/05/02    | 1     | 5  | 4  | 9  | 3       | 5  | 3        | 10 | 2     | 7  | 4     | 11 | 3    | 8  | 1      | 5  | 3        | 8  | 24                                  | 68                                   |
| 10             | Foed/Med/05/03    | 1     | 5  | 3  | 9  | 3       | 5  | 3        | 8  | 2     | 7  | 3     | 11 | 3    | 8  | 1      | 5  | 2        | 8  | 21                                  | 66                                   |
| 11             | Foed/Med/05/01    | 1     | 3  | 3  | 8  | 3       | 4  | 2        | 9  | 2     | 6  | 4     | 10 | 3    | 7  | 1      | 4  | 2        | 7  | 21                                  | 58                                   |
| 12             | Foed/Med/05/07    | 1     | 4  | 3  | 8  | 2       | 4  | 3        | 6  | 2     | 7  | 3     | 9  | 4    | 7  | 1      | 4  | 2        | 6  | 21                                  | 55                                   |
| <b>Average</b> |                   |       |    |    |    |         |    |          |    |       |    |       |    |      |    |        |    |          |    | <b>31.8</b>                         | <b>68.7</b>                          |

Key:

- DE** = Defining Information Problem or Research Topic
- IS** = Information Sources
- IntRes.** = Internet Resources
- I Search** = Information Searching
- L&DBs** = Library and Database Searching
- Eval.** = Evaluating Information Sources
- Ref.** = Referencing
- Synth.** = Synthesizing Information
- Present.** = Presenting Information
- Pr** = Diagnostic Pre-test
- Po** = Diagnostic post-test

The details of test results for each category of skills area and numbers of responses are provided below.

### 7.2.2. Personal particulars

All twelve students who participated in the course had registered for Masters of Education degrees in the Faculty of Education. Out of twelve, six were of science and arts backgrounds, also six male and female respectively. They were willing to provide their registration numbers in order to facilitate easy recording of marks.

### 7.2.3. Access to computers and Internet

All respondents indicated having access to computers and the Internet. They used computers for the following purposes:

**Table 7-2: Areas of computer applications for students**

| <b>Areas of computer application</b>                         | <b>Responses</b> |
|--|------------------|
| Access to Internet   | 12               |
| Using e-mail   | 12               |
| Word processing  | 12               |
| Access to library resources such as OPAC and other databases | 11               |
| Online chatting  | 6                |
| Online learning  | 5                |
| Entertainment (music, sports, games etc)                     | 4                |
| Online buying and selling                                    | 2                |

The table above indicate that students used computers heavily on access to Internet and e-mail, access to library online public access catalogue (OPAC) and other resources such as databases and word processing (Microsoft Word and Excel). They indicated low use of computers for online chatting, online learning (through the Blackboard /TEIL system), online buying and selling and entertainment such as music, sports, games and so on.



Students indicated having access to computers from other places as follows:

**Table 7-3: Students' access to computers and Internet**

| <b>Access Points</b>                   | <b>Computers</b> | <b>Internet</b> |
|--|------------------|-----------------|
| University library computer laboratory | 12               | 11              |
| Internet café                          | 10               | 10              |
| FoEd computer laboratory               | 9                | 7               |
| University computer laboratories       | 8                | 4               |
| Office                                 | 3                | 2               |

The above table indicates that students accessed computers and the Internet from other places within the University such as the library computer laboratory (12 for computers and 11 for Internet), Faculty of Education (FoEd) computer laboratory (nine for computers and seven for Internet) and University computer laboratories (eight for computers and four Internet). Others accessed computers and the Internet from commercially-run Internet cafes (10 for computers and Internet) and a few had access from their employers' offices (three for computers and two for Internet).

#### **7.2.4. Using Microsoft Windows and Internet Explorer**

Questions in this section asked students to indicate their skills in using Windows and Internet Explorer. Table 7-4 below provides a summary of results:

**Table 7-4: Students' basic skills in Microsoft Windows**

| Type of skills                             | Students skills in MS Windows (Pre-test) | Students skills in MS Windows (Post-test) |
|--|--|---|
| Attach files to an E-mail message          | 5  | 12  |
| Copy files from one floppy disk to another | 5  | 8   |
| Copy files to floppy                       | 8  | 7   |
| Copy files to folders                      | 4  | 7   |
| Format floppy disk                         | 4  | 8   |
| Manage folders                             | 6  | 12  |
| Maximize and minimize window               | 12                                       | 12  |
| Open window                                | 12                                       | 12  |
| Print a word processing document           | 12                                       | 12  |
| Use E-mail                                 | 8  | 12  |
| Use MS word processing software            | 12                                       | 12  |
| Use PowerPoint presentation                | 3  | 12  |

In summary, pre-test results for using Windows indicate that all students were familiar with opening windows, maximizing and minimizing windows, using Microsoft Word and printing word processing documents. Furthermore, eight students were familiar with using e-mails, eight students copying files to a floppy diskette, six students managing folders, five students attaching files to an e-mail message, five students copying files from one floppy diskette to another, four students formatting a floppy disk and three students using PowerPoint presentations. The post-test results indicate that students' skills for the above had increased dramatically, except for a few skills such as formatting floppy disks (eight out of 12), copying files from one floppy disk to another (eight out of 12), copying files to folders and into floppy disks respectively (seven out of 12).

Results for skills in using Internet Explorer indicate that, in the pre-test 10 students had used Internet Explorer's navigational bars (back, go, home, forward and scroll bars) and print document searched. Also, nine (out of 12) students used address bar, eight students favorites, eight students saving searched documents and five students using refresh. Few students indicated having knowledge of using stop retrieval (5 out of 12 students), document locator (4 out of 12 students), bookmark (3 out of 12 students) and reload (2 out of 12 students). Results for the post-test showed high levels of improvements in the skills, except for Netscape Navigator document location,

bookmarks (4) and reload (2). Navigator was less commonly used on computers at the University of Dar es Salaam. Students who indicated skills in using Navigator were those who used computers either at home or in their offices that had the browser software installed. Table 7-5 indicates students' basic skills with Internet Explorer.

**Table 7-5: Students' basic skills in Internet Explorer**

| Type of skills  | Students with the skills of IE/Navigator at Pre-test | Students with the skills of IE/Navigator at Post-test |
|---|--|---|
| Address bar (IE)  | 9  | 12  |
| Bookmark (Navigator)                                    | 3  | 4   |
| Document location (Navigator)                           | 4  | 4   |
| Favorites (IE)  | 8  | 12  |
| Find  | 5  | 12  |
| History   | 0  | 12  |
| Navigation tools (back, go, home, forward, scroll bars) | 10   | 12  |
| Print document  | 10   | 12  |
| Refresh (IE)  | 5  | 12  |
| Reload (Navigator)                                      | 2  | 2   |
| Save document   | 8  | 12  |
| Stop retrieval  | 5  | 12  |

#### 7.2.5. Defining information problem or research topic

Students were asked to indicate their skills in defining an information problem or research topic. Questions asked in this section centred on issues such as a need to review the title of the topic to determine information needed, consulting sources to familiarise with the topic and developing terms to be used for information searching. Answers drawn from the pre-test indicate that the maximum score was three marks (out of five) questions and the minimum was one (four students). This figure increased during the post-test, in which more than half of the students score five marks and minimum was three (one student). This indicates that students' skills of defining a topic or information problem increased after they attended the information literacy course. The scores for individual students and questions for this section are summarized in table 7-6. below.

**Table 7-6: Defining information problem or research topic**

(Choices were: TRUE/FALSE/NO COMMENT)

| No.                   | Student ID     | Questions (see the key below) |           |          |           |          |           |          |           |          |           |          |            | Total/student |  |
|-----------------------|----------------|-------------------------------|-----------|----------|-----------|----------|-----------|----------|-----------|----------|-----------|----------|------------|---------------|--|
|                       |                | 1                             |           | 2        |           | 3        |           | 4        |           | 5        |           |          |            |               |  |
|                       |                | Pr                            | Po        | Pr       | Po        | Pr       | Po        | Pr       | Po        | Pr       | Po        | Pr       | Po         |               |  |
| 1                     | Foed/Med/05/11 | ■                             | □         |          | □         | ■        | □         |          | □         | ■        | □         | 3        | 5          |               |  |
| 2                     | Foed/Med/05/06 | ■                             | □         | ■        | □         | ■        | □         |          | □         |          | □         | 3        | 5          |               |  |
| 3                     | Foed/Med/05/05 | ■                             | □         |          | □         | ■        | □         | ■        | □         |          | □         | 3        | 5          |               |  |
| 4                     | Foed/Med/05/12 |                               | □         | ■        | □         |          | □         | ■        | □         | ■        | □         | 3        | 5          |               |  |
| 5                     | Foed/Med/05/08 | ■                             | □         |          | □         | ■        | □         |          | □         |          | □         | 2        | 5          |               |  |
| 6                     | Foed/Med/05/10 |                               | □         |          | □         |          | □         | ■        | □         | ■        | □         | 2        | 5          |               |  |
| 7                     | Foed/Med/05/09 |                               | □         | ■        | □         |          | □         | ■        | □         |          | □         | 2        | 5          |               |  |
| 8                     | Foed/Med/05/04 | ■                             | □         |          | □         | ■        | □         |          | □         |          | □         | 2        | 5          |               |  |
| 9                     | Foed/Med/05/02 |                               | □         | ■        | □         |          | □         |          | □         |          | □         | 1        | 5          |               |  |
| 10                    | Foed/Med/05/03 | ■                             | □         |          | □         |          | □         |          | □         |          | □         | 1        | 5          |               |  |
| 11                    | Foed/Med/05/01 |                               |           | ■        | □         |          |           |          | □         |          | □         | 1        | 3          |               |  |
| 12                    | Foed/Med/05/07 |                               | □         |          | □         |          | □         |          | □         |          |           | 1        | 4          |               |  |
| <b>Total/Question</b> |                | <b>6</b>                      | <b>11</b> | <b>5</b> | <b>12</b> | <b>5</b> | <b>11</b> | <b>4</b> | <b>12</b> | <b>3</b> | <b>11</b> |          |            |               |  |
|                       |                | <b>Average</b>                |           |          |           |          |           |          |           |          |           | <b>2</b> | <b>4.6</b> |               |  |

Key:

- Pr = Pre-test
- Po = Post-test
- = Right answers for pre-test
- = Right answers for post-test

**Questions**

| No. | Question  | Answer |
|-----|---|--------|
| 1   | Before going to the library or elsewhere to acquire answers to a problem, review critically the title of the topic or assignment to determine the information needed  | TRUE   |
| 2   | It is always a good idea to consult reference sources to familiarize yourself with the topic (such as encyclopedias and dictionaries)   | TRUE   |
| 3   | You can also consult other professionals who deal with a particular subject for advice and guidance before actually consulting sources that can provide relevant/detailed information to answer the question or problem | TRUE   |
| 4   | Reference sources can also be used to identify terms/words to be used for searching electronic sources to make information easier   | TRUE   |
| 5   | In order to save time, it is always recommended that you consult your tutor who will tell you exactly what to do, rather than developing your topic yourself.   | FALSE  |

**7.2.6. Information sources**

Students were asked to indicate their knowledge of various information sources. Questions asked in this section centred on issues such as descriptions of reference sources, information generation and types of information sources. Results from the pre-test indicate that the maximum score was six marks (out of 10) questions and the minimum was three. Results from post-tests indicate that eight students scored the maximum of 10 marks and the minimum score was eight (by two students). This indicates that students' skills of information sources had increased. The scores for individual students and questions for this section are summarized in table 7-7 below.



Areas in which few students provided correct answers during pre-tests included the following: types of reference books (three out of 12 students), storage facilities for government information (two out of 12 students) and types of primary sources of information (two out of 12 students). After the post-test, 11 students provided correct answers to the three questions above. This is an indication that students' skills levels increased after attending the course.

#### **7.2.7. Internet resources**

Students were asked to indicate their skills in Internet resources. Questions asked in this section centred on the description and characteristics of various aspects of the Internet, World Wide Web and search engines. Results from pre-tests indicate that the maximum score was five (out of eight) questions and the minimum score was two. Post-test results indicate that the score rose to seven marks (out of eight) questions and the minimum score was four. Although no one acquired the maximum score of eight, this is an indication that students' skills of Internet resources had increased after attending the course. The scores for individual students and questions for this section are summarized in table 7-8 below.

(Choices were: TRUE/FALSE/NO COMMENT)

| No.                   | Student ID     | Questions (see the key below) |    |    |    |    |    |    |    |    |    |    |    |    |    |    |     | Total/student |    |
|-----------------------|----------------|-------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|---------------|----|
|                       |                | 1                             |    | 2  |    | 3  |    | 4  |    | 5  |    | 6  |    | 7  |    | 8  |     | Pr            | Po |
|                       |                | Pr                            | Po | Pr | Po | Pr | Po | Pr | Po | Pr | Po | Pr | Po | Pr | Po | Pr | Po  |               |    |
| 1                     | Foed/Med/05/11 | ■                             | □  |    | □  | ■  | □  | ■  | □  | ■  | □  | ■  | □  |    | □  |    |     | 5             | 7  |
| 2                     | Foed/Med/05/06 | ■                             | □  | ■  |    | ■  | □  |    | □  |    | □  |    |    | ■  | □  | ■  | □   | 5             | 6  |
| 3                     | Foed/Med/05/08 | ■                             | □  | ■  | □  | ■  | □  |    | □  | ■  |    |    | □  |    |    |    | □   | 4             | 6  |
| 4                     | Foed/Med/05/12 | ■                             | □  | ■  | □  |    |    | ■  | □  |    | □  |    | □  | ■  |    |    | □   | 4             | 6  |
| 5                     | Foed/Med/05/09 | ■                             | □  | ■  | □  |    | □  | ■  |    |    | □  | ■  | □  |    | □  |    |     | 4             | 6  |
| 6                     | Foed/Med/05/10 | ■                             | □  | ■  |    |    | □  | ■  | □  |    |    | ■  | □  |    | □  |    | □   | 4             | 6  |
| 7                     | Foed/Med/05/05 |                               | □  | ■  | □  |    | □  | ■  |    |    | □  |    |    | ■  | □  |    | □   | 3             | 6  |
| 8                     | Foed/Med/05/04 | ■                             | □  |    | □  |    | □  |    | □  |    |    |    |    | ■  | □  | ■  |     | 3             | 5  |
| 9                     | Foed/Med/05/02 | ■                             | □  |    | □  | ■  | □  |    |    |    |    |    |    | ■  | □  |    | □   | 3             | 5  |
| 10                    | Foed/Med/05/03 |                               | □  |    | □  | ■  | □  |    | □  |    | □  |    |    | ■  |    | ■  |     | 3             | 5  |
| 11                    | Foed/Med/05/01 | ■                             | □  |    |    | ■  |    |    |    |    |    |    | □  |    | □  |    | □   | 2             | 4  |
| 12                    | Foed/Med/05/07 |                               |    | ■  | □  | ■  | □  |    | □  |    |    |    | □  |    |    |    |     | 2             | 4  |
| <b>Total/question</b> |                | 9                             | 11 | 7  | 9  | 7  | 10 | 5  | 8  | 2  | 6  | 3  | 7  | 6  | 8  | 3  | 7   |               |    |
| <b>Average</b>        |                |                               |    |    |    |    |    |    |    |    |    |    |    |    |    |    | 3.5 | 5.5           |    |

**Key:**

Pr = Pre-test                      Po = Post-test  
 ■ = Right answers for pre-test    □ = Right answers for post-test

**Questions:**

| No. | Question  | Answer | No. | Question  | Answer |
|-----|---|--------|-----|---|--------|
| 1   | The Internet is a collection of interconnected computer networks around the world that make it possible to share information almost instantly | TRUE   | 5   | Search engines are updated by people who are employed to feed information on computer databascs, on regular basis | FALSE  |
| 2   | The Internet is able to send information back and forth to different types of computers   | TRUE   | 6   | Search engines such as Alta Vista, Alltheweb and Google use keyword searching options                             | TRUE   |
| 3   | Internet can also be used as a tool for teaching and learning   | TRUE   | 7   | Yahoo Directory arranges materials by subject   | TRUE   |
| 4   | Search engine is a tool that enables users to locate information on the World Wide Web  | TRUE   | 8   | The World Wide Web, e-mail, Newsgroups, and Telnet are all subsystems of the Internet                             | TRUE   |



However, in questions on search engines, several students provided wrong answers in the post-tests. Reasons for poor performance in these questions have been summarized under 7.2.14 below.

#### **7.2.8. Internet searching**

Students were asked to indicate their skills of Internet searching. Questions in this section focused on various search techniques used in search engines such as simple/advanced, phrase and Boolean searches. Results from pre-test indicate that the maximum score was seven marks (out of 12) questions and the minimum score was two. Post-test results indicate that the maximum score rose to nine (out of 12) question and the minimum score was six. This indicates that students' Internet skills improved slightly after attending the course. The scores for individual students and questions for this section are summarized in table 7-9 below.

(Choices were: TRUE/FALSE/NO COMMENT)

| No.                   | Student ID     | Questions (see the key below) |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | Total/<br>student |     |   |
|-----------------------|----------------|-------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-------------------|-----|---|
|                       |                | 1                             |    | 2  |    | 3  |    | 4  |    | 5  |    | 6  |    | 7  |    | 8  |    | 9  |    | 10 |    | 11 |    | 12 |    |                   |     |   |
|                       |                | Pr                            | Po | Pr | Po | Pr | Po | Pr | Po | Pr | Po | Pr | Po | Pr | Po | Pr | Po | Pr | Po | Pr | Po | Pr | Po | Pr | Po | Pr                | Po  |   |
| 1                     | Foed/Med/05/11 | ■                             | □  | ■  | □  | ■  | □  | ■  | □  | ■  | □  | ■  | □  |    | □  | ■  | □  |    | □  |    |    |    |    |    |    | 7                 | 9   |   |
| 2                     | Foed/Med/05/06 | ■                             | □  |    | □  |    |    | ■  | □  |    |    | ■  | □  | ■  | □  | ■  | □  | ■  | □  |    |    |    |    | ■  | □  | 7                 | 8   |   |
| 3                     | Foed/Med/05/12 | ■                             | □  | ■  | □  |    |    |    | □  |    |    |    | □  |    |    | ■  | □  | ■  | □  | ■  | □  | ■  |    | ■  | □  | 7                 | 8   |   |
| 4                     | Foed/Med/05/10 |                               | □  |    | □  | ■  | □  | ■  | □  |    |    |    | □  |    | ■  | □  |    | □  |    |    | ■  | □  |    |    | ■  | □                 | 5   | 9 |
| 5                     | Foed/Med/05/05 | ■                             | □  |    |    |    | □  |    |    |    |    | □  | ■  | □  | ■  | □  |    |    | ■  | □  | ■  | □  |    | □  |    | 5                 | 8   |   |
| 6                     | Foed/Med/05/09 |                               |    |    | □  | ■  | □  | ■  | □  |    |    | □  |    |    | ■  | □  |    |    |    |    | ■  |    |    | □  | ■  | □                 | 5   | 7 |
| 7                     | Foed/Med/05/08 |                               | □  |    | □  |    | □  | ■  |    | ■  |    | ■  | □  |    | □  |    | □  |    | □  |    | □  |    | □  | ■  | □  | 4                 | 10  |   |
| 8                     | Foed/Med/05/02 |                               | □  |    | □  |    | □  |    |    |    |    | □  |    | □  |    | □  | ■  | □  | ■  |    | ■  | □  |    | □  |    | 3                 | 10  |   |
| 9                     | Foed/Med/05/04 | ■                             | □  |    |    | ■  | □  |    | □  |    |    | □  |    |    |    |    |    |    | □  |    | □  | ■  | □  |    | □  | 3                 | 9   |   |
| 10                    | Foed/Med/05/03 |                               |    |    |    | ■  | □  |    | □  |    |    | □  |    |    | □  | ■  | □  |    | □  |    |    |    |    | ■  | □  | 3                 | 8   |   |
| 11                    | Foed/Med/05/07 | ■                             | □  |    |    |    |    |    | □  |    |    |    | ■  | □  |    |    |    | □  |    | □  |    | □  |    | ■  |    | 3                 | 6   |   |
| 12                    | Foed/Med/05/01 |                               |    | ■  | □  |    |    |    |    | ■  | □  |    | □  |    | □  |    |    | □  |    | □  |    | □  |    | □  |    | 2                 | 9   |   |
| <b>Total/question</b> |                | 6                             | 9  | 3  | 8  | 5  | 8  | 5  | 8  | 3  | 8  | 5  | 10 | 4  | 9  | 5  | 9  | 4  | 9  | 5  | 8  | 2  | 6  | 7  | 9  |                   |     |   |
|                       |                | <b>Average</b>                |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | 4.5               | 8.4 |   |

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**Key:**

Pr = Pre-test                      Po = Post-test  
 ■ = Right answers for pre-test    □ = Right answers for post-test

**Questions**

| No. | Question   | Answer | No. | Question   | Answer |
|-----|--|--------|-----|--|--------|
| 1   | You can search for images on the Internet  | TRUE   | 7   | The term OR is used to narrow search   | FALSE  |
| 2   | Stop words are short and frequently occurring words such as <i>the, on, in, of</i> that are often ignored by the search engine when used in a search | TRUE   | 8   | The term AND is used to combine two terms together so that the search engine retrieves site containing both terms (although these are not necessarily placed sequentially) | TRUE   |
| 3   | Search engines find websites by trying to match the words contained in the search box  | TRUE   | 9   | The term NOT is used to broaden search   | FALSE  |
| 4   | Search engines list sites found by ranking their relevance to the search   | TRUE   | 10  | Incorrect spelling will not limit your search  | FALSE  |
| 5   | To complete a phrase search you need to enclose the keywords in quotation marks  | TRUE   | 11  | The search engine will automatically correct your spelling when you make a mistake   | FALSE  |
| 6   | Phrase searching means that all the keywords are searched as a single entity   | TRUE   | 12  | Some of the search engines allow you to limit your search by date  | TRUE   |

Question 11 (search engines correcting spelling automatically) indicated low performance in the post-tests in which several students did not provide the right answers. The reasons why several students did not provide the right answers to this question are summarized under 7.2.14 below.

### **7.2.9. Library and database searching**

Students were asked to indicate their skills in library and database searching. Results from the pre-test indicate that the maximum score was five marks (out of eight) questions and the minimum score was two (five students). Post-test results indicate that the maximum score rose to eight marks by the majority of the students and the minimum score was six (by one student). The scores for individual students and questions for this section are summarized in table 7-10 below.



### **7.2.10. Evaluating information and sources**

Students were asked to indicate their skills in evaluating information and sources of information. Questions in this section focused on different criteria used to evaluate information such as authority, relevance, point of view and format of the information and sources. Results of the pre-test indicate that the maximum score was seven marks (out of 13) questions and the minimum score was three (two students). Post-test results indicate that the maximum score rose to 13 marks (one student), half of the students scored 12 marks and the minimum score was nine. This indicates that students' skills in evaluating information and sources had improved after the course. The scores for individual students and questions for this section are summarized in table 7-11 below.

(Choices were: TRUE/FALSE/NO COMMENT)

| No.                   | Student ID     | Questions (see the key below) |           |          |          |          |           |          |           |          |           |          |          |          |          |          |           |          |           |          |           |          |           |          |           |          |           |                   |             |   |    |    |
|-----------------------|----------------|-------------------------------|-----------|----------|----------|----------|-----------|----------|-----------|----------|-----------|----------|----------|----------|----------|----------|-----------|----------|-----------|----------|-----------|----------|-----------|----------|-----------|----------|-----------|-------------------|-------------|---|----|----|
|                       |                | 1                             |           | 2        |          | 3        |           | 4        |           | 5        |           | 6        |          | 7        |          | 8        |           | 9        |           | 10       |           | 11       |           | 12       |           | 13       |           | Total/<br>student |             |   |    |    |
|                       |                | Pr                            | Po        | Pr       | Po       | Pr       | Po        | Pr       | Po        | Pr       | Po        | Pr       | Po       | Pr       | Po       | Pr       | Po        | Pr       | Po        | Pr       | Po        | Pr       | Po        | Pr       | Po        | Pr       | Po        | Pr                | Po          |   |    |    |
| 1                     | Foed/Med/05/11 | ■                             | □         |          | □        | ■        | □         |          | □         |          | □         | ■        | □        | ■        | □        | ■        | □         |          | □         |          | □         | ■        | □         | ■        | □         |          | □         | ■                 | □           | 7 | 13 |    |
| 2                     | Foed/Med/05/12 | ■                             | □         |          | □        | ■        | □         | ■        | □         |          | □         |          | □        |          | □        |          | □         |          | □         |          | □         | ■        |           | ■        | □         | ■        | □         |                   | □           | 6 | 12 |    |
| 3                     | Foed/Med/05/09 |                               | □         |          | □        |          | □         | ■        | □         |          |           |          | □        | ■        | □        | ■        | □         |          | □         | ■        | □         |          | □         | ■        | □         | ■        | □         |                   | □           | 6 | 12 |    |
| 4                     | Foed/Med/05/10 | ■                             | □         |          | □        |          | □         | ■        | □         |          | □         |          | □        |          | ■        | □        |           | □        | ■         | □        |           | □        |           | □        |           | □        | ■         | □                 |             | □ | 5  | 12 |
| 5                     | Foed/Med/05/06 |                               | □         | ■        | □        | ■        | □         |          |           | ■        | □         |          |          | ■        | □        |          | □         |          | □         |          | □         | ■        | □         |          | □         | ■        | □         |                   | □           | 6 | 11 |    |
| 6                     | Foed/Med/05/05 |                               | □         | ■        | □        |          | □         | ■        | □         | ■        | □         |          | □        |          |          | ■        | □         |          | □         |          | □         |          | □         |          | □         | ■        | □         |                   | □           | 5 | 12 |    |
| 7                     | Foed/Med/05/08 |                               | □         |          | □        |          | □         |          | □         | ■        | □         |          |          | □        |          | □        |           | ■        | □         |          | □         |          | □         | ■        | □         | ■        | □         |                   | □           | 4 | 12 |    |
| 8                     | Foed/Med/05/04 | ■                             | □         |          | □        | ■        | □         |          | □         |          | □         |          | □        | ■        | □        |          |           |          | □         |          | □         |          | □         | ■        | □         |          | □         | ■                 | □           | 4 | 12 |    |
| 9                     | Foed/Med/05/02 | ■                             | □         |          | □        |          |           |          | □         | ■        | □         |          | □        |          |          | ■        | □         |          | □         |          | □         |          | □         | ■        | □         |          | □         | ■                 | □           | 4 | 11 |    |
| 10                    | Foed/Med/05/01 | ■                             | □         |          |          | ■        | □         |          | □         |          | □         |          | □        | ■        | □        |          |           |          | □         |          | □         |          | □         | ■        | □         |          |           | □                 | ■           | □ | 4  | 10 |
| 11                    | Foed/Med/05/03 |                               | □         |          |          |          | □         |          | □         | ■        | □         |          |          | □        |          | □        |           | □        |           | □        |           | □        | ■         | □        |           | □        | ■         | □                 |             | □ | 3  | 11 |
| 12                    | Foed/Med/05/07 |                               |           |          |          | ■        | □         |          |           | ■        | □         |          | □        |          | □        |          | □         |          | □         | ■        | □         |          | □         |          | □         |          | □         |                   | □           | 3 | 9  |    |
| <b>Total/question</b> |                | <b>6</b>                      | <b>11</b> | <b>2</b> | <b>9</b> | <b>6</b> | <b>11</b> | <b>4</b> | <b>10</b> | <b>6</b> | <b>11</b> | <b>1</b> | <b>9</b> | <b>5</b> | <b>9</b> | <b>5</b> | <b>10</b> | <b>1</b> | <b>12</b> | <b>3</b> | <b>12</b> | <b>5</b> | <b>11</b> | <b>6</b> | <b>11</b> | <b>7</b> | <b>11</b> | <b>4.6</b>        | <b>11.4</b> |   |    |    |

**Key:**

Pr = Pre-test                      Po = Post-test  
 ■ = Right answers for pre-test    □ = Right answers for post-test

**Questions:**

| No. | Question  | Answer | No. | Question  | Answer |
|-----|---|--------|-----|---|--------|
| 1   | All the information published on the Internet is sound  | FALSE  | 8   | Skim reading is when you read the whole text very quickly   | TRUE   |
| 2   | You can always tell who published a site by looking at the domain name  | TRUE   | 9   | Scan reading involves only reading first and last paragraph of text   | FALSE  |
| 3   | URL (Uniform Resource Locator) is a string of characters used to exclusively identify a page of information on the World-Wide Web | TRUE   | 10  | To see whether a book is relevant you need to read it from cover to   | FALSE  |
| 4   | To evaluate a website, you only need to check the date it was produced  | FALSE  | 11  | One way of evaluating information sources such as books is to find out whether the author's name has been cited in other sources or bibliographies  | TRUE   |
| 5   | Articles published in academic journals are not as reliable as books  | FALSE  | 12  | Other factors to consider when evaluating information in a source is whether the information covered is a piece of evidence, opinion, or propaganda | TRUE   |
| 6   | Websites are always more informative academically than periodicals  | FALSE  | 13  | It is always advised to explore enough sources to obtain a variety of viewpoints  | TRUE   |
| 7   | All information found on a university website is academically sound   | FALSE  |     |   |        |

### **7.2.11. Referencing**

Students were asked to indicate their skills in providing citations for the work accessed (referencing). Questions asked in this section aimed to find out whether students realized the significance of using bibliographic citations and legal use of information. Pre-test results indicate that the maximum score was six marks (out of 10) questions and the minimum was three (two students). Post-test results indicate that the maximum score rose to 10 (three students) and the minimum score rose to seven (two students). This indicates that students' referencing skills had improved after the course. The scores for individual students and questions for this section are summarized in table 7-12 below.

Table 7-12: Referencing

(Choices were: TRUE/FALSE/NO COMMENT)

| No.            | Student ID     | Questions (see the key below) |           |          |           |          |           |          |           |          |           |          |           |          |           |          |           |          |          |          |          |               |            |
|----------------|----------------|-------------------------------|-----------|----------|-----------|----------|-----------|----------|-----------|----------|-----------|----------|-----------|----------|-----------|----------|-----------|----------|----------|----------|----------|---------------|------------|
|                |                | 1                             |           | 2        |           | 3        |           | 4        |           | 5        |           | 6        |           | 7        |           | 8        |           | 9        |          | 10       |          | Total/student |            |
|                |                | Pr                            | Po        | Pr       | Po        | Pr       | Po        | Pr       | Po        | Pr       | Po        | Pr       | Po        | Pr       | Po        | Pr       | Po        | Pr       | Po       | Pr       | Po       | Pr            | Po         |
| 1              | Foed/Med/05/11 | ■                             | □         | ■        | □         |          | □         | ■        | □         | ■        | □         |          | □         | ■        | □         |          | □         |          | □        | ■        | □        | 6             | 10         |
| 2              | Foed/Med/05/06 | ■                             | □         | ■        | □         |          | □         | ■        | □         | ■        | □         |          | □         | ■        | □         |          | □         |          | □        |          | □        | 5             | 10         |
| 3              | Foed/Med/05/05 | ■                             | □         |          | □         |          | □         |          | □         |          | □         | ■        | □         |          | □         | ■        | □         | ■        | □        | ■        | □        | 5             | 10         |
| 4              | Foed/Med/05/10 |                               | □         | ■        | □         | ■        | □         |          | □         |          | □         | ■        |           |          | □         | ■        | □         | ■        | □        |          | □        | 5             | 9          |
| 5              | Foed/Med/05/09 | ■                             | □         |          | □         | ■        | □         |          |           | ■        | □         | ■        | □         |          | □         |          | □         |          | □        | ■        | □        | 5             | 9          |
| 6              | Foed/Med/05/12 |                               | □         |          |           |          | □         | ■        | □         | ■        |           | ■        | □         |          | □         | ■        | □         | ■        | □        |          | □        | 5             | 8          |
| 7              | Foed/Med/05/08 |                               | □         |          | □         | ■        | □         |          | □         | ■        | □         |          |           |          | □         |          | □         | ■        | □        | ■        | □        | 4             | 9          |
| 8              | Foed/Med/05/04 | ■                             | □         |          | □         | ■        |           |          | □         |          | □         |          | □         | ■        | □         | ■        | □         |          | □        |          | □        | 4             | 9          |
| 9              | Foed/Med/05/02 |                               | □         |          | □         | ■        | □         | ■        | □         | ■        | □         |          | □         |          |           |          | □         |          | □        | ■        |          | 4             | 8          |
| 10             | Foed/Med/05/07 | ■                             | □         |          | □         |          | □         | ■        | □         |          | □         | ■        | □         | ■        | □         |          |           |          |          |          |          | 4             | 7          |
| 11             | Foed/Med/05/03 |                               | □         |          | □         |          | □         |          | □         |          | □         | ■        | □         | ■        | □         | ■        | □         |          |          |          |          | 3             | 8          |
| 12             | Foed/Med/05/01 |                               | □         |          |           |          | □         | ■        | □         |          | □         |          | □         | ■        | □         | ■        | □         |          |          |          |          | 3             | 7          |
| <b>Total</b>   |                | <b>6</b>                      | <b>12</b> | <b>3</b> | <b>10</b> | <b>5</b> | <b>11</b> | <b>6</b> | <b>11</b> | <b>6</b> | <b>11</b> | <b>6</b> | <b>10</b> | <b>6</b> | <b>11</b> | <b>6</b> | <b>11</b> | <b>4</b> | <b>9</b> | <b>5</b> | <b>8</b> |               |            |
| <b>Average</b> |                |                               |           |          |           |          |           |          |           |          |           |          |           |          |           |          |           |          |          |          |          | <b>4.4</b>    | <b>8.7</b> |

**Key:**

Pr = Pre-test

Po = Post-test

■ = Right answers for pre-test

□ = Right answers for post-test

**Questions:**

| No. | Question  | Answer | No. | Question   | Answer |
|-----|---|--------|-----|--|--------|
| 1   | A bibliography is required for every academic essay   | TRUE   | 6   | Direct quotations should be enclosed in "inverted commas"  | TRUE   |
| 2   | A bibliography is a list of citations that appear at the end of a paper, article, chapter or book   | TRUE   | 7   | In addition to providing a site address when quoting Internet sources, you also need to indicate the date the site was accessed            | TRUE   |
| 3   | Plagiarism means using a textbook or journal article as a source of information in writing a research paper without referencing the author(s) | TRUE   | 8   | You can copy and paste information found on the Internet without having to reference it because the Internet is not protected by copyright | FALSE  |
| 4   | If you have a bibliography you can not be accused of plagiarism   | FALSE  | 9   | Authors must be listed alphabetically in a bibliography  | TRUE   |
| 5   | You only need to reference a source of information if you copy from it word for word  | FALSE  | 10  | A site address alone is accepted as reference in a bibliography  | FALSE  |



On the other hand, in the post-test, eight out of 12 students had provided correct answers to question number 10, which was asking about using site address alone as a reference. Reasons for this slight drop in scores are summarized under 7.2.14 below.

#### **7.2.12. Synthesizing (combining) information**

Students were asked to indicate their skills in combining (synthesizing) information. Questions asked were meant to test students' skills in using various ways of synthesizing information from different sources. Pre-test results indicated that the maximum score was three marks (out of six) questions and the minimum score was one (six students). Post-test results indicated that the maximum score rose to six marks (five students) and the minimum score was four (four students). This indicates that students' skills in synthesizing information had improved after the course. The scores for individual students and questions for this section are summarized in table 7-13 below.



### **7.2.13. Presenting information**

Students were asked to indicate skills in presenting information. Questions in this section focused on different aspects of communicating information to the intended audience, including factors to consider, different formats of presenting information and the importance of acknowledging sources consulted. Pre-test results indicated that the maximum score was five marks (out of eight) questions and the minimum score was two. Post-test results indicated that six students scored the maximum marks (eight) and one student got a minimum of six marks. This indicates that students' skills in presenting information had improved after the course. The scores for individual students and questions for this section are summarized in table 7-14 below.



#### **7.2.14. Summary of diagnostic pre-tests/post-tests**

The purpose of the diagnostic pre-tests and post-tests was to determine students' skills before and after the course based on the following aspects: using computers and the Internet, defining the problem or research topic, information sources, Internet resources, Internet searching, library and database searching, evaluating information and sources, referencing, synthesizing and presenting information.

Results from the tests indicate generally that students' skills improved after attending the course. This could be judged by comparing pre-test results for skills areas mentioned above, and post-test results after they attended the course. In the pre-test it was found that more than half the students provided incorrect answers to more than half the questions. This indicates that few students had prior knowledge of aspects asked. In the post-test a large majority of the students provided correct answers to all questions. This is an indication that students' skills improved after they attended the course.

Also, the post-test results indicate that students did less well in areas of Internet resources and searching. A possible reason for a few students' failure to provide correct answers to this question was the lack of ICT skills that were necessary for effective searching on the Internet and databases. These skills included Internet navigation skills, information search and retrieval, knowledge of various features of the Internet such as domain names, site address, URL and Internet resources like search engines and information gateways.

Three students (Foed/Med/05/01, Foed/Med/05/03 and Foed/Med/05/07, see table 7-2 above) did not perform well in diagnostic pre-tests in which they got 21 marks (out of 80) questions. In the post-test, they scored above 50 marks (out of 80) questions. It was noted during the programme that these students had little knowledge of ICT and failed to effectively use computers and electronic resources such as PERI databases and the Internet for searching, retrieving and organizing information (in folders and copying on Microsoft Word).

Despite these and other weaknesses in terms of students' performances after the course, post-test results indicate that generally students' skills had improved.

### **7.3. Results from quizzes**

#### **7.3.1. Introduction**

Three quizzes (see appendix H) were administered to 12 students during the programme. The quizzes aimed to encourage students' reflection and also assess understanding and provide immediate feedback to the students through discussions. Quizzes were carried out after each key stage, including: defining a problem or research topic; locating and accessing information and communicating and using information. Quizzes were completed in 20 minutes following each key stage in the training programme and were followed by immediate feedback where facilitators discussed with students their answers, enabling the learning process. This section intends to provide results for quizzes that consisted of both multiple choice questions and filling in blanks.

#### **7.3.2. Results for quiz A (Appendix H): defining an information problem.**

Questions in this section aimed to test students on aspects associated with defining a topic or information problem. Answers indicated their general understanding of issues taught for defining an information problem.

Responses to quizzes showed that students understood various aspects covered in defining information problems. For example, students seemed to understand the need to determine information needs, as indicated by an individual student:

*“Determining information needs may help in knowing, for example, which type of information is needed; if I need just a definition, I know that a subject dictionary is an obvious source to consult”.*

Quizzes also helped students to reflect on the process of developing a research topic by indicating the importance of having focus and the difficulties of doing so:

*“It is important to have a focus on a topic, however, this process is difficult because it requires a researcher to have an understanding of the subject itself plus other disciplines surrounding it”.*

In addition, students were able to use encyclopaedias, dictionaries and thesauri. They indicated that these sources could be used to provide meanings of terms, provision of

general knowledge of a topic and identify terms (narrow/broader, synonyms/antonyms and related terms).

### **7.3.3. Results for Quiz B (Appendix H): locating and accessing information**

Questions from this quiz aimed to test students on aspects related to locating and accessing information. Questions asked in this section centred on sources of information, tools used to locate information and information searching and retrieval techniques. Most of the questions were multiple-choice and a few required filling in blanks. Answers from students for filling in questions indicated their general understanding of issues taught in locating and accessing information. Furthermore, quizzes helped students to reflect on what the information seeking process involves, which was an important part of the learning process. For example they cited a number of questions they would ask when starting an investigative research topic:

*“What is the topic about?”.*

*“Does this topic or subject area exist and if so, which broader and or related subject area surrounds it?”.*

*“What has already been discussed about this topic?”.*

*“What do I know about this topic and what I do not know?”.*

*“Where and how to find background information about the topic?”.*

*“How do I plan to search for information?”.*

*“Which sources exist that provide answers to topical questions addressed?”.*

*“Will the answers obtained be relevant to my topic?”.*

*“To what extent will the information obtained solve information problems related to my topic?”.*

These questions demonstrated students' attempts to reflect on the information seeking process to find information relevant to their topics. In addition, students indicated various ways by which information is generated, citing specific examples of professional colleagues in workshops and seminars, University research reports, theses and dissertations.

In multiple-choice questions, most students indicated their understanding of various search techniques such as phrase searching, Boolean AND, OR and NOT. Other aspects indicated included reference sources and types of information one would expect to find in various sources such as journals, statistical tables and online discussion groups.

Quizzes also revealed areas where students did less well. During discussions between students and facilitators several factors for failing to provide correct answers were identified (see under 7.3.5 below).

#### **7.3.4. Results for Quiz C (Appendix H): communicating and using information**

Questions from this quiz aimed to test students on aspects related to communicating and using information. Questions in this section focused on aspects of engaging with information (reading, listening, and viewing, watching and so on), reasoning skills in using information, presenting information, citations and plagiarism.

Results from questions in this section indicated that students had an understanding of various ways of engaging with using information (through listening to a lecture or news broadcasted on a radio, watching TV, reading a research paper or election results on a government website). The results also indicated that students understood the importance of applying inductive/deductive reasoning in using information, various presentation techniques, provision of references for cited works and aspects of plagiarism. In addition, quizzes helped students to reflect on different types of plagiarism, for example:

*“The three paragraphs which demonstrate an example of plagiarism are important since they demonstrate various ways by which students can copy and paste part of text from a book or online source and pretend as if it was their own work”.*

The above statement indicates that students were able to reflect on various methods of plagiarism based on what they learned in the course.

#### **7.3.5. Summary for results of quizzes**

Quizzes were aimed to test students' understanding of skills taught and provided immediate feedback from students on what was covered (through discussions). Furthermore quizzes encouraged reflection on the previous learning. Responses to quizzes showed that students understood various aspects covered in the programme. For example, students understood the need to define a topic or research problem; the importance of having focus; the need to acquire knowledge about a topic and sources (such as reference sources and individuals). Students indicated their understanding of



sources of information, printed and electronic, primary and secondary, search techniques and information searching tools. Furthermore, they indicated their understanding of the different aspects of communicating and using information, such as through reading, listening, viewing and others. Also students indicated that they understood the importance of applying reasoning skills when using information and various ways of presenting information including citation styles and the meaning of plagiarism.

Quizzes also revealed areas where students did less well. This was primarily due to a lack of understanding. For example in quiz B, a question on “the information search process being iterative”, one student pointed out that he did not understand the meaning of the term “iterative” hence selected a wrong choice. However, the lack of understanding for term “iterative” could be attributed to English being second or third language for most students, hence becoming difficult to have a strong base of English vocabulary. Also, on “describing the Internet search engine Google”, one student pointed out that some records in Google contain similar information to the online catalogue record (author, title, place and year of publication) which showed a general understanding of structured information, but did not fully appreciate the highly structured nature of the catalogue record.

However, despite the weaknesses observed under questions, the quizzes proved to be a good way of testing students’ understanding of topics taught under defining a topic, locating and accessing information and communicating/using information.

## **7.4. Findings from group presentations**

### **7.4.1. Introduction**

In order to further facilitate information literacy learning, group presentations were adapted to help demonstrate what students learned during the key stages: defining research problems; identifying terms/words to be used for information searching; information seeking strategies; search and retrieval; analysis, evaluation and the use of information. In addition, group presentations served to highlight areas of the course that students did less well, hence emphasizing a need for improving the course teaching/learning methods. Presentations also facilitated peer-to-peer training as well

as stimulating discussion. Encouraging verbal communication, it was felt, also helped students to practice and use the language of information literacy and internalize the 'culture' of information literacy.

It should be noted that students were given the opportunity to form groups that were based on a common topic that helped all members of the group achieve their research objectives. Each group consisted of three students, based on the following topical areas:

- Formative evaluation of implementation of the learner-centred approach in diploma education in Tanzania (Group 1).
- Girls' attitude and performance in mathematics in Tanzania's secondary schools (Group 2).
- The roles of heads of departments in secondary schools in improving quality education in Tanzania (Group 3).
- The role of management styles for promoting quality of primary education in Tanzania (Group 4).

Groups were allocated 30 minutes for preparing presentations and used 20 minutes for presenting and responding to questions/comments raised by other group members and course facilitators. The following section provides results of students' presentations. The criteria used to determine strengths and weaknesses of presentations were based on logical sequence of presenting ideas; accuracy of the information presented; indications of information analysis; synthesis of information from various sources and indications of demonstration of skills gained.

#### **7.4.2. Results for presentations on defining a problem and determining information needs**

Results for day one reveal that presentations assisted students' engagement in the learning process by presenting what they learned on defining research problems and determining information needs. Apart from making presentations, students discussed different aspects emanating from presentations. They asked each other questions and provided suggestions on various aspects presented, as a way of sharing knowledge and enhancing what they had learned.

*“In our group, we are going to present our evaluation of the currently proposed curriculum for diploma education, which is considered to be student-centred. We know that the old curriculum emphasized on lecturing and discussions but what we do not know is the conception of student-centred approach in Tanzanian context”.* (Group 1)

*“Our topic focuses on girls’ attitude and performance towards mathematics in secondary schools. We know that the attitude of girls towards mathematics is very negative and performance has always been poor. What we do not know is factors contributing to negative attitude towards mathematics and extent this has on influencing poor performance”.* (Group 2)

*“Our topic focuses on roles of heads of departments in secondary schools in improving quality education in Tanzania. It falls generally under educational management. What we already know include roles of these heads as stipulated by the Ministry of Education; and we also know that the quality of education management is low. What we do not know are various issues such as how they view those roles, how they practice them and how the heads are facilitated; how other members of staff emphasize the roles”.* (Group 3)

*“The focus of our topic is on examining the impact of management styles in promoting primary education in Tanzania. Through literature we know a number of management styles, what we do not know is how each management style affects a particular setting of primary education”.* (Group 4)

All groups elaborated the type of information needed to research their topics such as definitions of key terms, detailed knowledge about key aspects, statistical data on certain aspects such as performance of girls as compared to boys in secondary schools, number of girls in schools, school performance in various regions and other statistical details. They identified various sources to find background information about their topics such as the World Book Encyclopaedias, Encyclopedia of Educational Psychology, individuals such as members of the Forum for African Women Educationalists (FAWE) and institutions, such as the Ministry of Education, National Examination Council of Tanzania, Tanzania Education Authority and Tanzania Institute of Education.

Results from presentations reveal further that several groups had not fully defined their topics. In addition, several of them did not properly identify core areas of their topics. For example, group number four identified their main topical area to be “*quality management of education*”, whereas, according to the views of facilitators

and other group members, the main topical area was supposed to be on “*teaching and learning*”. The same was the case for group number one who identified their central theme for their research to be “*curriculum evaluation*” rather than “*curriculum and teaching*”. Furthermore, several groups used fewer sources than expected to provide background information on their topics including little use of reports by the Ministry of Education and Culture.

However, despite several shortcomings, presentations helped students realize the need to focus their topics and obtain background information about their topics before embarking on information searching. Presentations on day one also helped to give them confidence in preparing presentations for Masters of Education proposals which were to take place in two weeks time at the Faculty of Education.

#### **7.4.3. Results for presentations on mind mapping**

Data from presentations reveal that students used mind maps to identify words/terms to use for searching for information on various information systems. Tools such as UNESCO IBE educational thesaurus (UNESCO- IBE, 2002) and Merriam Webster both printed and online were used to aid this activity. Apart from using mind maps for identifying key words/terms, they used the same to identify main topics and indicate their relationship with terms stemming out of them (see an example of a mind map figure 5-2 under 5.5.4. above). The following are examples of terms/words identified by each group:

**Group 1** – topic heading: *Formative evaluation of implementation of the learner-centred approach in diploma education in Tanzania*

Main subject area: *Curriculum and teaching*

Main term: *Evaluation (educational)*

Narrower/related terms: *appraisal, decision, estimation, interpretation, and rating*

Main term: *teaching methods*

Narrower terms or related terms: *learner-centred approach, student-centred learning,*

**Group 2** – topic heading: *Girls’ attitude and performance in mathematics in Tanzania’s secondary schools*

Main subject area: *Educational psychology*

Main term: *Performance (educational)*

Narrower/related terms: *attainment, accomplishment, achievement, success, realization, fulfilment, feat*

Main term: *attitude (students)*

Narrower/related terms: *approach, mindset, opinion, feelings, perception, judgement, thoughts*

**Group 3** – topic heading: *The roles of heads of departments in secondary schools in improving quality education in Tanzania*

Main subject area: *Educational planning and administration*

Main term: *Quality (educational)*

Narrower/related terms: *excellence, relevance, value, worth, superiority*

Main term: *Roles (educational)*

Narrower/related terms: *responsibility, job, task, position, function*

**Group 4** – topic heading: *The role of management styles for promoting quality of primary education in Tanzania*

Main subject area: *Teaching and learning*

Main term: *(Educational) management styles*

Narrower/related terms: *administration, leadership, controlling techniques, supervising, organising, coordinating, guiding, monitoring (assessment, measurement, inspection)*

Main term: *(educational) performance*

Narrower/related terms: *student performance, student attainment, students' efficiency, teachers' performance, teachers' effectiveness, teachers' attainment, school culture*

Data also reveal that students actively engaged in the learning process by asking each other questions and clarifying several issues that seemed unclear.

They asked each other questions such as:

*“Please show us the relationship between the main subject “teaching and learning” and “management styles”. (Student addressing a question to group 4)*

*“Imagine you are searching on Google, how could you use a term like Quality, expecting to get documents talking about education?”*. (Student addressing a question to group 3)

*“Which tools did you use to identify terms presented? Did you use your own experience?”*. (Student addressing a question to group 4)

Major weaknesses noted were in the failure to fully use all the terms/words identified in the maps. Several presented narrower/related terms verbally since time to write down everything was insufficient.

However, despite the above weaknesses, most groups utilized the knowledge acquired in mind mapping in preparation for using them for information searching.

#### **7.4.4. Results for presentations on strategies of information searching**

Presentations for day three focused on the following key aspects:

- Describing major activities to be carried out to locate and access information based on: sources relevant to topic such as printed, Web and individuals/institutions; locating tools relevant to topic and possible search techniques.
- Describing possible problems when searching, locating and accessing information.
- Describing ways of overcoming the obstacles for each category of constraints.
- Explaining briefly possible reasons for choosing a particular approach to overcome the obstacles.

Data from presentations indicate that students presented various strategies for information searching by using the above guidelines. They highlighted major activities they carried out to locate and access information, as the following example of statements indicates:

*“Identify sources of information relevant to our topic; identify and familiarize with search tools such as OPAC, search engines and information gateways; construct search strategies; use varieties of search techniques to perform searches, retrieve and review the searches; we will refine or modify our searches to get the best results”*. (Group 1)

They outlined possible problems when performing searches, which included the following:

*“Sources may not be available, ending up with insignificant search results”.* (Group 1)

*“We might find too many sources and get confused on which ones to take”.* (Group 2)

*“One problem may be the failure to access the sources especially if special permissions are required”.* (Group 2)

*“Some locating tools may become user un-friendly: familiarizing with them may be difficult”.* (Group 2)

*“Due to probable Internet low connection speed, it may be difficult to use some search tools such as Google and Yahoo”.* (Group 3)

*“Developing search strategies may become too much time consuming”.*  
(Group 4)

*“Some search techniques might fail to produce better results”.* (Group 3)

*“Internet connection speed may delay searching for online sources”.*  
(Group 4)

*“Search terms/words that we have developed may not give anticipated results”.* (Group 1)

Students outlined different ways they would overcome the problems:

*“We will overcome the constraints by using local resources such as printed pamphlets and reports as alternatives to those online”.* (Group 3)

*“Instead of being held down by difficulties with lack of relevant search terms, search techniques and knowledge of availability of sources, we will be frank to librarians who will provide us with guidance”.* (group 1)

*“We will try one resource after another. If we fail, we may try to consult our lecturers although we are quite confident that librarians will assist us”.* (Group 2)

*“If we still get stuck after trying all possibilities, we will start all over again until we get what we want”.* (Group 4)

Weaknesses noted in presentations included failure of some groups to indicate specific sources relevant to their topics. Students used printed and online sources but did not elaborate their formats (such as reports, theses and dissertations, government

publications such as budgetary speeches, online sources such as electronic journals, theses and dissertations, government publications and so on). Furthermore, most groups seemed less aware of certain features found on search tools such as help or FAQ, which they could consult to solve several problems. Presentations on day three also highlighted a situation where a group of students had not kept a record of previous activities, such as recording potentially useful search terms. As a result these students were asked to repeat this activity.

Despite the obstacles highlighted above, students shared knowledge and experiences such as suggesting to other groups about possible sources relevant to their topics. For example one student advised those in Group 1 to consult institutions such as Tanzania Institute of Education and various lecturers in the Department of Curriculum and Teaching, University of Dar es Salaam, to get more help on their topic.

#### **7.4.5. Results for presentations on information search**

Results from presentations on information search indicate that students applied numerous search strategies to retrieve sources relevant to their topics.

Students came up with several comments as follows:

*“We used OPAC to search for “teacher education” AND “Evaluation” and got one source, a book titled “Report on evaluation of teacher education” Then when we tried to type “formative evaluation” on Google, we did not get relevant results. However, when we used Boolean AND with “student centred learning we got 212, several titles were relevant to our topic”. (Group 1)*

*“We used OPAC and got three theses and one seminar paper, all sources were relevant to our topic. We tried subject search option “education” to search on Emerald and got one article from online journal. Then we used Google to search for “girls attitude” AND “performance in mathematics” and got several articles that seemed relevant to our topic” .(Group 2)*

*“We used the library’s OPAC to search in Advanced Search option. We typed “school culture” AND “educational performance”. We obtained two theses titled: “Managerial aspects influencing performance of catholic seminaries in national examinations”; “Instructional resources as a factor in education performance, case study in Tanzania”. But when we typed “educational performance” AND “management issue in Yahoos, we got irrelevant results, we used the above terms and got some results” (Group 3)*



An individual student gave the following comments:

*"I searched on Emerald by using subject option education; I got several journal articles which focused on roles of academic heads of departments and departmental heads' perception of their influence on promoting quality of education in primary schools".*

Students indicated that several searches did not give significant results. They gave comments on possible reasons as follows:

*"We tried to search for school leadership, school management and roles of academic heads by using both, simple and advanced search in the OPAC but got nothing. We went to a librarian for help; he told us that the database does not have documents under such subject area". (Group 4)*

*"When we used Yahoo to search for educational performance AND management issues we got irrelevant results, we think that the two aspects were too general because when we refined them, we got relevant results". (Group 3)*

*"We tried subject search option "education" to search on Emerald and got one article from online journal, the reason could be a wrong choice of search technique because later on we tried phrase search "performance in mathematics" AND "girls" and got several results". (Group 2)*

*"We tried to search for these terms: Girls attitude & performance in Math in Tanzania Online gateway but got nothing. We thought that the gateway did not index its information based on those terms". (Group 2)*

Weaknesses noted included failure by several groups to make use of ranges of search tools provided. They attributed this to poor Internet speed. However, it was noted that several groups paid particular attention to search tools they had used before, such as the OPAC, Tanzania Online and Google, ignoring some which were more subject specific (such as ERIC), interfaces such as Emerald, Ebsco-host for online journals, which seemed new to them. Some groups did not attempt to make use of ranges of terms identified on day three to obtain more results. They stopped searching after a few attempts in which they got what seemed to satisfy their topical questions. More so, several students failed to use ranges of search techniques such as truncation, field searches and others.

Despite all the obstacles and shortfalls, students showed the initiative to make use of several sources relevant to their topics. Some individual students made use of the available Inter-Library Loan system by applying for various journal articles and other relevant documents. They also spent extra time in their laboratories to practice what they learned, also to make use of less congested Internet connection later in the day.

#### **7.4.6. Results for presentations on synthesis and evaluation of information and sources**

Presentations for day five focused on the following evaluation criteria:

- Identifying authors and their credentials.
- Indicating date the source was published.
- Explaining relevance of the source to the topic.
- Describing formats of the sources.
- Indicating whether the source provides lists/links to other sources.
- Identifying and explaining point of view of the information.
- Explaining validity of information to the question.

Data from presentations reveal that students presented different criteria that they used to evaluate information and sources accessed. On evaluating the relevance of sources accessed, several comments were made, such as:

*“The sources we have evaluated indicate relevance because they are current, and also they have got links and references to other sources”.*  
(Group 2)

*“One of the books we have accessed is titled “Critical analysis of teacher education” which at a quick glance one may think it is very relevant. But other factors such as content and date of publication makes it not”.*  
(Group 1)

*“The journal article we have accessed has no any credentials about the author but we consider it to be relevant to our topic because the content covers exactly what we wanted to have in our topic, the source is very current research and has many links to other sources”.* (Group 3)

When challenged by another group whether the absence of authors’ credentials raises doubts about it being genuine, the above group came up with the following reply:

*“It is quite obvious that a cook or cleaner working at the University can not write such an intellectual work. After all, not all authors in the West prefer indicating their affiliations such as Dr, Prof or Eng. Like many African writers”.*

Weaknesses noted in the presentations included failure by several groups to provide exhaustive lists of sources evaluated. Due to limited time and details provided, most groups indicated less than five sources evaluated. They only selected sources that would best demonstrate skills acquired in the session. Several groups failed to provide enough details to several questions asked by indicating only “YES, it is relevant to our topic” without further justifications.

In general, presentations assisted to demonstrate students’ abilities to evaluate information and sources. Furthermore, presentations helped students to realize the need to evaluate information and sources.

#### **7.4.7. Results for final presentations**

Presentations on the final day demonstrated a combination of skills acquired in the entire course. These included all skills learned in the previous lessons, together with skills of communicating and using information (presenting information and citation styles). All students used Microsoft PowerPoint to make their presentations. In this session, each group made two presentations which focused on providing answers to their topical questions. In addition to the above, students were supposed to present their evaluation of the information seeking process, but since the answers related to information seeking process were similar to reflections for day seven (see section 7.5 below), results for this section focus only on evaluating students’ previous knowledge and what they gained from information searched.

Data from presentations indicate that students presented answers to questions addressed in their topics.

Below are examples of answers provided by several groups:

*“Answers to our topic: girls have a negative attitude in mathematics due to the following reasons few girls opt for Science, Mathematics and Technology (SMT) subjects; there are fewer women in higher level mathematics careers than men. The factors that contribute to girls’ negative attitudes include: stereotyping (girls are intellectually incapable in SMT subjects). The performance for other subjects indicate that girls perform lower than their male peers at the ratio of 1 to 4”. (Group 2)*

*“We have found in the information obtained that, views of heads of departments in secondary schools on their roles include: coordinating teaching of subjects, conducting departmental meetings etc. The administrative skills help heads of departments in seeking for sufficient resources, delegating responsibilities and authority to junior staff”.*  
(Group 3)

Each group provided citations of sources used and a list of the sources cited. On comparing prior subject knowledge and what they acquired from the training, all groups admitted to having acquired new subject knowledge, which to some extent helped to fill information gaps highlighted on day one. Examples of statements made included:

*“We have acquired more knowledge than what we knew before: the knowledge about our subject is very relevant to our research problem”.*  
(Group 1)

*“Our prior knowledge about the topic was on roles of heads of secondary schools departments in improving quality education but what we acquired after conducting information search (new knowledge) was on how the heads perceived those roles”.* (Group 3).

*“The knowledge about girls’ attitudes towards mathematics and the impact of the attitudes to performance worldwide was not new to us and we could not find addition information on this subject area globally. However, we acquired new knowledge on this subject matter in Tanzanian context”.* (Group 3)

Also all groups indicated that they needed to carry out more searches to enrich their knowledge and acquire evidence to support their arguments.

Weaknesses noted in the general presentations were in citation styles. Several groups failed to provide details of online sources cited, including full web addresses and dates when the sources were accessed. Lack of IT skills prevented most groups from making maximum use of the Microsoft PowerPoint presentation program.

In general, students acquired knowledge relevant to their research topics. Also, since the topics chosen for the course reflected the main areas of their Masters Dissertations, students shared knowledge and ideas with each other and with facilitators to further shape their topics.

#### **7.4.8. Summary for presentations**

The presentations successfully enabled students to demonstrate the knowledge they acquired in defining research problems; creation of terms/words to be used for information searching; information seeking strategies; search and retrieval; analysis, evaluation and using information. The presentations were also seen to help students engage in information seeking activities because each group aimed to present the best results hence making students work hard to achieve these objectives. Presentations also created a sense of responsibility in the groups and each student felt obliged to support group work by providing answers to the questions raised by the trainers and fellow students. Moreover, presentation methods, especially using PowerPoint, motivated students to learn new presentation skills vital in their teaching profession. These findings echoed those of Steinert and Snell (1999) who found that presentations promote active learning, heightening attention and motivation, and give satisfaction to the teacher and students.

Regular presentations also served to show where students had failed to undertake certain activities. For example, after day one, it was clear that two groups had not fully defined their topics. As a result trainers provided assistance and helped with this process. Presentations also served to highlight situations where a group of students had not kept a record of previous activities, such as recording potentially useful search terms. As a result these students were asked to repeat this activity.

#### **7.5. Results for reflective sessions**

##### **7.5.1. Introduction**

Reflective sessions for students took place at the end of each information skill process. The purpose of reflections was to allow students to reflect on each activity carried out and provide feedback on the overall information seeking process. In reflective sessions, students provided answers to the following questions:

- What were the major activities that you performed in this course?
- After having studied all the lessons in the information literacy course, have you acquired any skills? State briefly the most important skills that you have acquired in this course.

- To what extent do you think that the skills taught in this course assisted you to meet your information seeking goals?
- State what your major achievements resulting from attending this course are by referring to the activities carried out in your group.
- What do you consider to be the gaps in your knowledge that made some parts of the course difficult to understand? What solutions are there?
- Do you think that you have acquired enough skills to solve any information related problems in your future assignments or academic work? State briefly what you would consider to be the most important and relevant skills to use in your future activities.
- In general what were the major problems that you encountered in this course?
- Has the course met your expectations? State briefly your expectations for this course and indicate whether or not they have been met.
- What are your general comments about this course, what could be done to improve it?

In reflection sessions, facilitators asked students to look back at what they covered on each day in order to reflect on what happened. Then open ended exercise sheets were distributed to students to ask them the same questions to make sure that students provided adequate information to facilitators. Exercise sheets were used in the second place because several students could not contribute their ideas verbally as they did not get the chance to do so. Details of reflective sessions for each session are provided below.

### **7.5.2. Reflections for defining a research problem**

Reflective sessions were carried out at the end of the second day of training.

Reflections reveal that students were able to indicate various activities carried out on day one and two and what they learned. They also indicated skills they gained from the course and how the skills acquired were useful to their topics. They commented as follows:

*“In our group, we were able to identify terms related to our topic: attitude, performance, urban areas. A mind map helped us to discover relationships between various aspects of our topic such as how attitudes*

*would influence girls' performance in mathematics in urban areas".*  
(Group 2)

On individual capacities, several students made comments like these:

*"After having learned how to find the central idea about a topic, I was able to re-focus my topic from a general area of "Developmental psychology" to a more specific subject area: "Cognitive and perceptual development".*

*"I learned how to focus a topic and used the knowledge to restructure my topic and it was accepted by my supervisor"*

Students highlighted problems or obstacles encountered and various methods of solving them. These included difficulties in determining central or main topical areas, background information about topics, shortage of time to apply the skills and slow Internet speed; online tools being new to them and others. The following examples demonstrate the above:

*"Our mind map was not well structured and at first we failed to identify appropriate terms for our topic, not after we acquired a suitable thesaurus (UNESCO thesaurus)".* (Group 1)

Group 4 made such comments as:

*"Indeed, how to ascertain a problem for research and focus was a big problem for us. At first we failed to find a main topical area until a facilitator had to assist us".* (Group 4)

On the other hand, Group 3 commented as follows.

*"It required us to have a lot of background knowledge to be able to determine information needed for our topic".* (Group 3)

Students highlighted measures taken to solve problems encountered:

*"We will consult with lecturers to assist us in focusing our topics"*  
(Group 1)

*"We will make appointments with course facilitators to help us focus our topic"* (Group 2)

*"We will read more background materials produced by the Ministry of Education, which are available in the library, to find general information about roles of heads of departments in secondary schools"* (Group 3)

Students pointed out skills useful for future assignments that included: focusing a topic by narrowing/broadening subject domains, mind mapping, sources to find background information about a topic and overcoming frustrations caused by lack of knowledge about a topic or providing a focus for a topic. Also individual students gave general comments about the course:

*“Lessons were clear and understood, group discussions and presentations were very relevant in knowledge sharing”.*

*“These skills came too late – they should be taught early when we just reported at the University”.*

*“Lessons were very relevant but sources to familiarise with the topic were frustrating; we could not access most of online sources recommended”.*

In general, the reflection session in defining a topic gave a picture of what students perceived in skills they acquired and appreciations of their significance in facilitating information searching.

### **7.5.3. Reflections for location and accessing information**

Reflections for location and accessing information were carried out on the fourth day of the course. Reflections reveal that students elaborated on what was covered on day three. They also indicated different ways by which skills acquired helped them in information search. Below are examples of students’ comments:

*“We used phrase searching to search for information about “girls’ attitudes” AND “performance in mathematics” in Yahoo directory and got lists of annotated bibliographies which were relevant to our topic”.*  
(Group 2)

*“We used Yahoo directory to search for educational journals and alas! – We found so many articles on quality education, something that we never knew before”.* (Group 3)

One student gave his personal experience as follows.

*“I searched on the Database of African Theses and Dissertations (DATAD) for a topic on quality education and was surprised to find that someone else had written almost similar theses, from which I was able to extract information relevant to my topic”.*



Students pointed out important skills for future assignments, which included using specific search engines such as Google Scholar, Yahoo directory and subject gateways such as GEM (Gateway to Educational Materials) and other search tools. Other skills included various search techniques such as phrase search, text search, field search, truncation and others, refining searches, how information is generated and awareness of frustrations during locating and accessing information.

Students pointed out problems they encountered as follows:

*"Internet was so slow; we felt frustrated". (Group 2)*

*"Frankly speaking, many of us are still feeling uneasy with using computers; we could not make effective use of search tools because of being computer illiterate". (Group 3)*

*"Several terms used such as browse, retrieve, record, entry, field, database inverted file, index etc, seemed technical and complicated to us". (Group 3)*

*"We got little results relevant to our topic from online resources due to slow Internet speed; we resorted to printed ones available in University library's special collections". (Group 1)*

*"We searched and got so many results, all were relevant to our topic, we felt excited, confused and undecided which ones to select". (Group 4)*

One student commented about difficulties in understanding the types of sources

*"It took me time to realize the difference between primary and secondary sources and what they meant to me was different".*

Students gave general comments on the course and made several recommendations for improvements:

*"In order for information search and retrieval to be effective, there should be a careful and proper planning for ICT-related resources to avoid frustrations due to low Internet speed, lack of enough computers and so on ". (Group 4)*

*"Everything was well except for time to search for information". (Group 1)*

*"Many of us are using computers to do serious search for the first time now, in such cases; instructors should work closely with students rather*

*than leaving them struggle alone and they should use a lay man's language for technical terms". (Group 3)*

*"Everything was OK except for Internet speed. We recommend that next course like this should plan carefully on ICT equipment to be used". (Group 2)*

*"Sometimes instructors should find ways of rewarding those who keep records of their search and deal with those who do not, we lost all our searches and caused the lessons to start late because of our laziness". (Group 3)*

Generally, reflections on locating and accessing information revealed a necessity for students to possess ICT skills prior to the course and the need for awareness of uncertainties during locating and accessing information.

#### **7.5.4. Reflections for synthesis and evaluating information and sources**

Reflections for synthesis and evaluation of information were carried out on the fifth day of the course. Reflections by students indicate that they elaborated on activities carried out on day five. They also indicated new skills acquired and how they were applied, for example:

*"We evaluated a book by Wilson (1979) Critical analysis of teacher education and found that it was not relevant to our topic because it was old for our topic (the source was outdated) since many changes on curriculum aspects have taken place since then". (Group 1)*

*"We evaluated a journal article based on criteria learned and realized that it was very relevant to our topic on girls' attitudes towards mathematics". (Group 2)*

*"We retrieved more than 12 books from the library OPAC, when we evaluated them; we ended up by only four which we considered relevant to our topic". (Group 4)*

*"The knowledge of skimming and scanning enabled us to sort out most relevant items from the Internet since we had so many results in the first place". (Group 3)*

Students identified several problems encountered in this session:

*"We found it difficult to find materials that would meet all evaluation criteria; this forced us to discard many sources we found on the Internet". (Group 3)*

*"Some Internet sources did not provide details such as author and dates of publications". (Group 1)*

*"The Internet was very slow to evaluate the sources we obtained". (Group 2)*

*"Time was limited to evaluate all materials we obtained". (Group 4)*

*"Personally I was confused by such terms like "analysis" and "interpreting" information" to what we do in analyzing research data and interpreting results".*

Students identified relevant skills for future use such as skimming and scanning, evaluating criteria for information, critical thinking skills and different ways of combining information. They also made several recommendations such as:

*"Internet speed was a stumbling block to us, we recommend that it should be improved". (Group 2)*

*"In the future this course should teach the distinctions between data analysis and interpretation for research and analysing information from sources". (Group 3)*

*"More time should be allocated for synthesis and evaluating information". (Group 4)*

Generally, reflections for this session revealed students' acquired skills and were able to apply the same to their work. They also realized the importance of critical thinking skills in evaluating information and sources.

#### **7.5.5. Reflections for communicating and using information**

Reflections for communicating and using information were carried out on the sixth day of the course. Reflections by students revealed that they were able to elaborate what they learned on day six and activities they carried out. They also indicated new skills acquired and how they were applied:

*"I came to realize that reasoning skills are not only useful in research, they can be used in information seeking process in order to provide evidence for my work by using information (evidence) from a library journal to prove something".*

*"We acquired different skills of quoting sources and we are going to prove to others tomorrow that our presentation has not been plagiarized". (Group 1)*

*"We were able to learn different ways of presenting information, we will use MS PowerPoint presentation program to present our findings".*  
(Group 2)

They also outlined problems faced in the session as follows:

*"We lacked computer skills to apply some presentation techniques such as PowerPoint".* (Group 2)

*"We feel that several skills such as bibliographic citations lacked relevant examples of how to use various styles especially for Internet".*  
(Group 1)

*"There was limited time to exhaustively cover aspects such as presenting information and bibliographic citations".* (Group 3)

Students observed that all skills acquired on day six were relevant for use in future. These included presentation techniques, ways of using information, reasoning skills in communicating and using information, citation styles and plagiarism.

In general, reflections in this section revealed that students realized the need to acquire and apply reasoning skills, the importance of citation skills and aspects of plagiarism. Above all presenting results was found to be vital in sharing information with colleagues.

#### **7.5.6. Reflections for the entire course**

The reflections session for the entire course took place at the end of the programme, on 15<sup>th</sup> July 2005. Students provided an overview of all activities and what they learned during the course. They also indicated their perceptions of the course and how skills taught in the course assisted them to meet their information seeking goals:

*"Working in a group on a topic that covered various areas of our research interests has assisted in finding answers to the main questions of our individual topics. We have now got a direction to follow when writing our Masters dissertations".* (Group 2)

Individual students made the following comments:

*"One of my goals was to publish a journal paper in academic journals. The skills of information searching acquired from this course have enabled me to gather enough literature for my journal article within a short time, and I am going to submit it in September 2005".*  
*"I expected to learn how to search for information relevant to my research. I think this objective was met".*

*"I am happy that after knowing how to shape my topic and formulate relevant search terms, I was able to search for information sources that provided useful information to answer my research questions. Now my research proposal has been accepted by my supervisor and I am waiting to formally present it in the department".*

Students revealed that all skills acquired would be useful in future. Several of them gave comments such as:

*"Right from the beginning to the end of this course, all the skills taught have been very important in my future work. For example, in order to write any research work, I will need to know about what I am doing, what my subject is all about, what I knew before and what information is missing, how to get information to fill the gap how to find information and what to do with it".*

*"Information literacy skills, in my opinion, are scientifically well designed principles that enable one to do the same things even after this course is over. All skills taught can be repeated again by an individual with maximum effects".*

*"By knowing how information is generated, one can plan how to acquire it; this means that even after finishing my studies I can apply the same principles by knowing where to go for information".*

*"I can use reasoning skills to inductively observe an aspect, use the information from the observations to write a report about it in order to prove something".*

Several students pointed out gaps in their knowledge that made it difficult to understand what was taught:

*"Despite all that was covered, I failed to know how to effectively make use of various techniques of information searching, because the course did not teach us IT skills as well".*

*"My weaknesses have been on how to use computers. Frankly speaking, throughout this course, when it came to using computers I felt very frustrated because some of my colleagues were manipulating things on computers quite faster than me and I could not catch up with them so easily".*

*"I think I am getting old now. This is because most of my students have been very active in class in terms of thinking fast and contributing in discussions but whenever I did the same, I found myself doing things very slowly".*

Students highlighted several problems encountered during the programme:

*"Lack of IT skills, minimized the excitements of the course. Most resources have to be accessed online these days and we could not make effective use of it". (Group 1).*

*"Internet slow speed was a major hindrance especially when dealing with online resources". (Group 2)*

*"Time was not enough to learn details of information retrieval, bibliographic citations and presenting information". (Group 4)*

*"Bibliographic citations and reasoning lacked detailed "real-life" examples".*

*"Personally I was uncomfortable with terms used in information sources and searching, synthesis and evaluating information".*

*"This being a course of its kind, most of us found ourselves in a strange learning environment".*

Several students indicated their expectations with regards the course as follows:

*"I expected to learn how to search for information relevant to my research. I think this objective was met".*

*"I gained much more than what I expected would be covered in this course".*

However, other students indicated negative expectations:

*"I thought this course would also cover several aspects such as different writing skills for journal articles. The rest was OK except for this one".*

*"Despite all that was covered, I failed to know how to effectively make use of various techniques of information searching, because the course did not teach us IT skills as well".*

Students came up with different recommendations with the aim of improving the course for future purposes as follows:

*"Students should do IL courses after attending basic IT courses". (Group 4)*

*"The course should be run along a specific duration of time, say first eight weeks, once in every week". (Group 2)*

*“In order for students to acquire the required skills, more exercises and hands-on activities should be provided”. (Group 1)*

*“Skills such as IR and bibliographic citations should be broader and must have follow-up courses”. (Group 3)*

*“IL courses should be taught by considering the nature of students taught, in terms of the language used and teaching approaches”.*

*“The course should be conducted right before students finish year 1”.*

In general, the last day of presentations gave a picture of what students went through, different ways by which they applied skills taught, problems encountered and the way forward. They demonstrated the significance of skills acquired and different ways by which these skills would be applied in various scenarios.

### 7.5.7. Summary for reflections

The purpose of these was to encourage students to reflect on the various activities carried out in each session as well as to provide feedback on the overall course. It was also meant to provide critical comment on the course. The summary of reflective sessions is provided in table 7-15 below.

**Table 7-15: Summary of students’ reflections**

| <b>Main areas for reflections</b>     | <b>Categories of students’ responses</b>   |
|---------------------------------------|--|
| What did you learn/do in this course? | <ul style="list-style-type: none"> <li>• Identifying terms/words</li> <li>• Determining focus for a topic</li> <li>• Identifying sources and locating tools</li> <li>• Understanding the functionalities of databases</li> <li>• Planning search</li> <li>• Information search techniques</li> <li>• Capturing information from sources</li> <li>• Analysis, synthesis and evaluation of information</li> <li>• How to present information</li> <li>• Ethical use of information</li> <li>• Bibliographic citations</li> <li>• Group work and group presentations</li> </ul> |

| <b>Main areas for reflections</b>                         | <b>Categories of students' responses</b>   |
|---|--|
| What new skills have you gained?                          | <ul style="list-style-type: none"> <li>• How to narrow/broaden topic in order to find focus</li> <li>• Creating mind maps</li> <li>• Identifying and using terms to find information sources from databases</li> <li>• Information search by using various search techniques</li> <li>• The use of wide ranges of search tools</li> <li>• Evaluating information</li> <li>• Skimming and scanning</li> <li>• How to use reasoning skills in evaluating/using information</li> <li>• How to cite</li> <li>• Presenting information</li> <li>• How to avoid plagiarism</li> </ul>  |
| How did you apply the skills acquired?                    | <ul style="list-style-type: none"> <li>• Working in groups to find information for the topics selected</li> <li>• Presenting and sharing ideas</li> </ul>  |
| What problems did you encounter?                          | <ul style="list-style-type: none"> <li>• Lack of sufficient time to do most hands on activities</li> <li>• Failure to identify relevant terms</li> <li>• Failure to identify relevant sources of information</li> <li>• Poor focus for topics</li> <li>• ICT skills hampered information searching, information retrieval and presenting information by MS PowerPoint</li> <li>• Difficulties to evaluate information based on particular criteria such as author, place and date of publication</li> <li>• Lack of relevant examples to teach certain aspects such as bibliographic citation</li> <li>• Confusions with several terminologies such as analysis, entry, primary sources</li> </ul> |
| What are the relevant skills for similar future work?     | <ul style="list-style-type: none"> <li>• How to find focus for a topic</li> <li>• Mind mapping</li> <li>• How to use various sources to familiarise with a topic</li> <li>• IR skills</li> <li>• How information is generated and structure of databases</li> <li>• How to overcome emotions while engaged in information searching</li> <li>• How to evaluate information</li> <li>• Critical thinking skills</li> <li>• How to present information by MS PowerPoint</li> <li>• How to avoid plagiarism</li> <li>• How to use reasoning skills</li> </ul>   |
| Give your general comments for improvements in the future | <ul style="list-style-type: none"> <li>• Skills should be learned at the beginning of the academic year</li> <li>• Time management should be observed</li> <li>• Learners should possess ICT skills prior to the course</li> <li>• IL courses attendees should be awarded certificates (rewarded)</li> <li>• The need to make the course more problem-based with more hands on activities</li> <li>• IR and bibliographic citation skills should be taught as independent courses</li> </ul>   |

Reflective sessions were helpful in that they:

- Provided students' understanding of what was taught and activities done.



- Provided information on new skills acquired and ways by which skills acquired were applied into particular activities during the course. Hence it encouraged them integrate theory into practice.
- Indicated whether or not, students' expectations were met and what they achieved out of the course.
- Identified problems or difficulties encountered during the course (in terms of teaching materials and activities such as hands-on activities).
- Identified gaps in students' knowledge that made some parts of the course difficult to understand.
- Identified important skills for future applications.
- Solicited suggestions from students on improvements to course aspects for future programmes.

Also, apart from the above, reflection sessions provided a good way to keep students engaged and on track throughout the course.

#### **7.6. Comments from students and lecturers with regard to the impact of the course**

Six students were contacted through e-mail in order to find out whether they applied the knowledge acquired in the course to their Masters Degree theses. Furthermore, students were contacted to find out how they shared the knowledge acquired, with others who did not participate in the programme. Information from students helped to indicate that they were able to apply the knowledge acquired and that they were able to share it with fellow students who did not attend the training. Similarly, two lecturers agreed to provide their views about students' acquired knowledge when writing their theses. These lecturers were in a position to provide this information because they happened to know personally a few students who attended the course and were aware that these students attended the course. Information from lecturers to some extent, bearing in mind the limited response, helped to indicate differences in terms of information literacy skills between those who attended and those who did not. Below are the details of students' and lecturers' responses.

### 7.6.1. Comments from students

Students indicated various skills which were relevant at the thesis writing stage. These included determining the core area of a topic, sources of information to find background information about a topic, how information is generated, information sources, information searching, narrowing or broadening searches, capturing information from sources, synthesis and evaluating information, presenting information, deductive and inductive use of information and citation styles.

When asked how these skills were applied to their work and how useful they proved, the following were examples of their responses:

*“Skills to determine a core area of my topic helped me to narrow down my research area from a very general aspect of “quality of education” to “quality aspects in students’ performance in certain subjects”.*

*“I was able to narrow down my topic and got the information about problem solving approaches in sciences”.*

*“On skills of capturing information from sources, I have been able to capture information both in the library books, printed journals and theses, and online from electronic journals”.*

*“Information search techniques helped me to access information relevant to my study more quickly. The technique of narrowing the search helped me in searching specific information therefore it took me a very short time in accessing relevant information”.*

*“Information search techniques have been particularly useful. These have helped me to get relevant information for my study from the library and the Internet much faster. Generally the course broadened my understanding in different areas of information search”.*

*“The skills of PowerPoint presentation were used effectively in proposal and also for dissemination of my findings at the University of Dar es Salaam”.*

However, a few students indicated that they could not use certain skills:

*“I was not able to use the skills of defining a topic/information problem and determining a core area of my research because I had done this before going to the course”.*

*“When presenting my proposal with Microsoft PowerPoint, it really failed me because I had done very little PowerPoint exercises during the course, I had no chance of practicing more”.*

Students identified problems they encountered when applying the skills acquired:

*"Some interesting/useful information though accessible are sold at high costs".*

*"The use of citation styles: some of the articles do not have full bibliography of the author or the one who presented the materials. I had to leave the materials and not cite them in my work".*

*"It is very difficult to avoid plagiarism".*

*"At times it has been difficult to get the relevant information for my study from the Internet, either failing completely to get the information or taking a long time. Possibly it could be due to failure to master some skills well".*

*"I think that I did not master well some skills because sometimes I failed to get some information from the Internet. Perhaps it is because they taught us very fast due to shortage of time. Other reason might be lack of practice due to shortage of computers".*

*"Employing the skills was constrained with superficial knowledge I obtained due to limited time as well as poor computer knowledge I had prior to the course".*

Students were asked to comment on the relevance of the acquired skills for similar activities in the future:

*"These skills are supposed to be life skills thus I am sure that they will be very useful not in the daily academic life time but even in the future".*

*"Having learnt how to use PowerPoint, I would like to present my work especially my PhD proposal using PowerPoint".*

*"In the future the same skills can be applied in getting relevant information for various workshops. Also I can teach others who do not have these skills in the field".*

*"To me as a teacher, the above skills will be very useful because I will use them to get some materials when preparing my lessons".*

*"These skills will be well used in researching various issues in my teaching career. As a teacher, the use of PowerPoint presentation is vital and important in my daily teaching".*

Students were asked to indicate whether they were able to teach particular skills to others who did not attend the training and how helpful were the skills. The answers

from students indicated that they were able to share knowledge among each other and that students could use the acquired skills to “snow-ball” it to others. This has implications for the process efficacy for knowledge transfer but also indicates the depth of the learning that took place. Students made the following comments:

*“I taught them how to use simple and advanced search techniques on the library OPAC. The skills were useful to them especially when doing literature review”.*

*“I showed them how to search for literature from electronic journals. They used the same skills to search some important materials from different sources”.*

*“I shared the knowledge acquired from the course with others by helping them to determine subjects surrounding their topics and in searching for information using OPAC. They found these skills useful and others borrowed the course materials for further reading”.*

*“I helped those who needed my help, e.g. when we were in a computer lab I taught them whenever they asked for anything I could do for them. They found the course to be very helpful to their research and borrowed my handouts”.*

*“Knowledge was shared by giving my colleague the course materials to read, as well as orient them practically in various skills in need where necessary. Though had half-baked knowledge on them, mostly they used information collection strategies and techniques, PowerPoint presentation, and evaluation and synthesizing information”.*

However, one student made a different comment:

*“I was unable to share my knowledge with others. Everyone was busy and went for data collection up-country”.*

In short, most of the above statements made by students indicate that they communicated and shared knowledge with each other.

#### **7.6.2. Comments from lecturers**

Two lecturers were contacted by e-mail to find out their views on the skills acquired by students to assist in writing their Masters dissertations. Unlike students who were more than willing to provide their comments, lecturers’ views were given with caution since no official results for dissertations were out at that time. However, to some

extent their comments indicated that the skills acquired had made tremendous changes among several students. Their comments are summarized further below.

Lecturers were asked to comment if they were aware that students made use of the skills acquired from the course:

*"I know that some students applied the skills from the previous information class. For example several of them used PowerPoint presentation skills to present their proposals, we did not teach them these skills but one of them admitted after making a presentation that those skills were acquired from an information course in the library".*

*"I used to have a student who kept coming to me to ask for help to search for online journals. Later she told me she found someone who attended an information literacy course who taught her many things about online information searching. This indicates that these students made use of the skills taught".*

When lecturers were asked to comment whether the skills were useful to students they provided various answers as follows:

*"These skills came too late to some extent. Had they come earlier, in my opinion, students' thinking skills in terms of information seeking and use as well as plagiarism would be much better than now because they could get enough time to put into practice what they learned".*

*"I think the skills helped them very much. Before that course, many did not know how to access electronic journals and use the Internet. But from what I see now and their comments, I feel that these skills came at the right time because it is during theses writing that they needed to know how to seek for information relevant to their dissertations".*

Lecturers were asked to provide their opinion on whether students they supervised, especially those who attended the course, had performed better in their theses writing than others. Both lecturers said that it was difficult to provide answers to that question since official results for those who finished writing were not out and also several students were still writing. They also indicated that since many students had shared the knowledge, it was difficult to substantiate those assumptions. However they indicated that to some extent a few students who attended the course seemed better than the others:

*"In my opinion, the comparison between a few students who did not attend the course and the one I know who did, lies in the way the latter tried to avoid plagiarism and also how he analyzed his topical area. This*

*was not the case with other students I supervised, who failed to properly use standard citation styles and who plagiarized a lot. Again, other students did fail to indicate relationships between subject variables but at least this particular student tried to do so”.*

*“Well, two students in my case impressed me by the way they provided a wide literature about their research topics. They indicate to have done extensive literature search from online resources and institutions outside UDSM. This was far beyond what I recommended to them while suggesting sources to find relevant literature. However I can not exactly tell whether this was a result of that course because I know one of them is a very bright chap”.*

The above comments indicate that to some extent a few students did better in their dissertation in certain aspects such as describing topical areas, provision of relevant literature and bibliographic citations.

Lecturers were asked to provide general comments about the course:

*"I think this kind of course should be conducted to all graduates regardless of their faculties. It should start as EARLY as possible especially at the beginning of the Masters programmes in order to help postgraduate students to use those skills in searching materials for their term papers. The familiarization of these skills at early time will help them to do well in other courses and ultimately to their dissertations. I strongly advise that to be a full course".*

*"The course needs to be administered as a preliminary or orientation course because at Masters level students are more interested with information and search skills. I further propose that the course should be taught during the vacation (end of first and second semester or on Saturdays). This will provide students more time to formulate and shape their topics".*

To sum up, reflections by both categories of respondents helped to indicate that the knowledge acquired by students during the second implementation programme helped students in their thesis writing. In addition, students shared the acquired knowledge with fellow students who did not attend the course. Furthermore, there was an indication that several students performed better in certain areas of their theses than others, although official results to support this suggestion were not out at that time.

## **7.7. General observations**

### **7.7.1. Introduction**

Observation methods in the second implementation programme were used to collect data from aspects of the course such as teaching and learning, hands-on activities, presentations and reflections sessions. Observations also consisted of looking through course materials, the course programme, schedule, facilities and related aspects. All the above aspects of observations helped to provide additional information to indicate whether the course ran as was envisaged. Observations further helped to provide a picture of the learning process: whether the librarians were able to transfer the knowledge to students and how the latter acquired the information literacy knowledge, and were able to apply the same to various tasks throughout the course.

### **7.7.2. Observations for defining a topic or research problem**

Observations revealed that students successfully participated in active learning through responding to questions and issues raised by course facilitators and from each other. They responded to a question to define the term “information literacy” as follows:

*“Information literacy refers to the ability to ready and write, see, feel and comprehend information”.*

*“Information literacy is concerned with knowing about information”.*

*“Information literacy is about being aware of information through reading or writing it”.*

Hence facilitators enhanced students’ interpretations of the term “information literacy” by providing several definitions according to ANZIIL information literacy framework (Bundy, 2004). Unlike in the first implementation pilot programme in which the facilitator was “lecturing” in some cases, course facilitators spent more time discussing with students in order to encourage them to communicate with each other and share ideas. Students provided examples of questions one would ask when formulating focus:

*“What do girls think about mathematics, why their attitude is low? What effects does it cause in general academic performance?” (Group 2)*

*“How effective is the proposed curriculum for secondary education, what factors would favour or impede it, why was the curriculum changed to student-centred approach?” (Group 1)*

The following were examples of how they defined the term information needs:

*“Information needs are aspects of information needed to answer a particular research problem”.*

*“Information needs are what the question or problem requires”.*

*“Information needs are things that are lacking in the information to make it complete such as definitions or figures”.*

*“Information needs are simply why one would need the information”.*

*“Information needs are the essence of information – why the information is necessary”.*

The quotes above help to indicate students’ prior conception about information needs. Students worked in groups to discuss and later present their topic problems and constructed mind maps to identify terms relevant to topics chosen. The course facilitator and his assistants provided them with guidance, wherever necessary.

Observations helped to identify weaknesses in students’ knowledge about non-print sources to familiarize them with their topics (such as the Internet and CD-ROM). In addition, despite much effort by facilitators to prepare lists of online reference sources, students could not use the same during the course due to problems with the Internet speed.

### **7.7.3. Observations for locating and accessing information**

Observations helped to reveal that students were able to answer questions that aimed to determine their prior knowledge about aspects taught/discussed. A few examples of their answers are indicated below:

The meaning of a database:

*“A collection of information in a computer, tapes, CD or physical files”*  
*“It is a source of information”.*

Record:

*“Information that has been carefully kept for use”.*



*“Category of important piece of information used for evidence or official”.*

*“Recorded information on a tape or CD”.*

They described the information search process as:

*“The process of getting into the library to find a book or journal article that is relevant to a topic or using Internet search tools such as Yahoo to find the information needed”.*

Furthermore, students indicated they had realised the importance of being aware of uncertainties during location and accessing information by giving the following comments:

*“When we conducted searches by subject, phrases and particular fields, we came up with so many results that we felt confused and undecided since all were relevant to our topic. However, we repeated the exercise again by using Boolean operators AND and NOT; this time search results were narrowed and we got more relevant results than before”.* (Group 4)

*“We searched by using several search techniques such as Boolean and phrase search in Google, and simple search in the OPAC but got little results. We felt frustrated and helpless. However, we decided to use other sources such as subject gateways and constructed different terms. This time we managed to obtain very good number of relevant sources. We felt happy and realized a need of being patient”.* (Group 1)

Students also indicated the significance of applying thinking skills in locating and accessing information as follows:

*“When we searched and found few relevant sources, we remembered that problem-solving skills include looking for alternative solutions to problems encountered. Since we already planned our strategies in advance, we decided to abandon searching on online journals, search engines and information gateways. We looked for other sources such as institutions’ websites and managed to obtain relevant sources from them”.* (Group 2)

Observations helped to reveal problems related to students’ failure to differentiate between primary and secondary sources. Also certain terms used in the session such as browse, retrieve, entry, inverted file and several others confused several of them. Facilitators, on the other hand, failed to keep to time due to spending a lot of time clarifying to students various aspects of information generation, structures of databases and information search and retrieval. Furthermore, course materials (students’ handouts) lacked some details such as structure of databases and information search and retrieval.

#### **7.7.4. Observations for synthesis and evaluation of information and sources**

Observations helped to indicate how students used their prior knowledge to discuss several ways of combining information:

*“I have been synthesizing information from various sources in many ways, such as compilation of facts from various sources by writing down key aspects to form one piece of summarized information”.*

*“When dealing with online or electronic sources, I usually copy extracts from different online text, paste it on a notepad and try to summarize it”.*

*“If I find an important article on a book or printed journal paper, I use a pair of scissors to cut relevant extracts and paste them on a paper. This makes it easier for me to digest the information more easily”.*

Students further explained different ways they evaluated information:

*“I always check to see whether this source has been recommended on the reading list by my lecturer”.*

*“I evaluate sources by asking my lecturer, librarian or fellow students whether it is relevant in my work”.*

*“I always consider a source relevant when I see it appear on other sources in further reading lists”.*

*“I evaluate a source by looking at the way facts have been elaborated and this can also be verified by looking at the way the author has quoted others and list of references consulted”.*

Observations further helped to reveal problems including students’ confusion in using terms such as analyzing, interpreting, synthesizing information and sources in information literacy with the same terms used to deal with primary data in interviews, questionnaires, content analysis, experiments and others.

#### **7.7.5. Observations for communicating and using information**

Observations revealed that students were able to demonstrate their prior knowledge through answering various questions from facilitators. For example, they defined plagiarism (or “Desa” as it is commonly known at UDSM) as:

*“Plagiarism means copying someone’s work, putting your name on top and submitting it as if it is yours”.*

*“Stealing a rare book or important article from the library, copying important aspects from it and submit for academic work as if it is yours because others will not know that it exists and may not use the same examples from that source”.*

*“Presenting group members’ ideas in a seminar presentation as your own, and failing or ignoring to acknowledge their contributions”.*

*“Entering into examination rooms with prepared answers written somewhere instead of using your own brains”.*

What was observed further in this session is that facilitators spent more time elaborating on several aspects, such as different presentation techniques and examples of plagiarism. To some extent, this affected the course timetable. On the course materials, the handouts covered little on bibliographic citations for Internet based sources.

#### **7.7.6. Summary of observations**

Observations revealed that facilitators used an active teaching approach to engage students in the information problem solving activities, although on several occasions they had to “lecture” to instill knowledge to students. This encouraged students to apply theory into real world practices. Also, to some extent, observations revealed that students attempted to indicate their prior knowledge on several aspects taught/discussed in the course.

Several weaknesses observed included students’ failure to understand certain terms used in information literacy class; terms like browsing, retrieve, analyzing, entry and so on. Also facilitators spent more time giving many examples and clarifying several issues that seemed difficult, which altered the timetable. Course materials were also noted to lack important details especially in the areas of information retrieval and online bibliographic citation.

### **7.8. Summary of second implementation programme with students**

#### **7.8.1. Introduction**

The purpose of the second implementation programme was to find out whether skills from librarians who attended the first “pilot” implementation programme were transferred to students. It also aimed to find out the impact of the knowledge acquired

to students' information seeking skills. It also served to see if the teaching of information literacy skills were transferred to librarians.

### **7.8.2. General outcome of the second implementation stage**

This sub-section summarizes the outcome of diagnostic tests, presentations, quizzes, exercises and reflection sessions.

The diagnostic test showed a dramatic increase in students' knowledge. As there were only 12 students, percentage increases were considered relatively meaningless. Nevertheless, in the pre-test more than half the students provided incorrect answers to more than half the questions. In the post-test a large majority of the students provided correct answers to most questions.

The presentations enabled students to demonstrate the knowledge they acquired in defining research problems; creation of terms/words to be used for information searching; information seeking strategies; search and retrieval; analysis, evaluation and the use of information. The presentations were also seen to help students engage in information seeking activities because each group aimed to make a better presentation than the others and students worked hard to achieve this objective. However several problems such as failure by students to fully define their topics and poor record keeping were noted. To solve the problems, the course facilitators assisted students in identifying the broader and narrower subject domains associated with their topic. They also asked students to repeat several activities which seemed not to go well.

Quizzes encouraged reflection on the previous learning, helped to test understanding and also led to immediate feedback to the students through the discussion that followed each quiz. Responses to quizzes showed that students understood the need to define a topic or research problem, sources of information, search techniques and information searching tools and different aspects of communicating and using information. More so, quizzes revealed several aspects of the course that students did less well. This was caused by lack of understanding of several aspects asked.

Facilitators discussed answers with students at the end of each quiz to help further enhance their understanding.

The exercise and reflection sessions encouraged students to reflect on the entire course and what they had learnt. In addition it provided information that could be used to improve the training course. Reflections also revealed that students experienced lack of ICT knowledge, presentation skills, information retrieval skills, and bibliographical citation skills.

The extensive use of reflection and communication via group work, quizzes, reflective exercises and presentations seemed to be successful and were accepted by the students despite their unfamiliarity with this style of learning.

### **7.8.3. Changes/modifications incorporated on second implementation programme**

The section below summarizes how changes/modifications raised in the first pilot implementation programme were affected in this stage. Details of how the changes were applied are given below whereas the implications of these changes for students' work are elaborated in chapter 8 below.

**Students' choices of own topics and discussion groups:** Unlike in the first "pilot" implementation programme where librarians were required to select topics of their choices, students came to the course with ideas for topics they wanted to explore in their Masters thesis. They formed groups that were made up of students who shared similar individual research topics and were able to agree on a common topic that would help all members of the group achieve their research objectives.

**Modifications of questions for tests and quizzes:** Questions for tests and quizzes were modified to provide students with clear and relevant questions. In addition, modifications of formats of pre-test and post-test questions into the ones that followed an information seeking process created students' awareness of the process and aspects that fell within each stage. The course facilitators further ensured that various aspects asked in the diagnostic tests were taught or discussed during the programme. This was done in order to make valid assessment of post-test results. However, despite changes, a few questions in the tests appeared ambiguous. Examples include the question on

identifying a publisher for the website by looking at the domain name. It was noted that several domain names did not clearly indicate who the publisher was.

**Adaptations of course materials:** Various adaptations were made of the course materials. For example Hepworth's (2006) information seeking experience circle for electronic sources was used to demonstrate the information search process. Other added aspects included Paul et al's (1990) critical thinking skills as applied to evaluating information and logical fallacies for educators. These added aspects were meant to assist students' understanding about various cognitive aspects of information literacy related to educators for evaluating and using information.

**Additions of more presentations sessions:** A presentation session for defining a topic or information was added on day one to find out how students identify the broader and narrower subject domains associated with their topics. In addition more time was added on day seven in which students presented how the subject knowledge acquired helped to fulfill their information needs.

**Changes in start/finish time for the course:** During the second implementation programme, the course started at 8.00am and ended after 5.00pm to allow for more hands-on activities and preparations for activities to take place in the following days. Due to these changes, the number of working hours increased from 35 to 56.

## **8.0. CHAPTER EIGHT: DISCUSSION**

### **8.1. Introduction**

This section reflects on the results of the implementation programmes, with particular attention focused on the second stage of the information literacy programme with Masters of Education students. The reflections focus on three major aspects: general implications of findings for teaching and learning information literacy; implications of methods and approaches used to teach information literacy and challenges of implementing information literacy programmes.

### **8.2. Implications of the findings into learning/teaching information literacy**

#### **8.2.1. Introduction**

This section attempts to highlight the implications of the results of the second implementation of the information literacy course into teaching and learning information literacy. It examines main aspects that emerged from the course throughout the information seeking processes. Results from the information literacy second implementation programme at the University of Dar es Salaam assisted to highlight significant results which indicated varied implications for learning and teaching information literacy courses. The implications of the findings are enumerated in detail below.

#### **8.2.2. Implications for defining a problem or research topic**

Results from the course revealed that several aspects, such as students facing difficulties in identifying subject areas of their work or defining research problems, resemble what other researchers have discovered in previous studies. As literature suggests, this could be caused by several factors, one being students' lack of understanding of their subject domains. Previous research indicates that students' failure to fully define information problems could be caused by lecturers or tutors defining information problems for students and the latter follow what lecturers have told them (Hepworth, 2000). This observation was echoed by several lecturers interviewed during the study at Dar es Salaam, who gave comments such as:

*“Students always request us to define their information problems. They can not do it on their own. We therefore have to interpret what the questions or topics want and how to go about finding answers”.* (Lecturer, Faculty of Education)

*“In most cases students depended on lecturers to tell them what the question is all about and determine how much information they would need for a particular problem”.* (Lecturer, Department of Sociology)

*“Students always request us to clarify questions or topics. We provide guidance on what the topic or the question is about, type of information needed and where to obtain relevant information for the question or topic, which includes reading lists and handouts”.* (Lecturer, Faculty of Science)

This helps to explain the fact that since students relied on lecturers to be told what to do, they faced difficulties when encountering problems alone, where lecturers’/instructors’ support and intervention could not be found. In a learning environment such as the University of Dar es Salaam where the style of teaching/learning was teacher-led, the above problems were apparent.

In fact even, students who work in a problem-based, active teaching/learning environment could also face difficulties in identifying subject areas of their work or defining research problems. This is because although many information literacy programmes teach students how to identify their topics or research problems they do not tell them why they have to do it. Kuhlthau (1997) observed that this stage of defining the task has not been given enough emphasis by many information literacy course designers. The results of the failure to appropriately define research problems is that learners face difficulties in determining information needed for their research topics. It further leads to poor focus, poor plans for effective search strategies, hence failure to acquire relevant information. In addition, it has been noted in several cases that students attend information literacy courses without being given the chance to identify their information needs (Julien, 1998).

In addition, students fail to recognize the importance of acquiring information skills because several courses fail to meet or challenge learners’ own perceptions of information needs (Hartmann, 2001). To some extent this means that such courses do not provide learners with the opportunity to perceive their information needs.



Literature suggests that a successful information literacy course should help students elicit their perceptions of information needs. Various models of information literacy such as CILIP (2004), point out that an information literate person should be able to articulate a research question and develop a focus for a research topic. The above requirements can be met if an information literate person possesses adequate subject knowledge of a topic. Understanding subject matter related to a topic facilitates learners' ability to identify their information needs and further assists in judging the relevance of information retrieved (Hill & Hannafin, 1997; Macdonald, Heap & Mason, 2001). This can eventually help to determine how to address an information problem expressed by the main research question (Webber & Johnston, 2002).

Based on observations from the literature, it is imperative that students should be able to understand the subject domain surrounding their topics in order to successfully participate in an information seeking process. Therefore this stage of information seeking is very important because if the problem is not defined properly, the whole information seeking process might be affected.

However, results from the second implementation stage of information literacy course at the University of Dar es Salaam, despite students facing problems in defining their topics, demonstrated a number of positive aspects. Students were able to demonstrate general understanding of what their topics were about. The following extracts were taken from group presentations:

*"Our topic focuses on girls' attitude and performance towards mathematics in secondary schools". (Group 2)*

*"Our topic focuses on roles of heads of departments in secondary schools in improving quality education in Tanzania. It falls generally under educational management". (Group 3)*

*"The focus of our topic is on examining the impact of management styles in promoting primary education in Tanzania". (Group 4)*

This implies that students attended the course with general ideas for topics they wanted to explore in their Masters thesis. Students were given the choice to select their own topics based on what they wanted to explore in Masters Degrees theses.

Garland (1995) commends the above approach in facilitating teaching and learning information literacy courses. He reveals that when learners are given choice, they develop a sense of control and become more positive about getting involved in the research process. Other authors (Smith & Hepworth, 2005) also identified the significance in terms of motivations by allowing students to choose their own topics. Furthermore, Seamans (2002) also argues that choosing topics of interest help learners to have focus. In addition, the choice of topics helped students think about information sources and what these sources would cover. This was evident through students' comments as follows:

*"By selecting our own topic, we were able to think about where to get sources having relevant information matching with our subject area".*

*"When we chose our topic, we also considered the chances of getting relevant literature covering the subject area on girls and mathematics".*

In addition to being given choice of topics, students were allowed to formulate groups based on their research interests. This was considered to be a significant aspect for facilitating a successful information literacy course. The research found that when students were given the opportunity to formulate groups based on topical interests, it helped to support their learning habits and ensured discussions among group members. Garland (1995) and Laverty (2002) argue further that group work is one of the aspects that could help students in formulating questions for discussion, and it also contributes to a general satisfaction with the research process. This observation is supported by several students who commented as follows:

*"Working in a group on a topic that covered various areas of our research interests has assisted in finding answers to the main questions of our individual topics. We have now got a direction to follow when writing our Masters dissertations". (Group 2)*

The above statement serves to support the fact that students realized the importance of working in groups on an information problem.

Findings for this study indicate that students were able to identify what they already knew about their topics and pointed out what they did not know. Literature commends the above to be a good habit in information literacy courses since it helps learners build on the existing knowledge about their topics (Irving, 1985; Bruce,

1995). Bundy (2004) and CILIP IL model (2005) point out that demonstrating prior knowledge about a topic helps review the initial information need in order to redefine or revise the question. Fitzgerald (1999, 20) further argues that prior knowledge helps a learner in the process of evaluating information:

*"...prior knowledge is probably vital to successful cognitive performance. Memories of past experiences and content knowledge about a topic will equip an individual with tools to notice inconsistencies".*

From the argument above, the ability to identify what they knew about their topics helped students determine what information they needed to answer questions addressed in their topics. For example, when students were asked to discuss the importance of identifying what they knew before, the following comments were made:

*"The process of demonstrating what I knew about a topic helped me determine what we did not know; it also helped in formulating topical questions".*

*"By defining what I knew, I was able to determine the usefulness of new information that I later on found".*

The literature also suggests that, by identifying what they already know about their topics, learners are able to expand, reframe or create new knowledge acquired by integrating what they knew before and new understandings (CAUL, 2001; Halttunen, 2003). The significance of the above argument was also echoed by one of the groups in the course who commented as follows at the end of the course:

*"Our prior knowledge about the topic was on roles of heads of secondary schools departments in improving quality education but what we acquired after conducting information search (new knowledge) was on how the heads perceived those roles". (Group 3).*

In addition, results from quizzes indicate that students realized the need to acquire background knowledge about their topics from the information landscapes, such as reference sources and other potential sources of information. Several standards such as ACRL (2000) stress that general information sources assist in knowing what a topic is about. Cheuk (1998) in the study of how engineers and auditors sought and used information, discovered that general information sources such as magazines

and the Internet were helpful to learners during the “focus forming situation”, in which participants perceived that they had to gain a better understanding of how to carry out their tasks or solve problems. Apart from assisting in providing focus for a topic, information landscapes such as reference sources helps also in identifying key terms and concepts that describe the information needed (Orr & Cribb, 2003). Spink et al. (1999) and Hepworth (2003) argue that identifying relevant terms assists in the process of information search and retrieval. Searchers in many cases find it difficult to quickly identify terms and this results in the use of few terms which limits the success of the information searching process. The above observation was found to be the case in the course, which revealed that students needed to use dictionaries and thesauri to identify terms/words that helped them find relevant records from databases and other information systems. To facilitate the process of identifying relevant terms, a mind mapping technique was used. Literature point out that mind mapping helps in recognizing relationships between terms used to describe a particular subject field (Novak, Gowin & Johansen, 1983). Mind mapping also helps to determine aspects of the problem one is trying to sort out. It assists in placing the problem within a particular knowledge environment (Hepworth, 1999).

Results from the second implementation programme indicated that students attempted to provide their own interpretations of the term “information literacy”. From a pedagogical point of view, engaging learners in thinking about the meaning of the terms such as information literacy in this case, and what an information literate person is, help to recognize the way learners consider information literacy and presented them with a novel way of seeing it (Webber & Johnston, 2003), enabling them to start to construct a meaningful integration of information literacy. This helped to demonstrate what students understood about information literacy, which to them meant the *“ability to read, write and comprehend information”*. However, as the course progressed, they realized that being information literate entails possessing a wide range of skills, such as accessing, synthesizing, evaluating, communicating, using information, and above all, critical thinking and problem solving skills. Comments given by a third year student who participated in the Webber and Johnston (2000, 391) study help to support the above observations:

*“Whereas before I perceived being information literate as simply knowing how to search for information, I now see it as a deeper, more psychological outlook. Becoming a critical thinker and adopting a learned approach when it comes to searching, organizing and evaluating information is part of it. It also entails changing one's mindset as to how to approach the world around one. Information literacy, in my opinion, is as much about the way we think as the things we do”.*

The above statement was further supported by individual students in the study at the University of Dar es Salaam, who argued as follows at the end of the course:

*“From this course, I have come to realize a true meaning of information literacy. I once perceived information literacy as “knowing about information”, in relation to using computers. But now I have realized that information literacy is a cognitive process that assists users solve information problems, and is a lifelong learning process”.*

*“Information literacy skills, in my opinion, are scientifically well designed principles that enable one to do the same things even after this course is over. All skills taught can be repeated again by an individual with maximum effects”.*

From the above arguments, it is noted that when students made their own interpretation of information literacy, they anticipated what the course would cover, which also assisted to motivate them to actively participate in the course.

In summary, what was learned in this stage was that defining a problem or research topic was a continuous activity throughout the information seeking process. Moreover, this stage was considered to be very important because it enabled students to plan for information processes that followed. It was also learned however, that a failure to define a problem or research topic could inhibit the entire process of information seeking, thus making students unable to arrive at a point of appreciating the essence of acquiring information literacy skills. Hence, to overcome the above problem, course facilitators ensured that students became conversant with their subject domains in order to proceed well with the information seeking process. This was further facilitated by making students familiar with general sources of information such as reference sources.

### **8.2.3. Implications for location and access of information**

Literature reveals that many information literacy programmes provide wide coverage on how to locate and access information from various information systems. This implies that the knowledge of locating and accessing information sources is not new in the field of information literacy. The above statement is supported by Webber (2002) who argues that there is abundant literature which indicates that a number of information literacy courses focus on “access and locate” aspects rather than “recognize the information need”. However, several concerns such as lack of understanding of availability of information sources, search tools, information search strategies and organizing search results appear to be common in most of these courses (Pollock & Hockley, 1997; Armstrong et al., 2001). The above observations have also been highlighted by the results of this research in which several students seemed unaware of widely available information sources to identify relevant information for their topics. This was noted when they were asked to indicate what they knew before regarding different sources of information and their characteristics. In addition, students seemed to have a poor understanding of numerous search tools such as bibliographic databases, search engines, information gateways and others. Various researchers identified the same problems that learners in information literacy programmes have experienced (Wise, 2003; Hepworth, 1999). Hepworth argues that the above pitfalls could be due to the fact that students might not have had the opportunity to critically evaluate information sources in the past. If they had the chance, the circumstances would force them to identify a variety of types and formats of potential sources of information. This reason could explain why students were unable to identify wide ranges of sources due to the fact that most evaluation work for information sources was done by lecturers who later recommended suitable sources to be used.

In addition, lack of experience in using search tools such as search engines, information gateways, online catalogues and others could make students unable to identify relevant sources. During the second implementation programme, several students highlighted problems associated with their lack of sufficient skills in using information search tools:

*“Several search tools were new to me. I could not effectively make use of them”.*

*“This being a course of its kind, I found myself in a strange learning environment, using new tools such as information gateways, was a strange experience”.*

*“It is my first time to come across several tasks that require searchers, to identify and describe varieties of information sources and I have not made use of other search tools than Google and Yahoo”.*

Literature indicates further that while it may be easier for an experienced searcher who is familiar with the subject matter to locate relevant sources, it may not be the case for someone who is new in that particular subject area (Zins, 2000). The above reason could also explain why several students in the second implementation programme failed to effectively locate relevant sources for their topics. Few of them indicated having sufficient knowledge about their topics when they were asked to demonstrate the same on day one of the programme. This had ultimately made them unable to acquire relevant information to answer particular aspects addressed by their topics.

Results of the second implementation programme revealed further that several students failed to understand how information is structured in information systems. This was evident from results of quizzes in which a few students made wrong choices of answers in describing Google as an example of an online catalogue (instead of a search engine). This could be due to students' lack of prior experience in using various search tools as mentioned above. Also lack of knowledge of information systems such as databases and how information is structured may contribute to the above. Failure to recognise the structure of information in various systems inhibits planning for information search strategies and effective information search. Shneiderman et al. (1997) point out that an understanding of structure of sources in information systems is a result of adequate knowledge of aspects such as multiple fields (attributes, components or tags) which makes it easy for users to develop effective search strategies.

Results from the course indicate that several students had difficulties in developing search strategies. Although various search techniques were taught/discussed during the course, several students made little use of a wide ranges of techniques. For

example, apart from using the fields of author, title and subject, many students did not use other features available on the library online catalogue such as text search, organization, year and expert search. Students attempted to make use of various techniques such as Boolean AND, phrase search and field search in terms of subject and author, but did not make use of other techniques such as truncation, proximity search, Boolean OR and NOT. These observations have also been echoed by Hepworth (1999) who discovered that students do not make use of various fields of databases, truncation and synonyms, and failed to narrow or broaden searches. Bloom & Deyrup (2003) observed that students' search strategies demonstrated a poor understanding of the best ways of utilizing the online library catalog in that they relied on keyword searching and completely ignored subject headings. Similar observations were made by Hirsh, (1996) and Solomon (1993) who found that children had difficulty formulating and revising search queries, especially when the terminology used did not match the terminology used in the catalogue.

Various reasons could contribute to students' difficulties in developing search strategies. One of the reasons for this could be lack of experience in using various search tools to develop queries and expertise in formulating the same. In addition, Wise (2003) argues that too many interfaces with various navigation or search mechanisms and different structure of information systems may confuse students, hence poor planning in information searching. Furthermore, many high-quality resources are not adequately indexed on general search engines, making it difficult for users to access the right sources.

In addition to the above, students pointed out that lack of ICT skills hampered their ability to use functionalities (such as broadening or narrowing searches, refining search results, searching within results and so on) available in electronic search tools, which facilitate effective information searching. In addition, students demonstrated a lack of basic skills in using Microsoft Windows, which meant they made little use of folders or online file management facilities such as Yahoo Briefcase to capture and organise information. The above observations were echoed during presentations and reflection sessions with comments like:



*“Lack of IT skills minimized the excitements of the course. Most resources have to be accessed online these days and we could not make effective use of it”.*

*“Despite all that was covered, I failed to know how to effectively make use of various techniques of information searching, because the course did not teach us IT skills as well”.*

Various researchers have recommended a number of IT skills as pre-requisites for effectively learning information literacy. These include basic IT skills (use of keyboard, mouse, printer, file/disk management), standard software (word processing, spreadsheets, databases, and so on) and network applications (electronic mail, Internet, Web browsers) (SCONUL, 1999). These skills are necessary in enabling learners to effectively operate and navigate through online resources (Bruce, 2002; Taylor & Laurillard, 1995). The essence of IT skills in teaching and learning information literacy has also been highlighted by various models such as SCONUL (1999), ACRL (2000) and Bruce (1997). The negative effects of lack of IT skills on information skills have been echoed by various researchers (Bond, Fevyer & Pitt, 2004) who argue that due to their deficiency, students failed to make maximum use of online resources for teaching, learning and research. The problem of lack of IT skills for students in many African universities is common, which among other factors, is caused by lack of trained staff, lack of IT infrastructure, to mention but a few (Ondari-Okemwa, 2002). In this case, the University of Dar es Salaam was no exception.

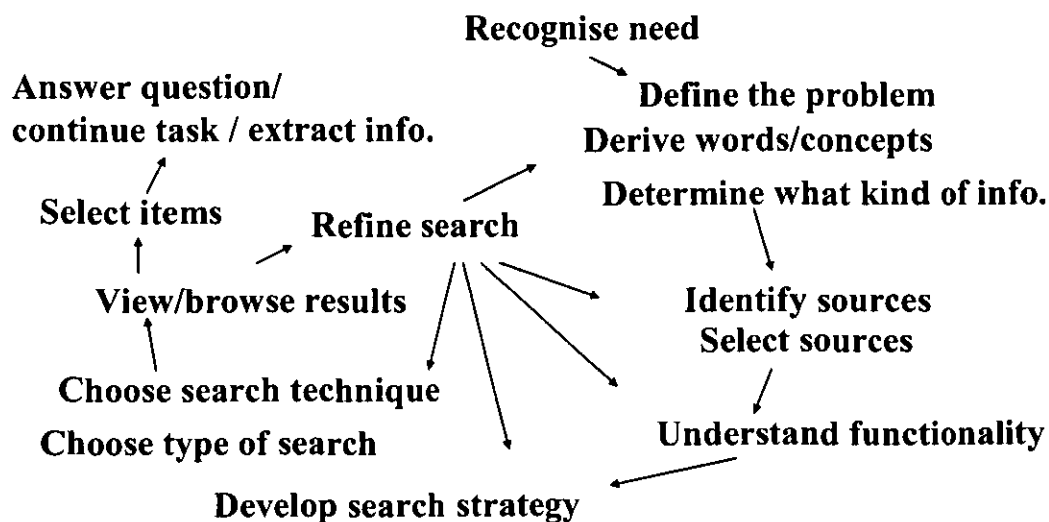
Various efforts were taken by programme facilitators to overcome problems highlighted above. These included introducing students to different sources of information in various formats that could meet their subject-specific research areas. Students utilized various specialized information services such as interlibrary loan and document delivery to find relevant information. In addition, students made use of institutions such as the Ministry of Education and Culture, Tanzania Education Authority, Haki-Elimu and others, to find information not available in the library or electronic resources. Other sources utilized included professional associations such as the Teachers Trade Union (TTU), Forum for African Women Educationalists (FAWE), Tanzania Gender Dimension Programme (TGNP) and experts and practitioners in the education field. In addition, efforts were made by the organizers

of the programme to introduce students to various ICT aspects related to accessing and organizing information. These included the basics of the Internet and Microsoft Windows. However, due to limited time, very few skills were introduced to students.

Despite problems associated with several skills identified above, a number of significant results have been identified by this study. Results from the second implementation programme indicated that students demonstrated consciousness of the affective states associated with information retrieval and the wider research process, and difficulties associated with using the Internet to locate and access information. Influenced by Kuhlthau (1993), facilitators felt the need to make students feel at ease during the information search process. This consciousness helped to make students aware that the information search process was not a linear process in which one develops a query, searches, and retrieves information, which results in making people abandon searches when they fail to obtain relevant results. The course made students aware of the fact that the information search process involves an iterative process of search-result-learn-refine-search-result-learn-refine, and so on (Marchionini, 1997). Wilson (1999, 267) further comment as follows:

*“Information searching is a complex process embedded in the broader perspective of information-seeking behavior, and information behavior in general”.*

In realization of the above, the course adopted Hepworth’s search and retrieval knowledge as indicated below:



**Figure 8-1: Hepworth’s user perspective of online search and retrieval knowledge (Hepworth, 2006)**

Results from the course indicate that, to some extent, the conscious knowledge about uncertainties and the online information search process, indicated above, helped students during the search process to recognize the iterative nature of information seeking process. Examples of students' comments are provided below:

*"When we conducted searches by subject, phrases and particular fields, we came up with so many results that we felt confused and undecided since all were relevant to our topic. However, we repeated the exercise again by using Boolean operators "AND" and NOT; this time search results were narrowed and we got more relevant results than before".*  
(Group 4)

*"We got stuck after trying all possibilities of searching for information sources; however, we started all over again until we got what we wanted".* (Group 2)

Due to uncertainties occurring during the information search process, several authors recommend that learners should overcome uncertainties in order to advance to the state of controlling the information search process (Ellis, 2004). Trainers should conduct training while being aware of the fact that the information search process can be chaotic, with uncertain results that can affect learners' expectations (Elmborg, 2002).

Results from the course indicate further that students demonstrated an understanding that the Internet may not always be a good place to start finding information for their topics. For example, results from quizzes revealed that students highlighted possible factors which explained why the Internet should not be used as a sole source of information for their topics:

*"Internet may not be a good place to begin looking for information about a topic because everybody puts anything out there. You have to start with authentic sources such as reference books, abstracting services or journals".*

*"When you begin on a topic, Internet may not be a good place to look for information because you may spend too much time searching, this can put you off".*

*"You may search on the Internet and find zero results and think perhaps your topic does not exist. You should use it only after consulting other sources such as reference books first, which will give you focus for your topic".*

*“There is quite a lot of sources on the Internet, you may not know what exists without the right search techniques. However other sources may be explicit”.*

These observations have also been echoed by Nelson (1997) who argues that despite the abundant resources in the Internet, finding them has always been difficult since several online information systems fail to inform its prospective users of the type and form of information sources available and access mechanisms. Hirsh (1996) observed that several students did not like using web resources because they failed to get what they wanted from it. On the other hand, other researchers argue that effective use of Internet resources is associated with equipping learners with the understanding of principles of information storage and retrieval techniques that would ensure effective information retrieval from various online information systems (Halttunen & Jarvelin, 2005; Espelt, 1998). However, results of the second implementation programme revealed that despite these observations, students made use of the Internet to find relevant information.

In summary, this study revealed that the programme enabled students to locate and access information. Students acquired various skills such as identifying sources, information search strategies and retrieval skills. Examples are given below to illustrate students’ reflections on the importance of these skills:

*“The course taught me how information is created and structured. This knowledge has helped me to accomplish one of the important processes in information searching, which is planning where to go for information”.*

*“In this course I learned different functionalities of search tools, such as the use of field searching in Emerald, advanced search in Google, Yahoo directory search tools and search fields in ERIC database. With this knowledge, I was able to navigate through different kinds of search tools”.*

*“This course taught me the following: Information search techniques, strategies in information searching, how to broaden and narrow search, using specific search tools such as Google scholar and GEM (Gateway to Educational Materials). These new skills helped me throughout the information search process”.*

*“The knowledge about information search process was helpful to me in integrating the knowledge I acquired on day one and two, and was able*

*to plan for evaluating the information to determine its relevance in my topic”.*

What was learned from the findings in this stage is that the knowledge of ICT is important in enabling learners make use of the available electronic resources. In addition, information search is an iterative, cognitive and therefore a complex process which requires both lower and higher order thinking skills to overcome confusions and uncertainties. However, despite problems associated with lack of relevant ICT skills, this study indicated that students utilized the knowledge acquired to locate and access information relevant to their topics. This was possible due to, above all, to the fact that students were able to cope with the uncertainties caused by the information search process as a result of its iterative nature. They learned that part of being information literate is to recognize that information seeking is not a linear process.

#### **8.2.4. Implications for synthesizing and evaluating information**

Literature that relates to evaluating information and sources in information literacy courses is widely covered. However this study highlighted aspects such as identifying, analyzing, capturing and synthesizing information, which are given less emphasis in various information literacy courses. These are considered to be meta-cognitive, higher order thinking activities (Gawith, 2003; Bundy, 2004) which play an important role in facilitating teaching and learning information literacy.

Results from the course indicate that students realized the need to identify, analyse and capture information from sources by using various techniques such as note taking, summarizing, paraphrasing and so on, which were placed in a wider research context. Although students were expected to possess these skills, it was felt that they needed to consciously apply these skills during the information seeking process (Herring, 2001). It has often been noted that learners may not have a sense of how to scan and read the information they find. They also experience problems in understanding the structure and complexities of documents, which make them read without clear purpose or direction (Chapman, 1993). Furthermore, learners may not have the abilities to know what to look for in the document structure or to be able to judge a document for relevance (Readence, Bean & Baldwin, 2000). In electronic

texts such as Web based journal articles and others, Wallace et al. (2000, 77) comments as follows:

*"... learners may find it difficult to direct their reading in productive directions due to the distractions arising from hyperlinks to other web pages, enticing images and animations, and dramatic differences in complexity, length, and readability".*

To overcome the above, the course considered introducing to students various techniques of analyzing information through making sense of the different pieces of information obtained from sources retrieved. In addition to the above, capturing information was also seen to be important. This is because it involves a complex information problem solving process in which learners work with a well defined and focused task in cognitive techniques for looking for relevant information (Irving, 1985). This justifies a need to make students aware of the above phenomena. Hill & Hannafin (1997) argue further that the process of capturing information is a higher level cognitive process that facilitates deep learning since it assists in focusing on the more significant aspects of information in relation to the needs and helps in organizing and structuring information collected more coherently. Bondy (1984) also argues that the process of capturing information assists in determining whether a particular source contains information needed for a particular task. It is also evident from the literature that effective ways of capturing information from sources minimizes problems associated with plagiarism in that it equips learners with the skills of summarizing or paraphrasing information in their own words (Harada, 2002; Ryan, 2004).

It was also found out, from the course, that students realized the need to synthesize information in a coherent manner and evaluate the same. Ellis's (1989) information seeking behaviour model reveals that chaining, browsing, differentiating, monitoring and extracting are the operations which synthesize information and generate new knowledge. The literature reveals that since the process of producing rich arguments is a complex one, students are likely to rely on a single resource from which they copy information for their arguments rather than synthesizing information from different sources. Therefore synthesizing information from multiple sources is important since it enables learners to develop arguments that

answer questions based on viewpoints and evidence from multiple sources (Oliver & Hannafin, 2000). The significance of synthesizing information was demonstrated by students in the second implementation programme, who gave several comments as highlighted in the three examples below:

*“Information synthesis helped me to put together information I collected from different sources in order to help me develop different view points”.*

*“Information synthesis enabled me to find out whether I had enough information to use for my topic”.*

*“Information synthesis helped us to bring together related themes that substantiated our arguments about perceived roles of heads of departments” (Group 3)*

In addition to the above, literature indicate that learners should be taught how to evaluate information and sources (Thompson 2003). Harley, Dreger & Knobloch (2001) also state that students should be taught to critically evaluate information and sources by determining the meaning and value of the information package and not merely finding answers from the source. Herring (2001) further argues that students should be taught to evaluate the quality, authority and credibility of the sources used, in whatever information medium. In realizing the above, the course included various evaluation criteria based on both printed and electronic/digital sources of information. Considered were criteria such as reliability, validity, authority, and timeliness. The above and other evaluation criteria helped students to make sense of the information accessed. For example:

*“The criteria to evaluate information and sources were very important to us because we were able to come up with relevant sources for our topic”.*

*“We were able to determine that the book on “Critical analysis of teacher education” was not suitable for our topic because many changes took place in teacher education, which were not reflected in this book”(Group 1)*

*“The criteria to evaluate information helped us to develop rationale for our topic because the coverage in most sources was in line with our assumptions about girls, attitudes and science and technology related disciplines”(Group 3)*

The above statements help to demonstrate students' appreciation of the significance of different criteria for evaluating information and sources. Furthermore, logical fallacies found in educational research enabled students to learn how to make and evaluate judgments about information collected and incorporate new information into the existing conceptual knowledge base (Jarvis & Petty, 1996). This was observed in the course from comments raised by one student:

*"Logical fallacies assisted me to judge information based on various evaluation criteria rather than making conclusions from what the author has said. This helped to give more credit to the information we collected".*

*Logical fallacies such as "Either Or Fallacy" helped our group to consider finding more research evidences from Non-Government information services about whether heads of departments in secondary schools play a positive role in improving quality education in Tanzania, rather than relying on government information sources only"(Group 2).*

To summarize the above section, the findings reveal that the course equipped students with skills which helped them to identify, analyze, synthesize and evaluate information from sources. This was true from comments by individual students in reflective exercises:

*"Out of this course, I was taught to analyze information, which helped me to know how different aspects associated with my topic relate to each other".*

*"I learned how to analyze, synthesize and evaluate information, these skills helped me to find weaknesses in my previous search strategies and I was able to go back and perform more searches to get more relevant information".*

*"The course taught me how to synthesize and evaluate information from sources, skills which assisted me to construct new subject knowledge and update the existing one, based on what was available in wider ranges of information sources".*

*"I learned how to evaluate information based on various criteria. This knowledge assisted me to determine whether the subject knowledge I acquired from the information was suitable to answer questions addressed by my topic".*

*I learned how to capture information from source, through skimming and scanning. It helped me to determine how to make use of the information acquired".*



Therefore, the findings from this indicated that, students recognized the importance of identifying, analyzing, synthesizing and evaluating information. These were important processes that enabled them to construct meaning and reconstruct understanding in the light of new learning experiences (in this case, problem-based learning). In addition, analysis, synthesis and evaluation helped students to evaluate the search strategy and provided the basis for refining search processes in order to obtain relevant information.

#### **8.2.5. Implications for communicating and using information**

This study realized that using computer-assisted communication and presentation techniques were important in developing information literate students. One reason for this is due to increased use of Web based resources, which at some points have prompted the misuse of information from a legal and ethical perspective. Various authors recommend that once information is collected, analysed, synthesized and evaluated, it has to be used effectively in order to accomplish a specific intention (ACRL, 1989). It is by recognizing the above, that the process of presenting or communicating information has been considered as part of being information literate (Walt, 1992). Bjorner (1991) points out that using information involves synthesizing, communicating and storing information for future use.

Results from the course indicate that students recognized the need to present or communicate their findings to others. The above skills were taught to students, among others, to fulfill recommendations by various information literacy models such as Bundy (2004, 21) who contends that an information literate person:

*“chooses a communication medium and format that best supports the purposes of the product and the intended audience; uses a range of appropriate information technology applications in creating the product; incorporates principles of design and communication appropriate to the environment; and communicates clearly and in a style to support the purposes of the intended audience”.*

The importance of presentation skills were recognized by students who made several comments in reflective sessions, such as:

*“In this session, aspects such as factors to consider when presenting information including target audience, format and presentation techniques formed an important part in enabling us to know how prepare ourselves to present relevant information to other group members by using the right presentation medium”*(Group 3)

*“Presentation techniques taught in this course are important because they put the little theory which we learned in education media and technology into real practice, this one being more advanced since we used computers”* (Group 2)

In particular, presentation techniques through using Microsoft PowerPoint were introduced to students, in addition to other techniques such as using slides, black/white boards and over-head projectors.

Several researchers point out that the skills of communicating information enable students to continually update their professional skills even after finishing studies at tertiary institutions (Holland, 1995). This is because, after finishing studies, students who acquire similar professional qualifications would continue communicating with one another through workshops, seminars and discussions, hence enriching their professional skills through sharing ideas. Furthermore, the design of the course realized that communication and the sharing of ideas among students were important tools in the development of an information literacy mind-set and culture (Laurillard 2002; Mayer, & de Freitas 2004). This was considered vital due to the fact that students would develop the spirit of sharing knowledge with one another, which would further encourage collegiality in information seeking and use even after finishing studies. The spirit of sharing information among colleagues was expressed by students as indicated by an example from one student who commented as follows:

*“When working in our groups, we shared ideas with each other and also with other groups. This was very important because it will encourage us to continue communicating when working on our theses and even back in our respective institutions. This is a very important skill which we have not acquired in other courses”* (Group 1)

Furthermore, communication helps to define, refine and concretize ideas and learning. This was evident from the course where students commented as follows:

*“When one of the groups presented their final results, I found myself refocusing my research topic to look specifically at quality issues in primary education rather than looking at aspects of quality education in a wider perspective”.*

*“Communicating information helped me to improve my thinking by borrowing and making use of ideas generated by other people both in my own group and others”.*

On information use, the programme designers realized the importance of introducing to students skills of engaging with information (reading, viewing, listening and understanding). Although students were supposed to possess these skills, it was found important that these skills be introduced to students to enable them to extract meaningful information communicated. Most of the above skills form part of the learning aspects covered in other subjects such as communication skills. Hence some programme designers tend to neglect these skills. However, Irving (1985, 76) describes these skills as “...some of the most neglected skills in secondary education”, which could also be true at tertiary levels. Due to the above observations Herring (1996) argues that it is important to teach students to read for information and that teachers and school librarians should find out whether their students are competent in this skill.

In addition, students’ recognition of the importance of applying inductive and deductive thinking to problem solving was another aspect that this study considered significant. They realized that the above skills provided the rationale for collecting data and information to support their arguments raised in Masters Dissertation topics. This was evident from comments raised by students in reflective exercises:

*“We used “deductive thinking” notion to gather information about girls’ attitudes towards mathematics from journal articles and other sources and used it to prove that the attitude problem exists in many schools in the world, Tanzania is not an exception to them”. (Group 3)*

An individual student made the following comment:

*“I used reasoning skills to inductively observe an aspect, used the information from the observations to write a report about it in order to prove arguments that my topic discovered”.*

The statements above help to demonstrate that students appreciated the need to apply these thinking skills in using information. In addition, inductive and deductive

thinking assist in solving situated, ill-structured problems that require some form of logic that are domain specific (Lehman et al, 1988). This was proved by groups of students who used these skills to support arguments by their topics.

Furthermore, students recognized the importance of learning various ways of referencing and citation and the ethical and legal issues surrounding effective use of information, particularly the topic of plagiarism. During the course, various comments were made by students to support this argument:

*“The topic about plagiarism enlightened me on various ways by which one may be caught because of providing fictitious references”.*

*“It was a very good point to learn about bibliographic citations. This is because many Masters Dissertations are rejected for submission by the Postgraduate Office for failure to cite properly” (Group 4).*

The two aspects of bibliographic citations and plagiarism are widely covered in most courses but as research indicates, various cases of academic misconduct arising from students' failure to appropriately quote sources used indicate that this area needed particular attention (Pincus & Schmelkin, 2003; St-Hill, 2004; Matteo, 2004). In recent years when Web resources are much in use, poor referencing and plagiarism have become a major area of concern for authorities in many academic institutions (Walton & Archer, 2004). In addition to the above, Lampert (2004, 348) argues that the new era of “copy and paste” from the Internet resources have further pressed the need to launch anti-plagiarism campaigns in higher education institutions to teach students effectively to integrate information resources ethically and correctly into their work. To support the above argument, results of this study indicated that lecturers and librarians who were interviewed at the University of Dar es Salaam highlighted plagiarism as being a serious issue:

*“Students plagiarize a lot. This can be clearly seen in their work through direct copying without quoting sources and indications of false reference lists” (Lecturer, Faculty of Education)*

Different researchers argue that students in various tertiary institutions have general consciousness of the consequences of plagiarism (fear of being caught and disciplinary measures taken for defaulters). However, information literacy courses

in some of these institutions fail to reinforce legal and ethical behaviour surrounding information use (Seamans, 2002). One reason for the above could be the fact that teaching students to avoid plagiarism has always been considered to be a task of academicians (Mogg, 2002). The above observations demonstrate further the need to integrate referencing skills and plagiarism into information literacy courses. Doyle (1992) and Marchionini (1999) argue that information literacy supports good citizenship by teaching learners to avoiding plagiarism.

What was learned from this information seeking process is the fact that by equipping students with the skills to communicate information, the information literacy mind-set and culture was established and it was expected that this would in turn be developed among professional peers once these students finished their studies. In the long run, this can foster a lifelong learning process among peers through sharing ideas and by keeping each other abreast of relevant developments in their professions.

#### **8.2.6. Implications for teaching/learning IL**

In the previous sections, several implications of the findings have been discussed, focusing on various skills which are considered vital in teaching and learning IL. Generally, from the discussion above, results of the course revealed that absence of certain skills made the teaching/learning of certain aspects of information literacy difficult. These included the failure to articulate information problems, a lack of understanding of available of information sources, search tools, information search strategies and ways to organize search results and also a lack of IT.

Results of the second implementation programme indicated that students needed to acquire sets of skills in order to find relevant information for their topics. As Eisenberg & Berkowitz (1996) point out, the acquisition of information literacy skills takes place when learners pass through the following information seeking process: defining an information task or problem, selecting appropriate resources, locating the resources in a collection, reading the materials, synthesizing the information, evaluating the product and solving the problem. These, as was shown in this study, are vital in instilling learners with the knowledge of an information problem and information needs, information search strategies, knowledge of sources,

retrieving information, analysis, synthesis, evaluation and use. In addition Oliver & McLoughlin (1999) who support the above, also argue that other skills such as presentation skills, skills of using information critically, innovatively with the appropriate technology and media are also important and this was found to be the case. Taylor & Laurillard (1995) elaborated broadly on using technology and media by proposing more practical IT skills which include operating or running the physical information system and navigation or running the software. They further proposed cognitive skills such as framing an information question, searching and retrieving and reflection. These views support the findings and assumptions in this research.

This study identified a number of essential skills that an information literate person needs to possess in an information seeking process. These include problem-solving skills in locating and accessing information, reasoning skills in evaluating, communicating and using information and information use skills. Furthermore, this study found that several skills which have been stressed by various researchers and emphasized by various competency standards call for further training to be able to be instilled into learners' information seeking competency and ideally would be evident before information literacy training was undertaken. These include basic IT skills (use of keyboard, mouse, printer and file/disk management), skills of using standard software (word processing, spreadsheets, databases, and so on) and network application skills (electronic mail, Internet, Web browsers and others.). Alternatively other topic could deserve additional training following basic information literacy training such as information retrieval skills and bibliographic citation skills. The table below summarizes various important skills identified in this study:

**Table 8-1: Significant skills identified in the study**

| <b>IL Process</b>                   | <b>Knowledge acquired</b>  | <b>Key skills acquired</b>   |
|-------------------------------------|--|--|
| Define Task                         | Knowledge of the topic   | <ul style="list-style-type: none"> <li>• Skills of articulating a research topic</li> <li>• Skills of formulating topic statements and questions</li> <li>• Skills of focusing a topic</li> </ul>  |
|                                     | Knowledge of information needs   | <ul style="list-style-type: none"> <li>• Skills of articulating information needs</li> </ul>   |
|                                     | Knowledge of sources to familiarise with a topic                             | <ul style="list-style-type: none"> <li>• Skills of identifying and using sources to familiarise with a topic</li> </ul>  |
|                                     | Knowledge of relevant terms/words for a topic                                | <ul style="list-style-type: none"> <li>• Skills of identifying and organizing terms/words (mind mapping)</li> </ul>  |
| Locate & access information         | Knowledge of categories of sources of information                            | <ul style="list-style-type: none"> <li>• Skills of identifying/choosing broad categories of information sources</li> </ul>   |
|                                     | Knowledge of location and access tools                                       | <ul style="list-style-type: none"> <li>• Skills of identifying/describing search tools</li> </ul>  |
|                                     | Knowledge of structure of information sources                                | <ul style="list-style-type: none"> <li>• Skills of identifying/describing elements of information sources</li> </ul>   |
|                                     | Knowledge of information retrieval systems & search strategies               | <ul style="list-style-type: none"> <li>• Skills of formulating information search strategies</li> <li>• Skills of operating the physical information system</li> <li>• Skills of navigating the information system</li> <li>• Information search and retrieval skills</li> <li>• Problem-solving skills</li> </ul> |
| Synthesize and evaluate information | Knowledge of various techniques of synthesizing information                  | <ul style="list-style-type: none"> <li>• Skills of capturing and synthesizing information from sources</li> </ul>  |
|                                     | Knowledge of evaluation criteria in information                              | <ul style="list-style-type: none"> <li>• Skills of evaluating information and sources</li> <li>• Reasoning skills in evaluating information</li> </ul>   |
| Communicate and use information     | Knowledge of presentation techniques and using information                   | <ul style="list-style-type: none"> <li>• Skills of presenting information</li> <li>• Information use skills</li> <li>• Reasoning skills in communicating and using information</li> <li>• Bibliographic citation skills</li> </ul>   |
|                                     | Knowledge of ethical and legal issues of communicating and using information | <ul style="list-style-type: none"> <li>• Skills of identifying/describing legal and ethical issues surrounding the effective use of information and IT</li> </ul>  |

In addition to the summary of skills in the table above, the study found that the key thinking skills associated with independent learning and creative thinking (Marton, Dall’Alba & Beaty, 1993; Moseley et al., 2004) were important. They helped to achieve the teaching and learning objectives of the IL course. The above authors highlight key thinking skills such as productive thinking (which include analyzing, synthesizing, evaluating, creativity and problem solving) and reflective thinking. These skills were considered important in this research as elaborated further below.

Students used a range of productive thinking skills outlined above to acquire relevant and meaningful information. In addition to analysis, synthesis and evaluating information, students used creative thinking to plan search strategies through narrowing/broadening searches and in synthesis and evaluating information. According to Scheirer (2000), students use intuitive and imaginative thoughts in selecting and evaluating ideas, processes, experiences and objects in more meaningful ways. This is evident from one student who admitted as follows:

*“I was looking for materials focused on “Financial allocation on the availability of physical facilities in Tanzanian secondary schools”, paying attention to Mtwara Region, but could not find any similar literature. However, through creative thinking in mind, I decided to organize a talk about problems associated with financial allocations and physical facilities in secondary schools in Dar es Salaam. Those who participated in the talk recommended several unpublished reports about this topic and I was able to get a lot of relevant information from these resources”.*

Students used problem solving skills to find solutions to obstacles associated with locating and accessing information to get relevant information from a wide range of sources of information. Wildemuth et. al. (1995) argue that problem solving skills facilitate searching proficiency in that they assist searchers in selection of search terms, improving the selection of search terms over the course of the search, and efficiency in performing searches in databases. Brown (1999) adds to the above observation by stating that problem solving skills are essential throughout the information seeking process in assisting learners to contemplate an information problem, locate, evaluate information and sources, evaluate, select and understand the information within sources, analyze, synthesize and apply information to the stated information problem. In this study, students made the following comments on problem-solving skills:

*“The problem-solving skills helped us to plan for information search process through solving problems associated with the process” (Group 4)*

*“We used problem solving skills to find information that solved our information problems”. (Group 2)*

*“Problem solving skills helped us define our task (information problem), identify activities carried out in the search process, identify problems that we encountered in the process and solutions sought”. (Group 1)*



The study integrated various forms of reflection throughout the programme. These included feedback through group presentations, reflective sessions, quizzes and exercises. Throughout the information search process, reflection helped students to articulate their information problems, determine their information needs, identify search terms, plan search strategies, search and refine their findings, assess the relevance of information found and integrate their prior knowledge with the new information to answer their research questions. A comment from one student from this course illustrates this:

*“Reflections, through exercises, group discussions and presentations helped me and my group to elaborate our research problem, determine information needed, planning for information search, carrying out the search, retrieve information, synthesize, evaluate and judge the usefulness of information found with what we knew before ”.*

Hence students acquired reflective skills which made them aware of the learning process and helped them envisage how to apply the learning to the information seeking activities throughout the course. Reflections prompted students to apply various skills summarised in the table above to find information relevant to their Masters Degree topics. In this study, students argued that reflective exercises made them aware of relevant skills related to information literacy:

*“Reflective questions that needed students to recall on new skills taught and what was acquired, created an awareness of various important skills in information seeking process”*

Although Macdonald, Heap & Mason (2001) argue that the acquisition of reflective thinking skills might not be straightforward, literature proves that these skills can be acquired and applied in various tasks. For example, Morris (2005) argues that students in their first year of study in tertiary institutions always find it hard to write their information search strategies due to failure in understanding the iterative nature of the process. This is caused by their lack of reflective thinking skills which could assist them to recognize what they have achieved in completing the process of developing search strategies. Hinett (2002) argues that in a mediated learning, reflections can help learners make connections between the theory and concepts learned formally. Furthermore reflection helps deep learning by promoting independent learning whereby learners focus their thoughts and articulate the results

of their reflections. Reflection in the form of on-going feedback is an important approach in project work since it helps learners in the processes and stages that underpin an independent learning project (Squires 1994; Smith & Hepworth 2005). Scheppner et al. (1998) argue further that reflection fosters self-assessment, which in turn promotes life long learning. One student argued as follows, to support the above aspect on fostering self assessment:

*“Reflective exercises have been very useful to me because when I was asked to explain what I have learned and what I did during a particular session, it helped to sharpen my memory and determined the extent to which the new skills acquired facilitated the learning process”.*

*“Questions in reflective exercises were very helpful. They helped me to think over in my mind about what I did and what new skills I acquired. This helped me to clarify things more and expand on what I have done”.*

Moseley et al. (2004) argue that productive and reflective thinking skills play an important role in helping learners develop a mature understanding of thinking and learning in a situation where learners actively engage in the learning process. Also thinking skills assist in recognizing the values of transferable skills, which can best be carried out in the environment where good communication, commitment and sharing of ideas improve learning and performance. Literature reveals that communication is an important tool in mediating meaning especially in a situation where learners are actively engaged in creating it (Squires, 1994; Bruce, 1995). The course was carried out in an active environment that encouraged students to communicate their findings and share ideas from one another through group presentations and reflection sessions. Hence, communication through group presentations assisted students to make use of the benefits of collaborative learning (Ramsden, 1992; Biggs, 1999). Communication in an active learning environment boosts motivation and concentration; it helps to provide feedback to the instructor and students and further helps to create a sense of fulfillment (Steinert & Snell, 1999). In addition, the above thinking skills assist IL instructors in reflecting on their own learning and teaching, also in assessing the programme to make constant adjustments to facilitate learning.

To summarise the above discussion, the study found that the above-mentioned skills (that is, reflective and productive skills) helped students recognise and manipulate several skills as summarised in the table 8-1 above.

### **8.3. Reflections on methods and approaches of teaching and learning and challenges in implementing IL programme**

#### **8.3.1. Introduction**

This section attempts to highlight the role and extent to which various teaching methods and approaches facilitated teaching and learning information literacy. It also discusses various challenges posed by the above methods and approaches in implementing information literacy education. Teaching the information literacy course was carried out through the use of various methods including lectures/tutorials, quizzes, diagnostic tests, group presentations and reflective sessions. Also the study adapted various approaches that assisted in the design and implementation of the programmes. These aspects, and the challenges they posed, are highlighted in the sections below, based largely on the results of the second implementation programme.

#### **8.3.2. Reflections on methods of teaching and learning information literacy**

Results from the course indicated that the use of a combination of methods such as quizzes, exercises, group presentations, reflections and lectures helped facilitate the teaching and learning of information literacy. The use of quizzes was successful in assessing students' understanding of what was taught. Furthermore, apart from demonstrating an understanding of what was taught, quizzes helped students reflect on what the information seeking process involves which in itself is an important part of the learning process. For example, a number stated questions they would ask when starting an investigative research topic:

*"What is the topic about?"*

*"Does this topic or subject area exist and if so, which broader and or related subject area surrounds it?"*

*"What has already been discussed about this topic?"*

*"What do I know about this topic and what I do not know?"*

*"Where and how to find background information about the topic?"*

*"How do I plan to search for information?"*

*"Which sources exist that provide answers to topical questions addressed?"*

*"Will the answers obtained be relevant to my topic?"*

*“To what extent will the information obtained solve information problems related to my topic?”*

These questions demonstrated students’ attempts to reflect on the information seeking process to find information relevant to their topics. Literature reveal that quizzes help recall a concrete knowledge of names, concepts or expressions (Cunningham, 1998). Quizzes also help evaluate and reflect on the course content, thus creating a more meaningful learning experience (Hall, 1997). Results from the course indicated that students commended the use of quizzes to reflect on what was taught:

*“Several questions in quizzes such as the proper uses of Boolean AND, OR and NOT made me reflect back on how the three operators work and I was able to provide the right answer to that question, based on the experience I got from the information retrieval aspect covered in this course”.*

Furthermore, students commented that questions in quizzes reflected what they had learned in other courses:

*“The first question in the quizzes, which was on difficulties in narrowing a topic when writing a research paper, is similar to what we had learned previously in research methodology course”.* (Group 1)

Also quizzes helped to determine the evidence of actual students’ learning and reinforced the impression that the course was a learning experience (Bury & Oud, 2004). Results from the second implementation programme revealed that quizzes helped students to realize that the course was part of what they learned. For example one student commented as follows:

*“Quizzes helped to give an impression that this course was a serious business and one had to recall what was learned in order to provide correct answers hence improve the learning process, this is what other courses do as well”.*

Moreover, in an active learning environment, quizzes help in applying knowledge to a practical setting (Keyser, 2000). Examples to support this statement include a comment made by one student:

*“The question on various examples of plagiarism addressed techniques that are really practical in the academic environment where people copy and paste information from the Internet and use it comfortably”.*

Lupton (2004) argues furthermore that quizzes assist to provide self-assessment for students at varying levels of the course. This was true in the course as the comment made below by a student helps to illustrate:

*“Quizzes helped to make me more alert during the course and work hard, because whenever we discussed answers to the questions, I found that my understanding of what was being taught was very low”.*

In addition to the significance of using quizzes, diagnostic tests (pre/post) demonstrated an increase in students' information literacy skills. The literature revealed that diagnostic tests can be used to compare pre- and post-training results as a way of evaluating a training course to identify the strengths or weaknesses of students in order to make improvements on programmes (Miller et al, 1998). Diagnostic tests can also be used as a benchmark measure for competence, although this was not the main purpose of the tests in the course. Diagnostic tests at the beginning of the course help to assess the students' learning needs (Jackson, 2005) and provide means for considering the progress that learners wish to make throughout the course (Steiner, 2001). The two observations were evident in the course. For example, various areas of IT skills that students seemed to lack necessitated the course facilitators to spend more time to equip students with basic IT skills which were considered relevant for the course.

Similarly, diagnostic post tests gave students the feelings of success and accomplishment of the learning process. For example one student argued as follows:

*“When I did the diagnostic test for the second time, I realized that I had acquired more skills than in the pre-test, I felt satisfied and achieved the objectives for attending the course”.*

Apart from successfully demonstrating the knowledge they acquired in the course, presentations helped students engage in information seeking activities since each group aimed to make a better presentation than others, which prompted students to work hard to achieve this objective, hence helped to facilitate peer-to-peer shared learning. One student made the following comment which highlighted students' full engagement in the process:

*“Group work made me work very hard because I knew that my turn would come for presenting what our group had discussed”.*

Presentations also helped students to feel obliged to support group work by providing answers to the questions raised by the trainers and fellow students.

*“In our group everybody felt obliged to work diligently to support each other, especially when other groups worked towards defeating us. We were willing to share responsibilities even when one of us committed mistakes while making a presentation”. (Group 4).*

Moreover, PowerPoint presentation skills motivated students to learn new presentation skills vital in their teaching profession (Steinert & Snell, 1999), which they perceived as generally useful. The following comment was made by one student in order to support the above argument:

*“Microsoft PowerPoint presentation techniques are new in our profession, yet very important because teaching in the world of today is mediated by IT facilities which prompt the use of numerous techniques, PowerPoint being one among them”.*

Presentations helped identify unfulfilled needs and possible adaptations of the course in future. Example of the above includes statements such as:

*“Despite all that was covered, I failed to know how to effectively make use of various techniques of information searching, because the course did not teach us IT skills as well”.*

*“I thought this course would also cover several aspects such as different writing skills for journal articles. The rest was OK except for this one”.*

The combination of presentations with reflective sessions facilitated communication among students and sharing ideas. One student made such comments as follows:

*“When we presented our work to other groups and reflected on what was covered on each day, we were able to learn from each other. Some students shared concerns/issues raised during these sessions with each other during their spare time, which included, for example, finding ways of dealing with things that seemed unclear during the sessions”.*

The combination of quizzes, reflective exercises, group presentations and reflections, together with lecture presentations improved the teaching/learning process. Lectures, for example, assumed that certain skills needed to be taught and demonstrated. One student made the following observation:

*"It was not easy to learn certain subjects such as information retrieval, without having lectures. I once registered for an online course on information search but could not get a clear explanation about certain things including for example, how Boolean search worked. However, when a facilitator lectured and demonstrated the same, I understood it absolutely well".*

Biggs (1999) argues that lectures are an effective means of disseminating information, to model problem solving, to elucidate difficult theories, and to organise concepts. Therefore lectures not only helped to disseminate information and clarify difficult aspects, they assisted in making students aware of what they were doing and the importance of knowing what they did. Furthermore, lectures helped to prepare students and enabled them to participate in the learning process which was facilitated by other methods discussed above. This was evident from comments raised by students:

*"Lectures worked as a guide to us because they assisted to highlight and clarify important aspects which we later encountered when participating in group discussions and reflection sessions through quizzes, exercises and presentations". (Group 3)*

To summarize the various methods used in teaching and learning information literacy, the study noted that a combination of reflection and communication via group work, quizzes, reflective exercises and presentations combined with problem based learning, worked effectively and students coped with these new methods of teaching and learning. Students were kept engaged and on track throughout the course. Despite being used in many other areas of learning, the literature indicates that widespread use of these methods is less evident in the teaching and learning of information literacy than perhaps it should be.

### **8.3.3. Reflections on approaches of teaching/learning information literacy**

Results from the study indicate that the success of the course was helped by the adaptation of different approaches of teaching and learning information literacy. These included the integration of information and library science approaches to information literacy with the knowledge of information behaviour and pedagogic theories from Kolb (1984) and Vygotsky (1978), knowledge transfer, collaborative learning, situated learning and problem-based approaches.

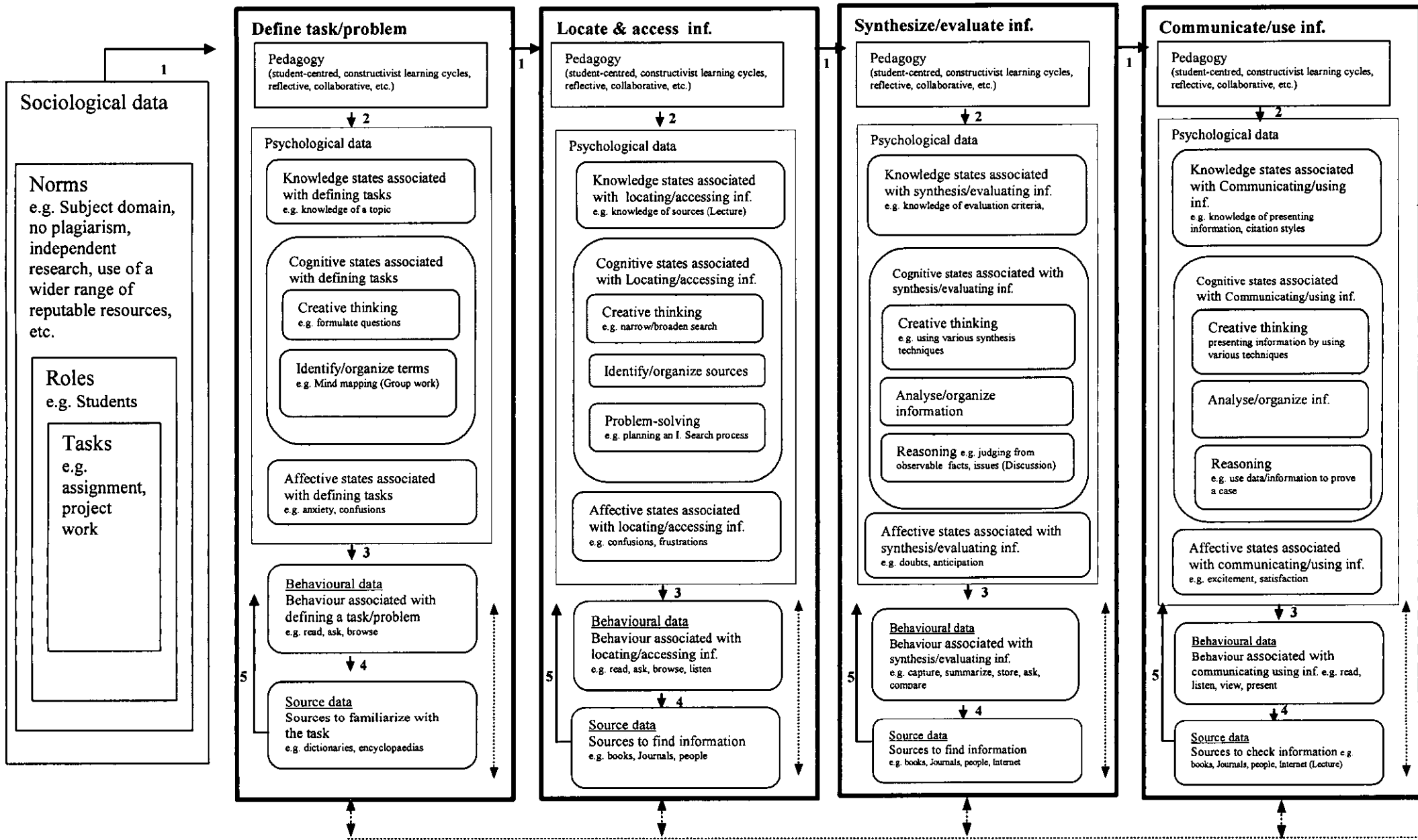
The integration of information and library science approaches to information literacy, the knowledge of information behaviour, the emphasis on key thinking skills associated with independent learning and creative thinking noted by Moseley et al., (2004) and pedagogic theories as proposed by Kolb (1984) and Vygotsky (1978) who advocate the importance of experiential and reflective learning and mediated communication, aided the design of the programme. This is supported by Burnard (1989) who considers experiential and reflective learning to be active, student-based, perception-based and much more participative.

A knowledge of information behaviour research also helped the trainers to understand the cognitive problems that students experience when undertaking an independent project as well as the iterative nature of this information seeking process. An understanding of pedagogy meant that teaching methods and techniques could be applied to foster the learning process in a way that engaged the students. The Information and Library Science approach to information literacy helped to provide an indication of what should be taught and the possible structure for the course. The integration of the three domains described above resulted into a model (summarized in chapter two) that is described in figure 8-2 below. The implementation of the course followed this model that highlights:

- The tasks related and drivers that stimulate the information need;
- The information literacy process a researcher would be involved in;
- The knowledge, cognitive and affective states associated with the process and the associated behaviour and the appropriate sources that people would interact with when undertaking an independent project based piece of learning.

Following the implementation of the course this can be seen to remain as a viable way of conceptualizing information literacy and the teaching and learning of information literacy. Individual components of the course that stemmed from this did change through the first and second implementation nevertheless the underlying structure and theory proved to be sound.





Key:   
 → IL process   
 ← Iterations   
 1 = Prompts an individual to acquire skills to   
 2 = Facilitates learning by stimulating   
 3 = Associated with   
 4 = Interaction with   
 5 = Has impact on

Figure 8-2 above highlights how various aspects from the three domains were incorporated in the design. For example it shows how various cognitive states such as creative thinking, identifying, organizing and analyzing information were applied at different point in the learning process. The model shows various sources that could be used to find relevant information at each stage (for example using dictionaries to find background information about a topic when defining a research topic). Furthermore, it indicates how different pedagogy could be applied to a particular process (for example using group works to identify search terms with the help of a mind map). It should be noted that the application of this model had to reflect the category of learners, in that, the course by the librarians had to use different scenarios from those by Masters of Education students. Despite the contents of the model being the same at both interventions, differences in terms of the model's use occurred due to the nature of subject domains covered by the two categories of learners.

In general, apart from helping with the design of the course, the integration of the above three approaches helped to develop students' interpersonal and communication skills, understanding of course concepts, teamwork, listening skills, critical thinking and problem solving skills.

The knowledge transfer notion of the training course worked well. To support the knowledge transfer aspect used in this course, Samson & Granath (2001) argue that end users acquire learning and information skills through a knowledge transfer process, by means of self-directed, personalized and adaptive knowledge routes, which are tailored to the users' needs, prerequisites and goals. Results from the course indicate that the librarians who took part in the "pilot" programme in April 2005 were able to implement the training programme with Masters of Education students from the Faculty of Education, in July 2005. The knowledge transfer was facilitated by librarians' ability to develop high-order competences such as critical thinking and problem solving that enabled the facilitation of information literacy for learners. Furthermore, librarians attended the course while knowing that the skills acquired would be beneficial to students and other potential information literacy learners. This was revealed by one of the librarians who argued as follows:

*"Since IL courses started running in this library, we have been lacking proper and professional IL teaching methods, structure and*

*harmonization. With this new knowledge, we will be in a better position to organize courses for our students and Training of Trainers sessions with other librarians because at least now there is a course structure to follow”.*

In addition, the librarians used the experience of the pilot training (through reflective quizzes, exercises, presentations and discussions), to reflect on the style of pedagogy and the content, and to propose various aspects that helped to further improve the second implementation with the Masters students. These included suggestions for more subject-specific information sources, sources and services provided by other institutions such as government ministries, Non-government Organizations and associations. Others included citation styles and provision of instructions in using the available library resources. It was evident from individual students who attended the course that they in turn were able to transfer the skills learned to their fellow students (see details under 7.6. above) although the quality of this training was not evaluated. Students used the same course materials to demonstrate to fellow students who did not attend the course on various information seeking activities. This, to some extent, helps to reflect the “scaffold/snowballing” learning experience that gives students the opportunity to acquire skills in information gathering, recognizing its relevance, critical thinking and reflection (Hine et al., 2002). In the scaffolding approach, facilitators gave students initial support at the beginning, and then students had to cope with the tasks independently. Students later “snow-balled” the skills with those who did not attend the programme.

The course took a situated learning approach, which according to Lave and Wenger (1990) was a function of the activity, context and culture in which it took place. Their argument is also supported by Linhart (2002) who views the teaching and learning of information literacy contextually; related to the context in which learners would understand, use, apply and communicate information. The course was based on a range of information seeking activities that reflected the curriculum needs of Masters of Education students in preparations for their final degree theses. The context and culture within which information literacy was taught was academic where students were expected to use online databases, online public access systems (OPACs), books, journal articles, search engines, Web based resources as well as experts and authoritative bodies that provided such resources and knowledge. Brown et al. (1989)

argue that situated learning recognizes the importance of contextualizing learning within settings which reflect the purpose of learning and the ultimate application of this learning beyond the classroom. Situated learning, which is based on constructivist learning philosophy, encourages learners to construct their own meaning for knowledge and information. Furthermore it recognizes the importance of interaction and socialization among learners as the most important elements in the learning process.

In the context of the information literacy course at the University of Dar es Salaam, situated learning was implemented by using a problem-based approach. This approach helped students to work on real life problems associated with their topics. Literature indicates that a number of information literacy courses conducted in the “Western world” realize the need to teach information literacy skills based on information problem-based approach as proposed by various models and standards (Barranoik, 2001; Kuh & Gonyea, 2003; Webber & Johnston, 2003; Smith & Hepworth, 2005). Problem-based learning was facilitated by the collaboration between the librarians and faculty members in Education who provided subject-specific, education-oriented aspects for effectively teaching the course. Students were guided by the librarians through the process of identifying information problems and finding information that answered problems addressed in their topics. Literature revealed that problem-based learning encourages students to pursue their own learning using a variety of resources (Oker-Blom, 1998). Enger et al. (2002) argue that problem-based learning helps students to effectively communicate with each other and work cooperatively in groups, think critically by analyzing and solving complex problems, apply the content in the real life situations and develop the required skills for life long learning. According to Bligh (1995), problem-based learning helps the learner use experience through a series of problem solving activities with the application of knowledge and skills to the solution of real world problems in the perspectives of real practice. In supporting this approach, Jonassen (1991, 32) argues that:

*“The most effective learning contexts are those which are problem-or case-based and activity oriented, that immerse the learner in the situation requiring him or her to acquire skills or knowledge in order to solve the problem or manipulate the solution”.*

In addition to the above comment, one student commended the problem-solving approach as follows:

*“The approach of using real topics to teach information literacy skills helped me to acquire necessary skills to solve real-life information-related problems”.*

The collaborative approach in teaching and learning information literacy seemed to work as envisaged. In this respect, the researcher and course facilitators collaborated with subject librarians and academicians in the Faculty of Education who helped to ensure that the content of the course was relevant to students. Subject librarians and academicians helped to ensure that ranges of information sources used and examples chosen to explain different topics fitted into what was being taught. Bruce (2000) argues that when information literacy is incorporated into subject teaching and learning strategies, the content and learning process of the course becomes a vehicle for the development of information literacy. Furthermore, students are able to acquire and maintain information literacy skills well when the skills are embedded in their subjects, and when librarians and academics collaborate and plan together because they integrate skills into the content, learning activities and delivery methods of the subject (Pitts, 1995; Todd, 1995). Also, the incorporation of information literacy skills into specific subject areas can be facilitated by collaboration between the faculty, librarians and students’ learning advisers (Iannuzzi, Mangrum & Strichart, 1999).

To sum up the discussion above, the study found that the adaptation of various approaches in teaching and learning information literacy skills helped to facilitate the design and running of the course. It is also evident from the literature that the integration of various approaches, as was the case in this course, was innovative.

#### **8.3.4. Challenges of implementing the teaching and learning of information literacy**

Despite successful adaptations of methods and approaches in teaching and learning information literacy skills, the course identified a number of challenges in implementing an information literacy course. These challenges could be categorised as challenges associated with teaching approaches, teaching methods, organizing the programme, the need to possess sets of prior skills and other learning aspects. The challenges are discussed in detail below.

#### **8.3.4.1 Challenges with regard to the approaches to teaching information literacy programmes**

Challenges associated with approaches to teaching included the linear nature of teaching information literacy, whereas the entire information seeking process is highly iterative. The course programme together with associated activities was organized in such a way that the course was run in a purely linear style and it was not easy for facilitators to teach the skills in a non-linear approach. However, the activities involved in the process were non-linear in that students did reflect on actions and results and often repeated, refined and changed actions and strategies at various points in the information seeking process. It was discovered that the teaching of information literacy skills in a linear fashion gave students an impression that the entire process of defining needs, finding, using and presenting information took place linearly. However this is not the case, since the information seeking process is highly iterative and non-linear. Marchionini (1997) argues that the information search process involves an iterative process of search-result-learn-refine-search-result-learn-refine, rather than just a search-and-retrieval process. During the programme, many students became aware of the iterative nature of the information seeking process only after they had made information searches. The failure to consciously recognise the iterative nature during the course, as Morris (2005) noted, is one explanation why some students failed to obtain relevant results from numerous online resources. One group implicitly recognized this:

*“We searched on various online resources but did not get what we desired. However, when we went back and identified other search terms different from the previous ones, we were able to obtain sound results”.*  
(Group 3)

Other studies such as Dearden et al. (2004) confirm that student skills and knowledge are developed through an iterative, incremental approach, which in other words implies a “developmental sequence of learning” throughout students’ academic life. Students require explicit iterative teaching of information literacy skills that would bring a meaningful purpose of incrementing information literacy skills throughout the academic process. In order to make students aware of the iterative nature of the information seeking process, the course adapted Hepworth’s user perspective of online search and retrieval knowledge (see 8.2.3. above) that helped to demonstrate the iterative nature of information searching. However getting a balance between the

linear course structure and the implied linearity of the process and a realization of the iterative nature of the process is therefore a challenge.

It was discovered from the course results that several students recognized the value of each information seeking step only when they reached their final goal. They failed to consciously appreciate information literacy knowledge and the component skills and attitudes associated with it during the learning process. This was evident from several comments at the end of the course such as:

*"I came to realize that reasoning skills are not only useful in research, they can be used in information seeking process in order to provide evidence for my work by using information (evidence) from a library journal to prove something".*

*"It took me time to realize the difference between primary and secondary sources what they meant to me was different".*

One of the factors that contributed to students' inability to recognise each information seeking step during the course could be their lack of information seeking experience. Students acquire this experience through participating in information seeking processes in information rich environments (Bruce, 2002). This poses a challenge in terms of getting students to engage with and appreciate the importance of what is to be learnt.

#### **8.3.4.2 Challenges in adapting various teaching/learning methods**

Challenges associated with methods of teaching information literacy included the fact that several methods such as lectures, tests and quizzes, have been criticized by various researchers for being poor methods of knowledge transfer, enhancing skills and assessing students understanding. Generally, lectures have been considered a poor way of imparting knowledge to students as compared to other methods such as personal reading and study or discussions (Ramsden, 1992; Steinert & Snell, 1999). The limitations of lectures include their ineffectiveness to promote deep level learning in which students are placed in a passive position that discourages reflection or critical thinking. Furthermore, lecturing is not the best method of teaching students' applications or knowledge production. This is explained by Mills as follows:

*“The main disadvantage is that knowledge gained by passive listening to a factual lecture without some participation by the class is not readily assimilated and saturation sets in very quickly. The lecture offers no scope for class participation and is therefore of no use in training students in skills”.* (Mills, 1967, 156)

With regard to this course, the use of lectures to some extent created an impression that the course was teacher-focused, which made students afraid of asking questions or challenging the facilitators. At certain points, facilitators spent time lecturing, hence making students less active. One student commented on this particular problem as follows:

*“Day three consisted of series of lectures. However due to the complex nature of what was being covered (structures of information sources and information retrieval) and limited time, the only best way of learning was by lectures, which however made the learning process very formal, hence unexciting”.*

However, certain aspects of the course had to be taught to students in order to clarify various concepts that seemed unfamiliar to students, such as structures of information sources, information retrieval aspects, citation styles and others. Also lecturing aimed to stress the importance of acquiring certain skills such as the reasons for defining a topic, identifying terms, understanding the structures of databases, broadening/narrowing searches, evaluating and communicating information. Furthermore, this course was conducted in an active style in which the short lectures proved to be an appropriate method in communicating the skills. Thus, lecturing was considered important because, as King (1993) noted, short lectures are useful to introduce the basic steps of a new skill hence “scaffolding” the knowledge and providing tools with which students learn well. Lectures were therefore combined with other participative methods as explained under 8.3.2 above and took the least time.

The use of quizzes and tests as a way of assessing the course performance has been criticized by several researchers. For example, Webber (2001) points out that multiple choice assessment methods allow for guess work. They may also end up testing superficial knowledge (Astin, 1993). During the course, a few students gave negative responses towards quizzes, as the example below attempts to illustrate:



*“Quizzes, especially multiple choices, provided less-committed students with greater chances of guessing the answers, hence preventing them from thinking harder”.*

*“Sometimes I selected possible answers for multiple-choice questions without thinking why I did so”.*

Nevertheless, to make the two methods more effective, quizzes consisted of both multiple-choice and filling in questions, which required elaborate and specific answers. Also quizzes were followed by immediate answer sessions in which students discussed with facilitators the correct answers, making these sessions useful in terms of knowledge acquisition, understanding and sharing hence contributing to learning encouraging reflection and encouraging motivation. Also, lectures and discussions were used to instill students with deep knowledge by elaborating in detail various aspects asked about in diagnostic tests such as information generation and sources, information search, evaluating information, presenting and using information.

Moreover, despite successfully using reflective exercises to facilitate reflective learning, it was discovered that learning reflective thinking was not straightforward. When asked to give their opinions about reflective thinking skills, a few students admitted as follows:

*“Reflective thinking skills were not acquired directly. One had to acquire these skills by thinking what was learned, not by practicing what was learned”.*

*“Whereas various skills in this course were acquired through practice, reflective thinking skills came as a result of series of expressions; some of them were without words”.*

*“Reflective thinking skills were meant to make us aware of what we have acquired. But it took time for some of us to recognize what new skills we have gained after each session”.* (Group 2)

The above comments concur with Macdonald, Heap & Mason (2001) who argue that the acquisition of reflective thinking skills may not be straightforward. However, literature supports the use of reflective skills since they can be acquired and applied in various situations. As was pointed out (see above), reflective thinking is learned indirectly through experience; hence the use of open-ended exercises and face to face reflection sessions was considered helpful to equip students with critical thinking

skills to reflect on the learning process. Furthermore, Boyd & Fales (1983, 100) comment;

*“...reflection makes the difference in whether an individual repeats the same experience several times, becoming highly proficient at one behavior, or learns from experiences in such a way that he or she is cognitively or affectively changed”.*

In addition, literature reveals that there is a lack of reliable methods of assessing whether reflection has taken place or not (Wong et al, 1995). In realising the above, this study adapted the use of reflexive exercises that to a great extent helped to indicate student’s comments which reflected what they went through in the course.

In addition to the above, the problem-based learning approach was a new phenomenon for students, owing to the nature of the education system in most Tanzanian secondary and tertiary institutions being teacher-based (Senzige & Sarukesi, 2003; Hepworth & Wema, 2005). Students were introduced to the problem-solving approach “to make meanings for themselves” (King, 1993, 30-31) on particular aspects of their topics which required the interaction with specific information to acquire new knowledge. Since this approach was new, at certain points students demonstrated low thinking skills especially when thinking of alternatives to problems associated with information search strategies. It was felt that the course would have registered much more significant results had students possessed problem based learning skills experience. This would have allowed them to frame important questions from their topics and apply sound research skills to find answers and communication skills to convey the results (Andretta, 2005).

The opportunity to assess the long term impact of the course on learners was a challenge. It was found in this course that, despite carrying out short-term assessment of skills acquired by students, the course failed to obtain results that demonstrated long term impact of the same. It proved difficult for the study to obtain responses from many lecturers/supervisors who administered Masters Degree theses of students who attended the programme to compare with those who did not. A follow-up survey carried out with two academic staff at the Faculty of Education, University of Dar es Salaam indicated that results for students’ theses would be obtained in September 2006. This was caused by differences in students’ finishing time for writing their theses and administrative procedures involved in obtaining such results. Furthermore,

the failure to carry out diagnostic tests for students who did not participate in the programme minimized the chances of determining the effectiveness of skills acquired by those who participated in the course and those who did not. However, the literature did indicate that assessments for information literacy skills for students who attend the programme (without taking into account those who do not) does still provide an insight of whether or not the objectives of teaching and learning the skills have been met (Andretta, 2005; Dewald et al., 2000; Brown & Krumholz, 2002).

#### **8.3.4.3 Challenges in organizing information literacy programmes**

Challenges that faced the organization of the information literacy programme included the difficulty in running the courses within the curriculum's time schedule. In addition, organizing information literacy classes, enrolling students, liaising with academics on subject-related aspects and long-term assessment of the course outcome posed challenges to the researcher. Although the course was run in a tight, 7 day, 8 hour (56 hours) programme that covered a wide range of topics, together with quizzes, exercises, presentations, reflection and hands-on use of ICT, it was evident that time was insufficient to exhaustively cover all aspects planned. This problem was echoed by students, for example:

*"Everything was well except for time to search for information". (Group 1)*

*"Time was limited to evaluate all materials we obtained". (Group 2)*

*"Time was not enough to learn details of various aspects such as information retrieval, bibliographic citations and presenting information". (Group 4)*

In addition to the above, running a course like this during the term time was difficult. In this particular course students were able to participate into the course only when the coursework session for their Masters Degree programme ended in June 2005. In view of the above, several students made the following comments:

*"The course should be conducted right before students start year 1".*

*"These skills came too late – they should be taught early when we just reported at the University".*

*"The course should be run along a specific duration of time, say first eight weeks, once in every week".*

The above comments imply that due to its discursive nature and lack of time, the course should be conducted either at the beginning of term, or as a specific skills course run across the academic year. Literature reveals that the challenges associated with planning the appropriate time to teach the skills and discursive nature of certain teaching aspects have also affected various programmes (such as Julien, 2000). In the light of the above, Bruce (2002) argues that critical components of a successful information literacy programme include the curriculum that facilitates learning specific skills either at the start of the course or at point of need.

Organizing information literacy programmes in learning environments such as the University of Dar es Salaam, where information literacy courses were not integrated into the academic curriculum, was difficult. It proved difficult enrolling librarians and students onto the courses, outsourcing facilitators and running the programme according to the planned time schedule. Enlisting librarians required a lengthy administrative process of assigning their normal duties to other staff to ensure that full participation in the course would not interfere with the institutional activities. The second implementation programme depended highly on students' availability, an aspect that a researcher could not influence or control. Course facilitators working beyond their normal work schedules to prepare and teach in the second implementation programme called for expenses in terms of over-time allowances and transport costs. In addition, administrative issues such as teaching facilities, enrolling students and gaining access to library resources such as equipment and classrooms took a long time to accomplish. This was caused by the University administration's failure to timely disburse funds required to facilitate certain activities such as secretarial services and paying allowances to course facilitators. Various researchers (such as Hepworth, 2000; Skov & Skærbak, 2003) have also found that in order to run information literacy courses effectively, there is a need to provide funding to facilitate teaching and associated activities.

In addition, it was observed that involving both librarians and academics in planning for information literacy classes in terms of provision of relevant sources of information and examples for teaching purposes was also not easy. In the first place, several academics did not realize the essence of teaching information literacy skills on a specific subject-basis. Instead they thought that equipping students with basic

library skills (such as using the library facilities and resources, including printed books, journals, theses/dissertations and OPAC) and the use of ICT to locate and access information was equivalent to equipping them with information literacy skills. Furthermore, most academics thought that they were in a better position to teach information literacy based on a specific subjects approach than subject librarians. Literature has recorded similar challenges have been faced by other researchers. For example Homann (2001) observed that academics have developed indifferent attitudes towards librarians' ability in teaching. In addition, there is a general failure of both the librarians and academicians to understand the role of one another (Ivey, 1994). Furthermore, Cannon (1994) discovered that the difficulties in collaboration between librarians and academics could be caused by too much teaching work load for academicians not wanting to take on new responsibilities and the perception that students in sciences and engineering do not require thorough information literacy training due to the nature of their courses.

#### **8.3.4.4 Learners' lack of prior skills associated with information literacy**

Challenges in terms of prior skills included learners' failure to possess key skills including ICT skills, which were considered vital in facilitating an effective learning experience. The selection of course participants focused specifically on their availability, willingness to participate and topical interests within groups rather than their prior skills in the above aspects. Several students pointed out specifically that their lack of IT skills (Windows basics and the Internet) was a contributing factor to effectively applying their information skills, as indicated in the following comments:

*"Frankly speaking, many of us are still feeling uneasy with using computers; we could not make effective use of search tools because of being computer illiterate". (Group 3)*

*"We lacked computer skills to apply some presentation techniques such as PowerPoint". (Group 2)*

*"Lack of IT skills minimized the excitements of the course. Most resources have to be accessed online these days and we could not make effective use of it". (Group 1)*

Literature suggests that there is a need for students to possess prior basic skills such as the use of libraries and related services (Joint & Kemp 2000). This prerequisite is also

supported by the SCONUL Model (2000) which places basic library and IT skills as the foundations of the seven information literacy competencies (Andretta, 2005).

One approach used to counter challenges indicated above was to mix novice with advanced IT skilled students. However, the above seemed not to be effective since students with the required skills dominated most hands on activities, depriving the novice users of the opportunity to acquire IT experience. Due to the discursive nature of the course, students needed to acquire prior skills in the basics of the library, the Internet and other information systems and services before getting involved in intensive skills related to information searching and retrieval.

#### **8.3.4.5 Challenges with regard to the nature of models for teaching information literacy**

A general challenge encountered in the initial design and implementation of the information literacy programmes was concerned with the nature of current models. Most models associated with an information and library science conception of information literacy, thinking skills and information seeking behaviour, together with numerous standards describe the detail of what information literacy skills to teach and the processes people go through. However there are many, each emphasizing different aspects of the phenomenon. There are a few models that demonstrate how to teach information literacy and how to plan and deliver creative and effective information literacy skills courses (Arnone et al., 2003; Johnston & Webber, 2003), but these do not incorporate all these disparate, yet relevant fields of thought. There are also very few information literacy skills instruction programs (such as Andretta, 2005; Johnston & Webber, 2003; Walton, Baker & Hepworth, 2006) that provide real-life demonstrations that explicitly use specific techniques that can be used by practitioners for designing and delivering effective information skills lessons. This work is therefore novel in the way it has brought to bear different, but related areas of knowledge to develop and gather extensive data on information literacy training.

#### **8.4. Summary**

To sum up the above discussion, the findings from this study derived a number of lessons. The findings have shown that teaching information literacy is a complex process and to do it well requires a significant amount of time for both the trainer and the student. It has also shown that knowledge from Information and Library Science and education plus subject knowledge of the domain within which information literacy is learnt is important in facilitating the teaching of information literacy. The findings also illustrate the fact that defining the overall task is a fundamental step in teaching and learning information literacy. This is because the process of defining tasks as well as instigating a number of processes continues throughout the information seeking process. Whereas previous research reveals less emphasis on developing this process. Furthermore, the strategic combination of various teaching/learning methods such as quizzes, diagnostic tests, reflective exercises, group presentations and reflections was shown to be effective in a problem-based learning environment which requires a learner to work towards solving real-life information problems that they can relate to. However, it was seen that in order to effectively implement successful information literacy programmes learners require prior skills in basic IT and other ICT applications related to information management, search and retrieval. Furthermore, teaching/learning information literacy is incremental in that as well as basic information literacy learners need to acquire in-depth knowledge of areas as information retrieval and bibliographic citations. This may involve follow up session following the basic course. Lastly due to the time and resources required to run such courses it is clear that such initiatives need to be considered and implemented from a university-wide perspective.

## **9.0. CHAPTER NINE: CONCLUSION AND DIRECTIONS FOR FURTHER RESEARCH**

### **9.1. Introduction**

This final chapter summarizes the main findings of the study and considers their significance, contribution to the field and significance for the future teaching and learning of information literacy in public university libraries in Tanzania. Changes and improvements that would have been made to the study and directions for further research are also discussed.

The aim and objectives of the study are considered and reflections on the achieved objectives are summarized. In addition, contributions made by this study to the field in terms of research methods and results attained and the future of teaching and learning information literacy are discussed. In particular the significance of this study for educational institutions in Tanzania is discussed.

### **9.2. Reflections on the aim and objectives of this study**

The main findings of this study are based on the aim and objectives of this study summarised below.

#### **9.2.1. Aims and objectives**

This study aimed to develop a training course that inculcated information literacy that could be implemented by staff in the library in order to provide students with appropriate information literacy skills to meet their educational goals.

To meet the above aim, the following objectives were set:

- (i). To solicit views from librarians and lecturers on students' information literacy skills.
- (ii). To identify gaps in the literature that would give reasons for the need to design a suitable information literacy programme.
- (iii). To define a model of information literacy to aid the design and teaching of information literacy programmes.
- (iv). To develop an information literacy programme based on the revised model.
- (v). To assess the impact of the information literacy programme.



- (vi). To recommend ways by which information literacy programmes could be more successful.

### **9.2.2. Research questions**

The above objectives were guided by the following research questions:

- (i). What is the nature of the ongoing information literacy skills programme at the University of Dar es Salaam?
- (ii). What are the problems associated with students' information literacy skills?
- (iii). What are the gaps in the literature that give reasons for the need to design a suitable information literacy programme?
- (iv). What should an information literacy programme teaching model consist of?
- (v). Which information literacy skills should be included in the programme?
- (vi). How should the information literacy course programme be implemented?
- (vii). What should be covered in an information literacy programme?
- (viii). What are the appropriate methods of teaching information literacy?
- (ix). To what extent has the designed information literacy course programme assisted to meet students' information literacy learning objectives?
- (x). What would facilitate the teaching and learning of information literacy in Tanzanian public universities?
- (xi). How should public universities in Tanzania organise information literacy courses?

The following analyzes how the main objectives of this study were met and categories of answers provided to research questions.

### **9.2.2.1 To solicit views from librarians and lecturers on students' information literacy skills**

This objective was fulfilled by providing answers to the following questions:

#### **(i) What is the nature of the ongoing information literacy skills programme at the University of Dar es Salaam?**

This study found that the nature of the on-going information literacy programmes was determined, to a great extent, by the current educational system in Tanzania, which was teacher-centred. Students were brought up in a system where teachers determined what students could do, including the type of information required for assignments, where to find it and how to do so. In such a system, lecturers would decide for students what books or journal articles to read. The result of such a system was quite apparent in that students were tied up in a situation where the only motivation to undertake a degree course was to pass examinations and attain academic qualifications rather than learning how to learn.

#### **(ii) What are the problems associated with students' information skills?**

The study discovered that students were unable to identify information needs associated with their academic work and lacked the knowledge of wide ranges of sources to acquaint themselves with their topics or subject areas. On a similar note, students lacked the skills to locate and access information through the range of tools such as the library OPAC, online databases and search engines. The knowledge of analyzing, synthesizing, evaluating information and making its effective use was also lacking among students.

The reasons for these problems were a lack of formal education in these skills at primary, secondary and tertiary educational levels and a lack of appropriate information literacy training programmes that would equip students with appropriate information seeking skills. The teacher-led, passive style did not consider employing suitable pedagogical teaching styles such as problem-based and active learning approaches. Hence, these programmes were unable to equip students with thinking/problem-solving skills. In addition, findings from this study revealed that students' knowledge of information literacy and the kind of problems they experienced were the same as those reported by researchers in "Western" countries.

### **9.2.2.2 To investigate gaps in the literature that would give reasons for the need to design a suitable information literacy programme**

This objective was fulfilled by providing answers to the following question:

#### **(iii) What are the gaps in information literacy research that give reasons for the need to design a suitable information literacy programme?**

The literature revealed a lack of research studies that attempted to indicate how various theories from information behaviour research and approaches in teaching information literacy have effectively been integrated with relevant educational theories and approaches. In addition, studies that have attempted to employ a combination of various methods of teaching and learning information literacy that encourage reflection such as quizzes (which encourage discussions of questions and answers), group work, presentations and reflective sessions, together with active lectures, are few. Furthermore, many studies made little use of reflective thinking; instead these skills are taught based on rehearsed answers and passive reception of what is being taught.

The review of information literacy studies indicates that various information literacy courses have not successfully equipped learners with relevant skills that encourage life long learning. The teaching approaches based on the traditional teacher-led fashion have not been successful in preparing learners to develop relevant critical thinking skills. In addition, information users in the academic environment demonstrated a lack of knowledge of their information needs, low skills in identifying and selecting relevant information sources, lack of or poor information seeking strategies, information searching, evaluating and use skills. Furthermore, assessment methods that determine the effectiveness of various information literacy programmes have not been effective. Several studies discovered that libraries only use simple multiple-choice questionnaires to assess whether a student has acquired certain skills.

Due to the gaps summarised above, it was realized that a successful information literacy programme should equip learners with information literacy skills which encourage lifelong learning based on critical thinking and problem-based approaches.

### **9.2.2.3 To define a model of information literacy to aid the design and teaching of an information literacy programme**

Answers to the question below provided information that fulfilled the objective highlighted above:

#### **(iv) What should an information literacy programme teaching model consist of?**

This study defined a teaching and learning framework that was intended to work as a tool to facilitate skills delivery and descriptions of the information literacy process. The model was based on an integration of information and library science approaches to information literacy with the knowledge of information behaviour and pedagogic theory. The information literacy model is intended to provide an indication of what should be taught and a broader course structure that would facilitate the teaching/learning of skills associated with information literacy. Various concepts from information behaviour (such as knowledge states; cognitive states; affective states; behaviour and characteristics of sources) were integrated into the programme. The purpose was to provide the content and an understanding of cognitive processes and the affective problems that students experience when undertaking an independent project as well as the “behaviour” expected of them. These were supported by pedagogic theories (such as behaviourist and constructivist approaches), together with thinking skills theory associated with independent learning and creativity including productive and reflective thinking and was intended to provide a suitable teaching approach.

### **9.2.2.4 To develop an information literacy programme with the aid of the revised model.**

This objective had a number of associated research questions as described below:

#### **(v) Which information literacy skills should be included in the course programme?**

This study realized that, in order to effectively implement the programme, a range of key skills were important. Key skills identified included IT skills, which included the use of keyboard, mouse, printers, file/disk management, word processing, spreadsheets, databases, electronic mail, Internet, Web browsers and the related skills. These were found important in working with various information systems,

managing information and communicating the same to others. Other key skills included thinking skills relating to the identification, analysis, selection, interpretation, evaluation and making inference on the information gathered. These skills were in addition to library skills such as information retrieval, bibliographic citation and knowledge of plagiarism. Others were meta-cognitive, which included reflection and self-assessment comprehension.

This study found that these skills were important for learners to achieve their perceived learning objectives. Results from the study indicated that learners who lacked these important skills failed to participate optimally in the programme to understand, find, evaluate and use information with the appropriate technology. ICT fluency ensured learners with the intellectual ability to use computers and other software applications (such as MS Word), databases and Internet technology were able to locate, access manage and communicate information through information literacy training. Information literacy enabled learners to envisage the content of information and apply key information literacy skills to locate, access, analyze, synthesize, evaluate and communicate information to achieve their learning objectives.

#### **(vi) How should the information literacy course programme be implemented?**

The implementation of an information literacy programme was done in two stages, namely the first implementation “pilot” and second implementation programmes. The first implementation “pilot” programme was carried out with 15 staff from the University of Dar es Salaam library. Its purpose was to determine whether the format of the programme could be run in the way it had been envisaged. In addition it later helped to determine whether the training course could be used to train librarians how to teach information literacy to Masters of Education students. Following the pilot adaptations were made and relevant material was created for the training of Masters Students from the Faculty of Education, in the second implementation stage of the programme. The second implementation stage was carried out to find out whether the students were able to acquire information literacy knowledge. The programme was facilitated by two librarians who participated in the first implementation “pilot” programme. A “pilot” stage would not be necessary in

the future. For future training decisions would need to be made about the length and structure of the course. For example whether it is run as a block or not plus whether such as course would be run at different levels, etc.

**(vii) What should be covered in an information literacy programme?**

The particular aspects to teach were derived from the literature that integrated various aspects from information behaviour, educational theories and information literacy concepts. Course materials to support the teaching were created based on the knowledge gathered from various tertiary institutions, together with others which were found relevant from the University of Dar es Salaam's ongoing information literacy programme (see under 5.3) and more suggestions by librarians. Others were added from areas suggested by lecturers in the Faculty of Education, such as problem-solving, creativity, reasoning, logical fallacies in education and aspects of presenting information.

**(viii) What are the appropriate methods of teaching information literacy?**

A range of teaching and learning methods was used to facilitate teaching and learning information literacy in both programmes. These methods were based on behaviourist and social constructivist approaches to learning. With a social constructivist approach, the researcher adopted active learning methods in the form of group presentations, discussions and reflections. The methods were used to assist students in creating meaning through communication and sharing ideas. On the other hand, behaviourist approaches included lectures which assumed that certain skills had to be taught and demonstrated. Examples of such skills included identifying information sources and the structure, information retrieval techniques, criteria for evaluating information and bibliographic citations. Furthermore, diagnostic tests and quizzes assumed that there were distinct information literacy skills that could be assessed to determine students' understanding and skills improvement before and after the programme. The usefulness of these methods was evaluated by students through discussions and results of an e-mail survey. These seemed to be appropriate methods judging on the feedback and impact of the course.

### **9.2.2.5 Impact of the information literacy course**

#### **(ix) To what extent has the designed information literacy programme assisted to meet students' information literacy learning objectives?**

In order to determine the impact of the information literacy programme on students, a range of assessment tools such as quizzes, group presentations, reflective exercises and diagnostic tests were used. Data obtained from these assessment tools indicated positive results for the course although some weaknesses were highlighted. Students indicated that the course enabled them to define their information problems and research topics, determine information needs, find background information about their topics, identify terms/words relevant for facilitating searching, plan search strategies, identify sources, search and retrieve information, capture information from sources, analyze, synthesize and evaluate information. Furthermore, the programme provided students with an understanding of ethical uses of information and presenting their information search findings. However, a lack of ICT knowledge, lack of presentation skills as well as information retrieval skills and bibliographical citation skills had a negative impact on the effectiveness of the course among a few students.

Six students who were contacted after the course indicated that they had made use of the acquired skills in writing up their Masters theses. They used the acquired skills to shape their research problems, searching for relevant information and meeting their research objectives. Students indicated that they had transferred the acquired knowledge to students who had not attended the training programme, who also valued the skills acquired indicating further, in addition to the transfer from researcher to librarians/trainers that the knowledge transfer notion of this course worked. Unfortunately feedback was only able to be gathered from two lecturers. However both were positive about the impact of the course.

Recommendations on ways by which the information literacy programme could have been more successful and the associated research questions are discussed under 9.4.3. below.

### **9.2.3. Overall findings**

In general, the first pilot and second implementation course programmes went well and were favourably received by both the University of Dar es Salaam librarians and Masters Students from the Educational Faculty. To sum up, the main findings are as follows:

#### **9.2.3.1 Findings with regard to the outcome of the course**

The general outcome of the course indicated the following:

- There was an increase in learners' information skills after the courses. The first implementation pilot programme indicated that librarians' information literacy skills improved after the course. On the same note, students' skills improved when the course was run for them by the librarians.
- In the first implementation "pilot" programme, several modifications and adjustments were suggested by librarians and lecturers, which when adapted, created a positive impact on the successful second implementation of the course with Masters of Education students. There were however, certain cases where students failed to effectively benefit from the suggestions due to limited time to run the programme and lack of basic information literacy skills such as the use of ICT.
- In addition to the above, the librarians who took part in the pilot in April 2005 were able to implement the training programme with Masters Students from the Faculty of Education, in July 2005. Other librarians who also took part in the pilot ran subsequent training programmes to regional librarians by applying the same course structure. Therefore, the knowledge transfer notion of the training course worked as planned. The knowledge transfer was facilitated by the librarians' ability to develop high-order competences such as critical thinking and problem solving that enabled the facilitation of information literacy for learners. The first implementation pilot programme equipped librarians with "meta-cognitive fluency", the awareness of how and why they learned, before teaching students and other librarians. In addition, the librarians used the experience of the pilot training (through reflective quizzes, exercises, presentations and discussions), to reflect on the style of pedagogy and the content, and to propose various aspects that helped to further improve the second



implementation with the Masters students. Students used the knowledge acquired and the same course materials to demonstrate to fellow students who did not attend the course about various information seeking processes such as defining information problems, identifying search terms/words, developing search strategies, information search and retrieval, evaluating information, citation styles and presenting information.

- The study found that lack of ICT knowledge, lack of presentation skills, information retrieval skills, and bibliographical citation skills among the students did have an impact on the effectiveness of the course. The lack of ICT skills prevented students effectively using folders (in the Windows environment) or online file management facilities such as Yahoo Briefcase to capture and organise information. The same was the case with the lack of other skills, which prevented students from making maximum use of search tools to search and retrieve sources, adapt ranges of presentation techniques to present their findings and utilize various bibliographic citation styles. Students were supposed to possess most of the above skills prior to the course.
- The assumptions made about students knowledge of information literacy and the kind of problems experienced by students were supported. Students lacked the relevant information literacy skills that would enable them to articulate an information problem, determine information needs, identify potential sources of information to use in their academic work, use search tools such as library OPAC and other Web tools, analyse and evaluate information and sources, present and use information ethically. These problems were the same as those written about in the western literature.

#### **9.2.3.2 Findings with regard to methods and approaches used to teach and learn information literacy**

With regard to the methods and approaches in teaching and learning information literacy, the course came to the following conclusions:

- The conscious integration of Library Science approaches to information literacy with both the knowledge of information behaviour and pedagogic theory aided the development of a training course, which achieved good results. Both the course content and outline were guided by the integration of the three aspects

mentioned above. For example, various aspects from information behaviour concepts (such as knowledge states; cognitive states; affective states; behaviour and characteristics of sources) were integrated into the course. These were supported by thinking skills associated with independent learning and creativity including productive and reflective thinking. Furthermore, the information literacy standards and models provided a broader course structure that facilitated the teaching/learning of skills associated with information literacy (define tasks; locate and access information; synthesize and evaluate information; communicate and use information). In addition to providing course structure and content the conscious attempt to draw on knowledge from information behaviour research helped the trainers understand the cognitive and affective problems that students experience when undertaking an independent project as well as the iterative nature of this information seeking process.

- In addition, an understanding of the style of learning, which was influenced by pedagogical theories of Kolb (1984) and Vygotsky (1978) helped to support the learning process. This approach, which stressed the importance of experiential and reflective learning and mediated communication helped to engage students. They actively performed various tasks in groups and communicated with each other and the trainers, and reflected on what they learned through group presentations and reflective sessions. Despite being new to them, this teaching/learning technique became popular among the learners.
- The situated learning approach which this course tried to adopt also worked well. The course was based on ranges of information seeking activities that reflected the curriculum needs of Masters of Education students in preparations for their final degree theses. The context and culture within which information literacy was taught was academic where students used online databases, online public access systems (OPACs), books, journal articles, search engines, Web based resources as well as local experts and authoritative bodies that provided such resources and knowledge. This approach encouraged students to construct their own meaning of knowledge and information in that they investigated topics relevant to the local context and their imperatives.
- The extensive use of reflection and communication via group work, quizzes, reflective exercises and presentations was effective in that it helped students to

make connections between the theory and concepts learned formally. Furthermore it helped to promote independent learning whereby students focused their thoughts and articulated the results of their reflections. Furthermore, reflection helped students to assess themselves and the learning process as a whole, through highlighting suggestions for course improvements. Throughout the reflection process, students acquired reflective skills which made them aware of the learning process and enabled them to envisage applying this learning in other information seeking activities carried out in their course.

- The use of a combination of methods such as diagnostic tests, quizzes, reflective sessions, group work, presentations and lectures helped facilitate the teaching and learning of information literacy. Diagnostic tests helped to demonstrate an increase or decrease in students' knowledge. The use of quizzes was successful in making students reflect on what they learned previously, hence tested their understanding on what was taught. It helped students realize that the course was part of what they learned and created a "serious learning environment". Presentations helped students to demonstrate the knowledge they acquired in the course, and also helped them engage in information seeking activities. Presentations also helped to identify unfulfilled needs and therefore called for possible adaptations of the course in future. Moreover, PowerPoint presentation skills motivated students to learn new presentation skills vital in their teaching profession.
- All teaching/learning methods including quizzes, diagnostic tests, reflective sessions, group work and presentations were effectively used as assessment tools. They helped to provide information to students about how well they learned and where they had difficulties. Also they provided information to instructors on how well the class understood what was taught and indicated areas where further input was needed. They also provided an overall indication of students' success in achieving their information seeking goals. Lectures helped to disseminate information to students and assisted in demonstrating and clarifying difficult aspects. They helped students to be aware of what they were doing and the importance of knowing what they did. Lectures prepared students to participate in the learning process which was facilitated by other methods

discussed above. Diagnostic tests (pre/post) helped to demonstrate the increase/decrease in students' information literacy skills.

- Results of this study seem to support the collaborative approach to teaching and learning information literacy in which librarians and academics collaborate and plan together to integrate skills into the content, learning activities and delivery methods of the subject. Hence part of the success of this course was felt to be due to the collaboration with faculty and subject librarians. They were able to help to ensure that the content of the course was relevant to the students in terms of the sources accessed and the examples chosen to explain various topics. They realized that the fundamental aspect of the course was to make it relevant to the context and goals of the students.

### **9.3. What was learned from the results of this study?**

This study aimed to develop a course programme that would be delivered to students by librarians. The overall process of design, implementation and evaluation provided several lessons to the researcher, which could also apply to other professionals in the field of information literacy.

- The integration of Information and Library Science approaches to information literacy with both the knowledge of information behaviour and pedagogic theory was seen to be a new innovation and effective approach of designing information literacy programmes. This was based on the fact that the current approach in teaching/learning information literacy focuses on adopting standardized models and frameworks of information literacy such as ACRL, SCONUL, Big6, to mention but a few. However in both implementation stages, this study integrated Information and Library Science approaches to information literacy as conceptualized by these and other models, with both the knowledge of information behaviour and pedagogic theory, which provided the content and structure of the course. In addition, the integration of the above attributes helped to equip the researcher and trainers with the knowledge of what students went through in the information seeking process, problems encountered and realizing the iterative nature of the information seeking process. It also provided the knowledge of appropriate pedagogy to assist in teaching and learning. The

Information and Library Science approaches to information literacy served to provide the course with an indication of what should be taught and a structure that facilitated the teaching/learning of skills associated with information literacy.

- The learning of information literacy was considered to be similar to learning the “culture” of information literacy, rather than simply learning information seeking skills. In this context, students learned the attitudes, values, customs and norms of information literacy, which was encouraged through discourse and the sharing of ideas. These were seen to be important tools in the development of an information literacy mind-set and culture among students. The learning environment encouraged students to formulate groups based on mutual understanding of similar topical areas for their Masters theses. This helped to bring together different students to share common skills, ideas, values and ways of thinking in solving problems. Students went away with the same mentalities, that is discussing and sharing ideas related to information seeking experiences.
- The teaching of information literacy based on problem-based, active learning through reflective learning and mediated communication approaches could work well even in learning environments where the education system is purely teacher-led. This study employed the above approaches in the learning environment where students were not familiar with problem based, active learning styles. However, results from the study indicated that despite being alien to their educational system, students favoured this approach since it helped to foster their understanding of what was being taught through active participation in solving real world problems. Students enjoyed working in this learning environment, which helped to stimulate their learning. A problem-based approach enabled students to actively engage in information problem-solving activities through collaboration with each other and it encouraged reflection and the feelings of personal ownership of the learning process.
- The above approaches worked well with teaching and learning styles based on experiential and situated learning. Experiential learning enabled students to experiment and discover the knowledge themselves. They reflected on their experience of what they went through in the programme, and developed new skills and attitudes. Situated learning helped to ensure that the training course

took place in a way that was relevant to the learning context of the students both in terms of resources, and type of topics they investigated. This helped to develop a students' mind-set that reflected an appreciation of the norms, values as well as the knowledge associated with academic information literacy (which includes instructional strategies - learning it in a subject context, different teaching/learning and assessment methods and others).

- In addition to facilitating teaching/learning, the use of diagnostic tests, quizzes, reflective exercises, group presentations and reflections helped to provide rich data that further helped to accomplish the objectives of this study. In general, these methods helped to determine the increase in students' knowledge, students' understanding of what was taught, reflections on the teaching/learning experience and assessment of the course through an on-going feedback mechanism. From the teaching/learning point of view, these methods enhanced understanding and encouraged reflection on what was learned and they helped to support learners' critical knowledge, problem solving proficiency, self-directed learning strategies, and team participation skills.
- The acquisition and possession of basic skills and competence in ICT knowledge, presentation skills, information retrieval skills, and bibliographical citation skills prior to the course had an impact on the success of such an information literacy programme. These skills supported the learning of information literacy by enabling students to search, capture, organise, store, retrieve and present information. It was discovered in this research that the lack of ICT skills meant that students made little use of folders (in the Windows environment) or online file management facilities such as Yahoo Briefcase to capture and organise information.
- Results of the study indicated that the information literacy training course would not be the end of such training. For example it was found that further training was required to build on the information retrieval skills learnt in the main course, particularly in relation to the use of subject specific databases. Further training was also seen as important in areas such as how to present information in reports, essays or journal papers and additional training on bibliographical citation was also felt necessary.

- In addition this study discovered that there was a need to explain to learners that information seeking is an iterative process. Therefore while teaching learners in a linear pattern, they should always be reminded to work iteratively within the overall process in order to achieve their desired objectives.

#### **9.4. Significance of the information literacy course to educational institutions in Tanzania**

As was indicated in chapter one, very few institutions in Tanzania offer some kind of information literacy programmes to their library users. In addition, these programmes provided insufficient knowledge to the intended audience. The course which was designed and implemented as part of this research offers an opportunity to develop information literacy levels for learners in various institutions in Tanzania. The paragraphs below attempt to highlight how these institutions could benefit from this programme and to suggest how to create a conducive environment for developing information literacy programmes.

##### **9.4.1. Benefits of the programme to educational institutions in Tanzania**

This programme developed a course framework (see figure 2-10 in chapter 2) which could be adapted by any institution and applied at different levels. It could be used by various educational institutions as a guide when designing and implementing information literacy programmes. Results from this study indicate that librarians at the University of Dar es Salaam complained about the lack of a course guide to be used for planning and running the current courses (see under 6.2.2. above for details). These librarians indicated at the end of the programme that they were happy that they could participate in teaching the on-going programmes confidently after having acquired both, information literacy skills and a training guide (see under 6.6.5. for details). The course framework could also be applied beyond tertiary institutions, such as in secondary and primary schools.

In addition to providing a training guide, this course developed teaching materials which have been integrated from course materials created by various institutions. These materials could supplement the currently used ones at the University of Dar es Salaam. The same would be the case for other institutions that conduct information literacy courses in Tanzania, such as Sokoine University of Agriculture.

These materials could be published on institutional Websites to provide students with online access, given adaptations that would seem necessary to reflect subject-specific requirements.

The learners who were trained in this course could make a contribution to the development of information literacy education in Tanzania. Gyamfi (2005) realised that one of major obstacles to introducing information literacy in the Sub-Saharan Africa was lack of trained librarians in information literacy education. To solve this problem, librarians themselves require information literacy training that among others things, would equip them with the knowledge of educational pedagogy. This course was introduced partly to solve the problem highlighted by the above author. Librarians at the University of Dar es Salaam and from regional libraries would advocate the teaching and learning of information literacy based on their experience from this course. In addition, Masters of Education students who attended this training could teach these skills to students in other institutions such as secondary and primary schools (or influence others about the same, such as authorities in the Ministry of Education or respective institutions). Several students who attended the course indicated that they would use the acquired skills in their teaching profession, to look for materials related to specific teaching subjects and teach those who would require such skills (see under 7.6.1. for details).

Results from the research will contribute to the Tanzanian literature about teaching information literacy based on the integration of Information and Library Science approaches to information literacy with the knowledge of information behaviour and pedagogic theory. Results of this study provide an indication of the best practice of teaching information literacy into tertiary institutions in Tanzania through utilizing educational theories and appropriate course design. The literature would further convey to the professionals in Information and Library Science in Tanzania the importance of teaching information literacy based on active, situated and problem-based learning. This approach, as results indicate, is responsible for developing learners' thinking and problem-solving skills which are key in independent learning. The literature would further help to demonstrate how these new approaches of teaching and learning information work practically in a local context that is familiar to Tanzanians.



However, the above benefits can only be truly realized if several obstacles are alleviated.

#### **9.4.2. Challenges for implementing information literacy programmes into educational institutions in Tanzania**

There seem to be many challenges facing the implementation of such an information literacy programme as designed in this research.

In the first place, the provision of information literacy training of this nature to an educational environment driven by teacher-centred, passive learning approaches would make this course alien to what students are used to. Rather than viewing information literacy (taught in a problem-based, active approach) as a constituent of independent learning, students might treat this course as a new phenomenon, unique to other courses, therefore “foreign” to how they are used to learn in the current information literacy courses. As a result, it might take a considerable time before they accommodate it to their local minds. In addition, the concept of independent learning is still foreign in most educational institutions in Tanzania. This approach could be treated as a threat by the academia for the fear of losing authority and their jobs.

The design and implementation of this course based on a subject area requires immense efforts by librarians and academicians, backed up by parent institutions. Several academicians expressed their lack of confidence in librarians working as instructors. There was a perceived need by the academicians that librarians should possess teaching qualifications, which unfortunately, was not the case for most of them. However few academics have teaching qualifications. In addition to academics’ attitudes towards librarians, there has been a failure by the libraries to provide services (including information literacy training) to clients based on the academic sphere of activities (that is teaching, learning, research and administrative activities). There is a general feeling by most librarians that services rendered to clients should only focus on resources and services available in the library, including teaching how to use the library OPAC to effectively locate and access library materials. They have failed to make themselves accepted by academicians and University administrators in teaching and undertaking research projects

(Nkhoma-Wamunza, 2003). Librarians in general lack the zeal to demonstrate their potential for participation in the above activities partly due to their resistance to accept changes that occur everyday in academic institutions, such as adoptions of ICT (Nawe, 2003). In addition, a lack of enthusiasm is engendered by librarians' feelings of dissatisfaction with the levels of services they provide, employers' attitudes towards libraries and the librarians themselves, hence making their abilities, requests and suggestions less significant (Nawe, 2001). This has a drastic effect on implementing new innovations into institutions where staff members treat new ideas with a cold reception and pessimism. For example, during this study, the researcher observed that several librarians did not see the importance of teaching students to define tasks (or information problems) and communicating their findings, since this appeared to be the academicians' job. Some librarians posed such questions like "despite its being a very useful invention, how could the library convince lecturers to work together in a programme like this?" These and other questions showed lack of confidence and glumness.

There is further evidence that librarians' participation in academic related activities such as carrying out research projects on librarianship or the information profession (particularly in the area of information literacy) is very low. In recent years, university administrators have started to involve academic librarians in numerous research activities, due to the perceived role academic libraries played in facilitating teaching, learning and research. Unfortunately, despite availability of funds, research into Library/Information Science has been hampered by the lack of priority librarians place on research. The University of Dar es Salaam Academic Audit Report reveals:

*"Research conducted by the library staff is of varied nature. Very little has been done on Information Science. There does not seem to be a clear priority in the library; every staff member tries to do some research in whatever area possible, apparently because in most cases such research is contracted research". (University of Dar es Salaam, 1999, 138).*

Following this critical observation, the University of Dar es Salaam set out priority areas for research in the year 2002 (Msuya, 2002). However, out of the various research areas identified (information needs, information systems, ICT, library professional education), information literacy was not included. One could ask a

question, how could information literacy prosper if librarians themselves do not put research efforts in seeing how it could be developed? Moreover, research revealed that research publications have been low among University of Dar es Salaam library staff (Manda, 2005). Hence there is a lack of locally published research on information literacy.

This study found that information literacy training in most Tanzanian institutions was considered secondary to the basic courses taught. Less importance was given towards it than other modular courses. For example, the University of Dar es Salaam administrators who were considered key in supporting all institutional training courses did not give information literacy training a significant emphasis due to lack of knowledge about it. The University's Five-Year Rolling Strategic Plan placed information literacy training at an auxiliary level in facilitating teaching, learning and research activities at the University. The following quotation from part of this document provides an example to support the above argument:

*“Information Literacy Programme intends to establish bibliographic instruction and information retrieval programme with a view to strengthening and enhancing information search, evaluation and use skills and competence of users in accessing a wide variety of information resources”.* (DPD, 2004, 17).

This document does not indicate that information literacy is essential to foster independent learning among the students, nor does it indicate fundamental skills achieved in such courses, apart from enabling users' access to information through bibliographic instruction and information retrieval skills only. This quotation helps to indicate further the weak influence librarians have on management and administrative authorities in most academic and research libraries in Tanzania. Due to librarians' failure to understand the role of information literacy in facilitating teaching, learning and research, authorities in such institutions put little emphasis on the actual role of information literacy education (Katundu, 2001; Nyerembe, 2004). Moreover, in most higher learning institutions in Tanzania, librarians' influence on institutional decision-making processes has not been significant enough (Nkhoma-Wamunza, 2003). This gives academicians and administrators room to decide and implement plans that might place information literacy programmes as a low priority area for institutional strategic plans.

To conclude this section, despite being a useful innovation, the course designed and implemented by this study might prove useless unless these obstacles are alleviated. The section below attempts to provide a way forward to reduce the impediments highlighted by this study.

#### **9.4.3. Recommendations for the implementation of successful information literacy programmes in public University libraries in Tanzania**

Librarians and information scientists in Tanzania are key in playing a fundamental role in facilitating the development of information literacy programmes in Tanzania (Katundu, 2001; Nyerembe, 2004). However in the current situation, it may not be possible for any significant changes to take place unless librarians initiate those changes. Therefore, this study proposes several recommendations and in particular focuses on the role of librarians and information scientists in Tanzania. When these professionals accept the changes that need to be made to past and current practice, then it would be easier for others such as academicians, institutional administrators and the government to support the changes. Potential areas where librarians can influence the development of information literacy education and reasons for focusing on this target audience are provided below.

##### **Incorporating information literacy in Library/Information Science curriculum:**

The current curriculum in most institutions where Librarianship/Information Science is taught does not include information literacy. In Tanzania, institutions that participate in teaching Library/Information Science courses include the University of Dar es Salaam Department of Information Studies; Tumaini University, Department of Information Studies, Iringa, School of Library, Archives and Documentation Studies Bagamoyo and; the Eastern and Southern African Management Institute Arusha. It is considered important for these institutions to introduce information literacy education into their curricula to train librarians/information science professionals who could emulate the same in their respective institutions. Introducing such courses in Africa has been emphasised by Gyamfi (2005) who recommends that institutions in Africa should establish information literacy programmes in the information science curriculum as this would prepare competent teacher-librarians to participate in teaching these skills to

students, academics and the general public. Information literacy could also help to bridge a digital divide among the Sub-Saharan African countries where people would learn how to seek and use information through using ICT tools. Kigongo-Bukenya (2003) concurs with the author above by arguing that establishing information literacy courses within the Library and Information Science curriculum in Africa would help to popularise ICT use and information ethics that relate to the ethical issues related to information use by students and academics campus-wide. Aina (2005) argues further that Library and Information Science courses in Africa should introduce information literacy programmes in their curricula since it caters for user needs related to coping with the emerging African information markets whether in the work place, the rural agricultural population or elsewhere where information literacy skills are needed.

**Holistic approach in teaching and learning information literacy to students:**

The current teaching/learning approaches in information literacy in tertiary institutions need a new focus. Librarians need to view the teaching and learning of information literacy beyond the “library research skills” and “IT literacy”. This is because, in addition to the two skills mentioned above, information literacy should teach how to seek and use information for independent learning and lifelong learning through the use of higher order analysis, synthesis, critical thinking and problem solving skills (Lupton, 2004). A holistic approach in this context takes into account teaching the above skills through the application of a range of teaching and learning methods that encourage creative thinking, reflections and sharing of ideas. These methods should be applied in problem-based, active learning environments. However, to make teaching and learning information literacy realistic, librarians need to understand what it is. The failure of librarians in not clearly understanding what is meant by information literacy can be the cause of other problems mentioned above, such as an institutional lack of emphasis on information literacy in strategic plans.

**Librarians’ active role in participation into teaching and research:** Librarians need to realize that they have an active role to play in academic activities in tertiary institutions in Tanzania. However, many of them do not realize this, they lack confidence in participating in these activities. Katundu (2001) clearly observed that

librarians have a leading role in defining aspects that need collaboration with academics. However questions such as these are always raised by librarians in Tanzania:

*“Will University professors view library staff as the logical group to facilitate such programmes? Will faculty accept librarians as partners in teaching and learning given their attitude towards librarians? Does the faculty have a good grasp of the role and complexity of the contemporary university library?”* (Nyerembe, 2004, 75)

Librarians have an influential role to play in facilitating information literacy training in tertiary institutions. For example, University of Dar es Salaam academic librarians' participation in teaching CT-300 (Library Education) module to undergraduate Education students (Msuya, 2002) could be a starting point to influence academicians in their capacity as teachers. The above course, among others, could train teachers to become information literate, which would potentially have a big impact on future teachers who would extend the knowledge to students at colleges, secondary and primary schools. Furthermore the Faculty of Education at the University of Dar es Salaam, has in the past years shown an interest in information literacy and this could be used as a starting point to help impress other faculties/departments at the University to give information literacy the importance it deserves. Librarians should also participate in research activities which aim to develop information literacy in Tanzania. Currently, very few research reports related to information literacy have been published (such as Kiondo & Katunzi-Mollel, 2005) despite interest shown by academicians and university authorities. In this particular case, research areas in information literacy would focus on the appropriate teaching/learning methods ideal to the Tanzanian academic environment and teaching information literacy to school students and other non-academic environments such as Non-Government Organizations, specific industry/sector (such as agriculture, construction industry, health and so on) and the rural population.

**Librarians' potential role in facilitating information literacy education at school levels:** Librarians have an influential role in the introduction of information literacy training at school levels. This could be possible because the Ministry of Education and Vocational Training has recently introduced a Directorate of

Libraries in Tanzania, whose role, among others is to coordinate the development of library services at schools and vocational training levels. The directorate has a supervisory role in establishing and developing school libraries. In addition, the directorate has the mandate to advise the Ministry on matters related to school libraries, information literacy could be one of them. At school levels, librarians have a role to play in facilitating the development of information literacy training courses. Several schools (such as International Schools, English medium schools and privately owned) have employed qualified librarians who participate in teaching ICT courses to students. These librarians could introduce information literacy courses as part of other programmes they participate in teaching. However these librarians need to be conversant with what information literacy entails and possess the skills to teach it.

**Role of the Tanzania Library Services Board in developing information literacy in primary schools:** The public library could use its position and the current setting to develop information literacy programmes for primary school children. The role of the public library in developing information literacy courses in primary schools has also been recognized by Bundy (2001) who argues that schools and public libraries have common goals of ensuring that students develop as information-enabled learners and encouraging students and professional staff to use libraries and information. Several regional libraries such as the National Central Library in Dar es Salaam have Children and Schools Departments (Mcharazo, 2000) where various activities such as story-telling and film/video programmes are conducted. These libraries could possibly incorporate information literacy sessions together with these programmes since they attract larger student populations.

This study expects that when the above recommendations have been realised and acted upon by librarians/information professionals, the following could become a reality:

- Universities' administration would be committed to ensure that an information literacy programme is embedded in the curricula as part of other teaching subjects. In addition, these authorities could provide physical and human resources, facilitate cooperation between librarians and the faculty, motivate

students and the faculty to acquire information literacy skills and ensure that information literacy is taught through using effective pedagogy and approaches.

- Librarians would be in a position to confidently and effectively participate in teaching information literacy courses, in liaison with the faculty. This liaison could consist of the provision of appropriate teaching aids and working with each other to ensure that the content of the course would be relevant to the students in terms of the sources accessed and the examples chosen to explain various topics.
- Virtual or hybrid learning environments (VLEs) would be developed to emulate and support the kind of information literacy learning designed for this study. The VLEs would enable course delivery to a wider student population.
- Information literacy training would be carried out in primary and secondary school levels. Students would only need advanced training skills at tertiary institutions, in addition to what they would acquire from basic education levels.

## **9.5. Improvements and directions for further research**

### **9.5.1. Improvements to be made in terms of research methods used**

There are a number of improvements which, with hindsight, could have been employed by this study and would result in better results in similar future research projects.

- Adopting a Quasi-Experimental design approach (a type of experimental design in which random selection of samples is either not possible or impractical), together with the action research design. This would involve collecting data via diagnostic pre-tests and post-tests on the experimental group and on a control group to determine variations in learning information literacy skills. Despite its weaknesses in terms of lack of randomization, quasi-experimental design would help to compare students' grades and determine if there was a difference between the two groups before and after the course.
- An alternative to a Quasi-Experimental design would be for this study to consider administering diagnostic tests to non-participants and continue



adopting case study/action research approaches to participating students. This would help to see whether the Masters theses of attendees are significantly different from those produced by students who did not attend the information literacy course.

- Administering questionnaires or interview sessions to students to find out their own views about information literacy practices at the University could be useful. This is due to the fact that information supplied by librarians and lecturers could be biased in terms of censorship. Information supplied by students could help to determine whether weaknesses noted in students were contributed to by academics' or librarians' failures to promote and develop students' information literacy skills. Weaknesses could be because librarians/lecturers were themselves information illiterate, hence failing to foster the students' information literacy.

#### **9.5.2. Improvements to be made in terms of the course**

It is believed that the course could make more impact on the learners if the following were done:

- More subject-specific questions for diagnostic tests should be designed for future subject-based courses. This study tested students' information skills generally without focusing on a particular subject domain. It would be ideal to include in the diagnostic test topics such as logical reasoning, creativity, problem-solving and critical thinking skills but draws on subject/discipline specific context.
- Provide feedback on diagnostic pre/post tests results to students. In this particular course, students did not get feedback of the diagnostic test results. The feedback in terms of test scores would help students determine whether learning needs improvement at the post course stages. The results of pre-tests could also motivate them to work more diligently to see the dramatic changes in the post-test results or maintain the scores, if they were relatively high on a previous test. It could enable them to identify their own strengths and weaknesses.
- Provision of short lectures, followed by a longer time for tutorials would allow more time for group discussions. It was noted that lectures were carried out

concurrently with discussions, whereby in some cases, facilitators spent time lecturing to clarify various issues that seemed unclear or difficult. The inclusion of more time for tutorials would allow for more peer-to-peer shared learning among students, in which they could learn from each other as well as “hands-on” time.

- In terms of teaching approach this programme could introduce a “peer-to-peer shared learning” approach in which students would be given the opportunity to “teach” each other with the support of course facilitators. This would increase more interactivity and shared learning. Also, by learning how to “teach” each other, they would be in a better position to teach other students. It could also help to further concretize and develop their learning information literacy as well as learning how to teach/train. From a wider perspective, this would also help prepare them to go and teach information literacy to students at colleges, secondary and primary school levels.
- Demonstrating the use of bulletin boards and mailing lists in presenting information are two techniques that were listed as commonly used communication channels but were not practiced on the course due to limited time. Introducing the skills of using the two would help to encourage knowledge sharing and provide students with the opportunity for future communication.

### **9.5.3. Directions for further research**

This study discovered that several areas were not fully covered or specific details were not known. It is therefore recommended that further research be done in the following areas:

#### **9.5.3.1 Long term assessment of information literacy programme**

There is a need to conduct follow-up research to assess long term impact of the course on students’ information literacy skills to determine whether the course made a contribution to their development as lifelong independent learners. Much as students showed that their skills improved after the course, little is known whether they will be able to utilize skills acquired as part of the lifelong learning process. Literature reveals that very few attempts have been made by course designers to carry out long term evaluation programmes to determine students’ information skills

over a period of time (Chapman et al., 2001). A long term assessment project will assist to see whether the course made a contribution to their development in their future careers. It is evident that a number of information literacy programmes indicate that they are a prerequisite for preparing lifelong learners (Shorten et al.; 2001, Verhey, 1999). However, more effort is required to ensure that future information literacy skills of trainers are understood. Case study research through interview sessions with the former twelve students who participated in the second implementation programme would need to be conducted. This could be facilitated by the fact that most students were employees of the Ministry of Education, in which case it would be possible to contact them. In addition to the above, an assessment of their final Masters theses could be done to compare with the ones for non-participants to determine whether the course produced any significant difference in terms of performance.

#### **9.5.3.2 Adapting information literacy course structure in non-academic environments**

Future research is required to determine the applicability of the designed course for other areas such as the workplace and/or industries. This is because various researchers have highlighted issues such as information overload and lack of information skills among end users as contributing factors in affecting the promotion of information services in these sectors (Oman, 2001; Edmunds & Morris, 2000). Remedies to the above problems include implementing an extensive information literacy programme, in which case, an integrated one similar to the one designed for University of Dar es Salaam could be ideal. Therefore, there is a need to carry out a study to determine the extent to which the designed course with the same structure could be implemented in areas like Non-Government Organizations, the disadvantaged groups such as those in slums, rural populations and specific industries/sectors (agriculture, health, small industries and so on).

#### **9.5.3.3 Adapting scaffolding/snowballing approach into teaching information literacy**

Results from the study indicate that several students who attended the training, used the same course materials and skills acquired, to “teach” information literacy skills to those who did not attend the programme. There is a need to carry out a study to

find out how this approach could assist in teaching an information literacy course over a wider university student population. It is evident from the literature that the “scaffolding” approach assisted knowledge transfer and acquisition (Nadeau, 2005). Teachers assist students to solve complex, real world problems that require students to be more self-regulated and capable of performing sophisticated forms of cognitive processing (such as application, analysis, and synthesis). These qualities are essential in making students able to deliver skills to others based on their experience in solving problems in new content areas (Palincsar & Brown, 1984). In order to determine how scaffolding/snowballing could assist students to teach each other, an action research project with a cohort of students in a university department attending a particular course could be conducted. By using similar course structure, these students would be asked to “teach” other students the same skills. This would be followed by an interview survey to determine the extent to which the knowledge acquired by a certain group of students spread to the rest of the students in that particular department. The scaffolding/snowballing approach could also be used to teach in other areas such as highlighted under 9.5.3.2 above.

#### **9.5.3.4 Adapting information literacy course structure into other areas of independent learning.**

Research needs to be carried out to determine whether the integration of Information and Library Science approaches to information literacy with a knowledge of information behaviour and pedagogic theory would assist the design of information literacy courses that could enhance research skills for learners who do not deal with library-oriented secondary sources of information. These include most learners in sciences and engineering whose research skills are connected with gathering primary data through experimentation or survey. This is because most research skills taught to such learners focus on thinking skills associated with using primary data for experimentation or survey. Moreover, it is evident that little research has been conducted to find out the views of such learners with respect to using library-related research skills for problem solving, as implied by this research (Leckie & Fullerton, 1999). A study should therefore be conducted to find out the extent to which an integrated course could assist students in science and engineering disciplines improve their information literacy skills in dealing with both primary and secondary data. Whereas the course structure could be used to teach how to

collect primary data, drawing learners' attention towards the long-term usefulness of information literacy skills in dealing with secondary data to support educational goals seem equally important. Several researchers recommend teaching information literacy focusing on primary sources (such as those available on the Internet) (Rakes, 1996). This argument is supported by the California School Library Association (1997) who state that information literacy is concerned with defining a problem, location and exploration of resources, information/data analysis, application and presentation of the findings whether data or information bases.

#### **9.6. Limitations of the study**

This study was intended to oversee the design, implementation and evaluation of an information literacy programme at the University of Dar es Salaam. The sample population who took part were 15 librarians and 12 Masters of Education students from the Faculty of Education in the University. It would be ideal to conduct this study to see whether the course structure would apply to other tertiary institutions in Tanzania such as Sokoine University of Agriculture, the Mzumbe University, University of Dar es Salaam's constituent colleges of Muhimbili University College of Health Sciences (MUCHS) and University College of Lands and Architectural Studies (UCLAS) with a larger sample size. Similarly, the same structure could be tested in other tertiary institutions outside Tanzania. However, due to lack of time and resources, it was only possible to do the same for University of Dar es Salaam dealing with a small population. The same programme structure was used to teach the regional librarians at the University of Dar es Salaam in June 2005. However there was no evaluation of whether these librarians had transferred the knowledge to their users. It would be important if such a research was carried out to see whether this was the case.

In addition to the above, this study considered information literacy to be an aspect of independent learning that depended on the use of secondary sources of information, such as books, articles, World Wide Web sites, and the tools to locate these resources. For this reason, other skills, attitudes and knowledge that fall under the heading of research skills, such as gathering primary data through experimentation or survey that could also be considered a part of independent learning and problem solving, were not covered. The context and normative values

within which information literacy was to be taught was academic where people are expected to use certain resources such as online databases, online public access systems (OPACs), books, journal articles, search engines, Web based resources as well as experts and authoritative bodies that may provide such resources and knowledge. Other sources such as friends, relatives, television, radio and other informal media that may be relevant were not considered.

Several problems were encountered while carrying out this study. There was not sufficient time to prepare, organize and carry out group presentations, hands-on activities and group discussions. Various lessons such as mind mapping, information searching, presenting information and bibliographic citations needed extra time. In addition, low Internet bandwidth hindered students' access to Web-based resources. Furthermore, facilities such as computers were very limited and students had to share the few that were working. Only seven computers out of 12 available in the training room were operating fully.

### **9.7. Summary**

This chapter highlighted the major findings of this study. The study found that the integrated course programme successfully transformed students' information literacy skills. Academic librarians were able to transfer skills learned to Masters of Education students, who in turn used the same course materials to teach fellow students who did not participate in the course. In addition, the design of the course was facilitated by the integration of Information and Library Science approaches to information literacy with the knowledge of information behaviour and pedagogic theory.

Out of this study, one could learn several lessons including the useful nature of course design because of the integration of various elements, but also how learning information literacy skills is related to learning a culture, plus the effectiveness of problem-based learning in a non-problem based learning environment and also that information literacy education is part of a continuous process.

The chapter highlighted the importance of the course designed, including the potential usefulness of the framework that was created to provide structure and

guidance, course materials, potential information literacy trainers and literature regarding the design of information literacy courses for public University libraries in Tanzania. However a number of challenges were identified including difficulties in teaching new approaches in an environment where teacher-led approaches were still in place and where an independent learning approach could be perceived as a potential threat to librarians and academics. Other challenges included librarians' lack of participation in teaching, research and decision-making and a lack of emphasis on developing information literacy programmes by authorities in tertiary institutions. To alleviate these obstacles, it was recommended that the Library and Information Department should introduce information literacy in the curriculum, teaching information literacy in a holistic way so that future librarians can effectively participate in teaching and the development of information literacy in schools.

Furthermore, the chapter highlighted aspects of the course programme and the research process that could be improved or built upon. These include the inclusion of a Quasi-experimental design approach, providing diagnostic tests to non-participants to determine the difference in terms of performance in their Masters theses and increasing sample size and facilities. Other initiatives could include collecting views of students on their information literacy skills; the provision of subject-specific diagnostic tests with feedback and the inclusion of other presentation techniques such as bulletin boards and mailing lists as training and learning tools.

The chapter highlighted potential areas for future research. Research areas for future considerations include: follow-up research on the long-term effect of information literacy skills of the 12 students, adapting the same information literacy course structure in non-academic environments, the application of student-to-student teaching as a way to facilitate teaching information literacy course throughout the university and adapting the same information literacy course structure into other areas of independent learning such as business enterprises and in industries. Limitations of this study the sample of respondents which, at the time was unavoidable due to limitations of time and resources. It was noted that the study limited itself to the teaching of information literacy in relation to dealing with

primary data. This was because the secondary sources of information such as online databases, online public access systems (OPACs), books, journal articles, search engines, Web based resources as well as experts and various authoritative bodies were considered to form the backbone of learning particularly in the social sciences and humanities. Hence a decision would need to be made whether to broaden this approach to information literacy training. Overall this research proved an excellent opportunity to explore the teaching on information literacy and to develop strategies that could lead to improved information literacy in Tanzania.



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## Appendix A: Interview questions for lecturers

### Need for information literacy course

#### A: Observations of a lecturer towards students' information seeking activities

- Being a lecturer of a particular course, you give students assignments; also you supervise a few of them in their research projects. In either case, they need to obtain information in order to answer the questions or work on a research topic (*Please give a brief explanation on each question below*):
  - How do they start out working on the tasks assigned to them?
  - Are students aware of sources of information relevant in their assignments or research topics
  - Which sources do they consult for information regarding their topic or research problem?
  - How do they locate and access information from the sources for their assignments or research topic?
  - Do students always use various resources or just the ones recommended for particular purposes?
  - In case they use specific recommended ones, why is that so?
  - Do you guide them where to go for information and how to access it?
  - If yes, what makes you tell them to do so?
  - If no, where do you think they get the guidance?
  - Do students collaborate with one another for information problem solving?
  - Do students demonstrate initiative in information problem solving and readiness to acquire new knowledge?
  - Do students continually improve and update their knowledge?
  - Do students communicate information acquired to others?
  - What media do they use to communicate information to others?
  - Do students practise responsible and ethical behaviour?
- What problems do you think students encounter when they locate and access relevant information from various sources, for their assignments or research topics?

#### B: Observations of a lecturer on students' academic work

- When reading students' work (or listen to their presentations or observe their demonstrations), how can you evaluate their work with regards the following:
  - Their ability to articulate a problem (or task) given?
  - Their ability to determine the extent of information needed to solve information problem associated with tasks given?
  - An indication that they provide background information regarding a topic or research problem and demonstrate a general understanding of a topic from the information they acquire?
  - An indication that they use varieties of sources of information to answer questions in their assignments or research topics?
  - Their analytical and evaluative skills of information that they use for assignments or research topics?
  - Presentation skills relevant for communicating their academic work such as tutorials, seminars and class sessions or the work they submit?
    - Which presentation skills do they possess?
    - Do they make use of different presentation tools and equipment?

- An indication that they reference or acknowledge the information they use from varieties of sources?
  - Which styles do they use
  - How do they learn such skills?
- Their efforts in dealing with the problem of plagiarism?

### **C: Lecturer's views about a need for information literacy course**

- After having observed students in their work, and all the problems they encounter, what are your views regarding students' information seeking skills?

### **Specific information literacy skills necessary for students' academic activities**

- Are you aware of information literacy courses run in the university to enhance students' information seeking skills?
- Which skills do students acquire in these courses?
- What do you think are the shortfalls of the existing courses?
- What do you think should be the specific information seeking skills to be taught, which you consider relevant to their academic tasks (in addition to what is being taught or as a replacement/improvement of the existing modules)?
- In your opinion, how will the proposed skills assist students in their information seeking activities?

### **Categories of information sources/tools**

- Which categories of general information sources/tools do you think are vital for students to know how to use? (i.e. print and non print reference sources, periodicals, books, web resources etc)
- Which categories of specific information sources/tools do you think are vital for students to know how to use? (i.e. print and non print subject specific resources such as dictionaries, encyclopaedias, periodicals, web resources etc)
- In your opinion, why do you think that these resources are more important for students to learn how to use than the ones they currently know?

### **Methods of delivering information literacy skills to students**

- If the university runs information literacy courses, how is the course/courses conducted?
- In your opinion, how students should be taught information literacy skills:
  - As a modular course in their curriculum?
  - As part of their orientation programme?
  - Library drop in sessions?
  - When they go to the library to seek information?
  - Any other method?
- Who in your opinion should teach students how to access, evaluate and use information?
- Reasons?

### **Motivational issues regarding Information Literacy skills**

- Do you take a special consideration in rewarding students more marks if they demonstrate satisfactory information literacy skills in their work? (circle the

bullet point of whichever is applicable and provide explanations – if any – below)

- In terms of demonstrating a problem (or main issues of the topic)
  - In terms of identifying/highlighting and analysing key concepts regarding the topic
  - In terms of demonstrating the evidence of a wider use of information sources
  - In terms of provision of bibliographies or references
- If you do the above, to what extent do you think it contributes to their desire to acquire information literacy skills?
  - In case you do not do the above, what is your opinion on the above approach towards motivating students to acquire information literacy skills

**D: Expectations with regards improving students' information seeking skills**

- What are your short term expectations when students acquire relevant information seeking skills towards their day today academic activities
- What are your long term expectations when students acquire relevant information seeking skills as a contribution to their life long learning activities?
- What do you consider to be factors that will facilitate a successful running of information literacy courses?
- What do you consider to be factors that will impede the running of information literacy courses?
- What do you think is the role of the university to ensure that students' information skills are enhanced

## **Appendix B: Interview questions for librarians and teacher-librarians**

### **Need for information literacy course**

#### **A: Observations of librarians towards students' information seeking activities in the library**

Being a librarian, you have been able to observe and probably offer help to students who come to the library to search for information. As part of your observation, you are in a position to give your comments with regards students' information seeking skills when they come to the library:

- Do students demonstrate a need for information and define the information needed for problem solving for their assignments or research problem?
- Do students demonstrate the ability to determine the extent of information needed to solve information problem associated with tasks given? (please explain briefly)
- Are they able to identify potential sources of printed and electronic formats from the library or other sources outside the library? (please explain briefly)
- Are they able to apply different search strategies to retrieve information by using conventional aids such as card catalogues or current technologies such as library OPAC? (please explain briefly)
- Are they able to analyse, select, interpret and evaluate relevant information critically and make meaning of this information? (please explain briefly)
- Are they able to combine information from different sources, that makes sense (please explain briefly)
- Are they able to appraise the information seeking process and product of an information search (please explain briefly)
- Are they able to work with others for information problem solving (please explain briefly)
- Are there indications that they able to continually update and improve their knowledge even after finishing their degree courses (please explain briefly)
- Are they able to practise responsible and ethical behaviour (please explain briefly)
- What problems do you think students encounter when they locate and access relevant information from various sources, for their assignments or research topics?

#### **B: Observations of teacher-librarians on students' information literacy activities (If you have not been involved in this activity, please skip this section)**

- Being a teacher-librarian you have been involved in teaching students library skills or conducted information skills courses. How would you evaluate the courses and skills taught: *(please explain briefly on each question)*
  - Does the course teach students how to articulate a problem (or task) given?
  - Does the course teach students how to use tools and sources of information to provide background information regarding a topic or research problem and demonstrate a general understanding of a topic?
  - Does the course teach students how to use a broad range of sources of information to answer questions in their information literacy activities?
  - Does the course teach students how to analyse and evaluate information and sources?



- Does the course teach students how to synthesize information from a wide range of sources?
- Does the course teach students presentation skills relevant for communicating information to others?
- Does the course teach students to use varieties of presentation tools and equipment?
- Does the course teach students how to evaluate information product and the process of information problem solving?
- Does the course teach students referencing or acknowledging the information they use from varieties of sources?
- Does the course teach students different referencing skills?
- Does the course teach students how to use information legally and ethically?

**C: Librarians and Teacher-librarian's views about a need for information literacy course**

- After having observed students in their information seeking process, the problems they encounter, and the information literacy courses taught what are your views regarding students' information seeking skills?

**Specific information literacy skills necessary for students' academic activities**

- Which information literacy skills do students learn in the ongoing information literacy courses?
- What are the shortfalls of the ongoing information literacy skills courses?
- What do you think should be the specific information seeking skills to be taught, which you consider relevant to their academic tasks (in addition to what is being taught or as a replacement/improvement of the modules being run at the present moment)?
- In your opinion, how will the skills that you propose assist students in their information seeking activities?

**Categories of information sources/tools**

- Which categories of general information sources/tools do you think are vital for students to know how to use? (i.e. print and non print reference sources, periodicals, books, web resources etc)
- Which categories of specific information sources/tools do you think are vital for students to know how to use? (i.e. print and non print subject specific resources such as dictionaries, encyclopaedias, periodicals, web resources etc)
- In your opinion, why do you think that these resources are more important for students to learn how to use than the ones they currently know?

**Methods of delivering information literacy skills to students**

- How is the information literacy course/courses conducted?
- In your opinion, how students should be taught information literacy skills:
  - As a modular course in their curriculum?
  - Using the existing delivery methods (as part of their orientation programme, library drop in sessions, when students go to the library to seek information)?
- Any other method?

- Who in your opinion should teach students how to access, evaluate and use information? Why?

**D: Expectations with regards improving students' information seeking skills**

- What are your short term expectations when students acquire relevant information seeking skills towards their day today academic activities
- What are your long term expectations when students acquire relevant information seeking skills as a contribution to their life long learning activities?
- What do you consider to be factors that will facilitate a successful running of information literacy courses?
- What do you consider to be factors that will impede the running of information literacy courses?
- What do you think is the role of the university to ensure that students' information skills are enhanced

## **Appendix C: Follow-up interview questions with Masters of Education students**

### **Reflections on the Information Literacy training course which was conducted at the University of Dar es Salaam library from 4<sup>th</sup> to 15<sup>th</sup> July, 2005**

Dear course participant,

The above course which took place on the above mentioned dates calls for your personal reflection on its usefulness towards the successful writing up of your Masters thesis. I am requesting you to humbly and sincerely provide your comments on whether or not the course contributed towards the above success. The information supplied will be used to justify the usefulness of such a course for the future students generation at the University. Therefore your responses will be treated with utmost confidentiality.

Based on the skills acquired, highlight the impact of the skills gained into developing your masters dissertation through gathering and compiling related literature and background information for your Masters thesis based on the following aspects:

- Which particular skills were useful?
- Explain briefly how you applied the skills to shape your Masters theses and find the information you wanted (Which ones were relevant and you liked most?)
- Which skills were not applicable
- Please, give a short description of possible reasons why certain skills were not applied
- Explain briefly any problems you experienced when applying the above skills when working on your Masters thesis and alternatives taken
- Explain briefly, how would you be able to apply the same skills again in future?
- Did you share the knowledge acquired from the course with those who did not participate into the course? (including the course materials)
- If the answer is YES, explain briefly, how you did it
- If the answer above is NO, what made you unable to do so?
- Did the other people find the skills useful?
- If the answer is YES, in which ways did they make use of the skills?
- If the answer is NO, what did they say was difficult?
- During the training session, it was observed that time was not sufficient to teach all the skills. In your opinion, what would you propose to be the best approach in teaching the course in future?

## **Appendix D: Follow-up interview questions with lecturers, Faculty of Education**

### **Reflections on the Information Literacy training course which was conducted at the University of Dar es Salaam library from 4<sup>th</sup> to 15<sup>th</sup> July, 2005**

Dear Sir/Madam,

The above course which took place on the above mentioned dates calls for your personal reflection on its usefulness towards the successful writing up of students' Masters of Education dissertations. I am requesting you to humbly and sincerely provide your comments on whether or not the course contributed towards the above success. The information supplied will be used to justify the usefulness of such a course for the future students generation at the University. Therefore your responses will be treated with utmost confidentiality.

- Were you aware that several students attended the course on Information Literacy, which was run in the library from 4<sup>th</sup> to 15<sup>th</sup> July 2005?
- Did you have any student from the group of attendees that you supervised his/her Masters degree dissertation?
- Were you aware that the students made use of the skills acquired from the course?
- To what extent do you think that the skills were useful to students?
- Do you think that the information literacy skills acquired by these students contributed to their performing better than those who did not attend the course?
- Generally, what are your views about the course conducted?



- d) Office
- e) Other (please specify)

**Skills of using windows environment**

10. Can you use the following facilities in the windows environment? (If you do not know the meaning of the term used in the following questions in this section, select the DON'T KNOW option)

|  |     |    |            |
|--|-----|----|------------|
| a) Open a window   | Yes | No | Don't know |
| b) Minimize and maximize a window                              | Yes | No | Don't know |
| c) Manage folders  | Yes | No | Don't know |
| d) Format a Floppy disk  | Yes | No | Don't know |
| e) Attach a file to an E mail message                          | Yes | No | Don't know |
| f) Copy files to folders                                       | Yes | No | Don't know |
| g) Copy files to floppy disk                                   | Yes | No | Don't know |
| h) Copy from one floppy disk to another                        | Yes | No | Don't know |
| i) Use word processing software<br>(MS word, Word Perfect etc) | Yes | No | Don't know |
| j) Print a word processing document                            | Yes | No | Don't know |
| k) Use power point presentation                                | Yes | No | Don't know |

**Skills of using Internet Explorer or Netscape Navigator facilities**

11. Can you use the following facilities in Internet Explorer or Netscape navigator? (If you do not know the meaning of the term used in the following questions in this section, select the DON'T KNOW option)

|  |     |    |            |
|--|-----|----|------------|
| a) Refresh (Internet Explorer)                                   | Yes | No | Don't know |
| b) Reload (Navigator)  | Yes | No | Don't know |
| c) Stop retrieval  | Yes | No | Don't know |
| d) Use E-mail  | Yes | No | Don't know |
| e) Attach a file to an E mail message                            | Yes | No | Don't know |
| f) Navigation tools (back, go, home,<br>g) forward, scroll bars) | Yes | No | Don't know |
| h) Favourites (Internet Explorer)                                | Yes | No | Don't know |
| i) Bookmarks (Navigator)   | Yes | No | Don't know |
| j) History   | Yes | No | Don't know |
| k) Find option   | Yes | No | Don't know |
| l) Address bar (Internet Explorer)                               | Yes | No | Don't know |
| m) Document Location Box (Navigator)                             | Yes | No | Don't know |
| n) Save document   | Yes | No | Don't know |
| o) Print document  | Yes | No | Don't know |

12. State whether the following statements are TRUE or FALSE (If you do not know the meaning of the terms used in the following questions in this section, select the NO COMMENT option):

- (i). By creating a favourite the website's address is saved and can be accessed at a later date  
True          False      No comment
- (ii). Favourites can be renamed for easy retrieval  
True          False      No comment
- (iii). Favourites can be organized into folders  
True          False      No comment
- (iv). The back button is the same as the Home button  
True          False      No comment
- (v). The Refresh (or reload) button is used to save a website visited  
True          False      No comment

### **Skills of Internet resources**

13. State whether the following statements are TRUE or FALSE (If you do not know the meaning of the terms used in the following questions in this section, select the NO COMMENT option):

- (i). The Internet is a collection of interconnected computer networks around the world that make it possible to share information almost instantly  
True          False      No comment
- (ii). The Internet is able to send information back and forth to different types of computers because it uses a word processing software  
True          False      No comment
- (iii). Internet is organised by subjects  
True          False      No comment
- (iv). Search engine is a tool that enables users to locate information on the World Wide Web  
True          False      No comment
- (v). Search engines such as Alta vista are updated by people who are employed to feed information on regular basis  
True          False      No comment
- (vi). Search engines such as Meta-crawler, Yahoo and Google use keyword searching facility  
True          False      No comment
- (vii). Yahoo arranges materials by subject  
True          False      No comment

- (viii). The World Wide Web, Email, Newsgroups, and Telnet are all subsystems of the Internet  
True            False    No comment

### Internet searching skills

14. State whether the following statements are TRUE or FALSE (If you do not know the meaning of the terms used in the following questions in this section, select the NO COMMENT option):

- (i). You can search for images on the internet  
True            False    No comment
- (ii). Stop words are short and frequently occurring words such as *the, on, in, of*, that are often ignored by the search engine when used in a search  
True            False    No comment
- (iii). Search engines find websites by trying to match the words contained in the search box  
True            False    No comment
- (iv). Search engines list sites found by ranking their relevance to the search  
True            False    No comment
- (v). To complete a phrase search you need to enclose the keywords in quotation marks  
True            False    No comment
- (vi). Phrase searching means that all the keywords are searched as a single entity  
True            False    No comment
- (vii). The term OR is used to narrow search  
True            False    No comment
- (viii). The term AND is used to combine two terms together so that the search engine retrieves site containing both terms (although these are not necessarily placed sequentially)  
True            False    No comment
- (ix). The term NOT is used to broaden search  
True            False    No comment
- (x). Incorrect spelling will limit your searching and may even produce a zero search result  
True            False    No comment
- (xi). The search engine will automatically correct your spelling when you make a mistake  
True            False    No comment



- (xii). Some of the search engines allow you to limit your search by date  
True            False    No comment

### **Information sources skills**

15. State whether the following statements are TRUE or FALSE (If you do not know the meaning of the terms used in the following questions in this section, select the NO COMMENT option):

- (i). Reference books include dictionaries, almanacs, encyclopedias, atlases and periodicals  
True            False    No comment
- (ii). Reference books may be borrowed from the library for three days by staff or students having valid identification  
True            False    No comment
- (iii). Reference books often provide a good introduction to a topic  
True            False    No comment
- (iv). The citation database includes the bibliographic information about articles. A full-text database includes the entire text of some articles.  
True            False    No comment
- (v). Research produced by faculty at research universities is most often published in general interest magazines  
True            False    No comment
- (vi). Most of the information produced by the government is kept in the National Central library and is free to the public  
True            False    No comment
- (vii). Encyclopaedias are often good places to begin your research because they provide you helpful background information on a topic and are written with the lay reader in mind.  
True            False    No comment
- (viii). An abridged dictionary contains all the "officially recognized" words in a language while an unabridged dictionary contains only the most common words  
True            False    No comment
- (ix). When you face problems with your assignment or research topic, you can consult specialists who deal with that particular subject for advice and guidance  
True            False    No comment

- (x). Internet is not a source of information, but it is mainly used for entertainment, online buying/selling, E-mails, online learning and news.  
True            False    No comment
- (xi). Online library catalogues, electronic periodical indexes, and Internet search engines are all examples of databases  
True            False    No comment

**Skills of library and database searching**

16. State whether the following statements are TRUE or FALSE (If you do not know the meaning of the terms used in the following questions in this section, select the NO COMMENT option):

- (i). You can find printed journals using the online library catalogue  
True            False    No comment
- (ii). You can reserve items for borrowing purposes using the University's catalogue  
True            False    No comment
- (iii). The University library has CD-ROMs for various subject disciplines  
True            False    No comment
- (iv). You can find articles of important journals, newspaper articles, theses and dissertations which are stored on microfiches using University's online catalogue  
True            False    No comment
- (v). You need to know the exact title of a book in order to find it by using the online catalogue  
True            False    No comment
- (vi). All items searched by online catalogue can be borrowed from the library  
True            False    No comment
- (vii). To locate books in a library you must search in Yahoo  
True            False    No comment
- (viii). Materials not available in the library can be obtained through a document delivery facility  
True            False    No comment

## Skills of evaluating information and sources

17. State whether the following statements are TRUE or FALSE (If you do not know the meaning of the terms used in the following questions in this section, select the NO COMMENT option):

- (i). All the information published on the Internet is sound  
True            False    No comment
- (ii). You can always tell who published a site by looking at the domain name  
True            False    No comment
- (iii). The URL is the address of the site  
True            False    No comment
- (iv). To evaluate a website, you just need to check the date it was produced  
True            False    No comment
- (v). Articles published in academic journals are not as reliable as books  
True            False    No comment
- (vi). Websites are always more informative academically than periodicals  
True            False    No comment
- (vii). All information found on a university website is academically sound  
True            False    No comment
- (viii). Skim reading is when you read the whole text very quickly  
True            False    No comment
- (ix). Scan reading involves only reading key sections, such as first and last paragraphs  
True            False    No comment
- (x). To see whether a book is relevant you need to read it from cover to cover  
True            False    No comment
- (xi). One way of evaluating information sources such as books is to find out whether the author's name has been cited in other sources or bibliographies  
True            False    No comment
- (xii). Other fact to consider when evaluating information in a source is whether the information covered is a fact, opinion, or propaganda  
True            False    No comment
- (xiii). It is always advised to explore enough sources to obtain a variety of viewpoints  
True            False    No comment

## Referencing skills

18. State whether the following statements are TRUE or FALSE (If you do not know the meaning of the terms used in the following questions in this section, select the NO COMMENT option):

- (i). A bibliography is required for every academic essay  
True            False    No comment
- (ii). A bibliography is the same as a list of references  
True            False    No comment
- (iii). Plagiarism means using a textbook or encyclopedia article as a source of information in writing a research paper without referencing the author(s).  
True            False    No comment
- (iv). If you have a bibliography you can not be accused of plagiarism  
True            False    No comment
- (v). If you do not quote directly from a text you do not require a reference  
True            False    No comment
- (vi). Direct quotations should be enclosed in “inverted commas”  
True            False    No comment
- (vii). Copyright is the right to copy from books, articles and you can do whatever you want with this information  
True            False    No comment
- (viii). You can copy and paste information found on the Internet without having to reference it because the Internet is not protected by copyright  
True            False    No comment
- (ix). Authors must be listed alphabetically in a bibliography  
True            False    No comment
- (x). A site address alone is accepted as reference in a bibliography  
True            False    No comment

## Skills of synthesizing information

19. State whether the following statements are TRUE or FALSE (If you do not know the meaning of the terms used in the following questions in this section, select the NO COMMENT option):

- (i). Once information is retrieved, one has to interpret it to formulate ideas which address the question or problem  
True            False    No comment

- (ii). There are several ways of combining information from different sources, these include translating, reproducing, re-writing, copying, summarizing and outlining  
True            False    No comment
- (iii). Whereas summarizing several chapters in a book is one way of combining information, taking notes from a lecture is not a way of combining information  
True            False    No comment
- (iv). You can combine information by using tables, charts or graphs  
True            False    No comment
- (v). A journal abstract is a synthesized piece of information since it is a summary of ideas from a particular journal  
True            False    No comment
- (vi). It is not always advisable to compare and contrast ideas from various sources as this may lead to biased piece of information  
True            False    No comment

### Information presentation skills

20. State whether the following statements are TRUE or FALSE (If you do not know the meaning of the terms used in the following questions in this section, select the NO COMMENT option):

- (i). Several factors to consider when presenting information include target audience, availability of funds, personality and purpose of information presented  
True            False    No comment
- (ii). The formats for presenting information include written, oral, visual or audio and animations  
True            False    No comment
- (iii). Communication skills are not essential in making presentation of information more effective and meaningful  
True            False    No comment
- (iv). There are different ways of presenting information; these include using models, black/white board, PowerPoint presentations, graphics, charts or discussion forum  
True            False    No comment
- (v). You can also present information through watching a TV program or listening to a radio broadcast  
True            False    No comment

- (vi). The following are not ways of presenting information: writing a journal article, submitting a research report and giving a lecture.  
True            False    No comment
- (vii). You must select and use composition process appropriate to presentation format  
True            False    No comment
- (viii). While presenting information, one has to choose presentation format (whether written, oral etc), however, it is not important to determine whether the information has answered the question because this can be judged by the audience.  
True            False    No comment
- (ix). Information should be presented without quoting sources used  
True            False    No comment



6. Do you have access to computer at home? Yes No

7. Do you have access to Internet at home? Yes No

8. From which other places do you have access to computers (tick as appropriate?)

- a) University library
- b) University computer laboratory
- c) Internet café
- d) Office
- e) Other (please specify)

9. From which other places do you have access to the Internet (tick as appropriate?)

- a) University library
- b) University computer laboratory
- c) Internet café
- d) Office
- e) Other (please specify)

### Skills of using windows environment

10. Can you use the following facilities in the windows environment? (If you do not know the meaning of the term used in the following questions in this section, select the DON'T KNOW option)

|  |     |    |            |
|--|-----|----|------------|
| a) Open a window   | Yes | No | Don't know |
| b) Minimize and maximize a window                              | Yes | No | Don't know |
| c) Manage folders  | Yes | No | Don't know |
| d) Use E-mail  | Yes | No | Don't know |
| e) Format a Floppy disk  | Yes | No | Don't know |
| f) Attach a file to an E mail message                          | Yes | No | Don't know |
| g) Copy files to folders                                       | Yes | No | Don't know |
| h) Copy files to floppy disk                                   | Yes | No | Don't know |
| i) Copy from one floppy disk to another                        | Yes | No | Don't know |
| j) Use word processing software<br>(MS word, Word Perfect etc) | Yes | No | Don't know |
| k) Print a word processing document                            | Yes | No | Don't know |
| l) Use power point presentation                                | Yes | No | Don't know |

### Skills of using Internet Explorer or Netscape Navigator facilities

11. Can you use the following facilities in Internet Explorer or Netscape navigator? (If you do not know the meaning of the term used in the following questions in this section, select the DON'T KNOW option)

|                                |     |    |            |
|--------------------------------|-----|----|------------|
| a) Refresh (Internet Explorer) | Yes | No | Don't know |
| b) Reload (Navigator)          | Yes | No | Don't know |
| c) Stop retrieval              | Yes | No | Don't know |



|  |     |    |            |
|--|-----|----|------------|
| d) Navigation tools (back, go, home, forward, scroll bars) | Yes | No | Don't know |
| e) Favourites (Internet Explorer)                          | Yes | No | Don't know |
| f) Bookmarks (Navigator)                                   | Yes | No | Don't know |
| g) History   | Yes | No | Don't know |
| h) Find option   | Yes | No | Don't know |
| i) Address bar (Internet Explorer)                         | Yes | No | Don't know |
| j) Document Location Box (Navigator)                       | Yes | No | Don't know |
| k) Save document   | Yes | No | Don't know |
| l) Print document  | Yes | No | Don't know |

12. State whether the following statements are TRUE or FALSE (If you do not know the meaning of the terms used in the following questions in this section, select the NO COMMENT option).

(i) By creating a favourite the website's address is saved and can be accessed at a later date

True            False    No comment

(ii) Favourites can be renamed for easy retrieval

True            False    No comment

(iii) Favourites can be organized into folders

True            False    No comment

(iv) The back button is the same as the Home button

True            False    No comment

(v) The Refresh (or reload) button is used to save a website visited

True            False    No comment

### Defining a problem or research topic

13. State whether the following statements are TRUE or FALSE (If you do not know the meaning of the terms used in the following questions in this section, select the I DO NOT KNOW option):

After determining the area of your research topic and formulate a title of your research topic, your next move would be as follows:

(i) Before going to the library or elsewhere to acquire answers to a problem, review critically the title of the topic or assignment to determine the information needed

True            False    I DO Not Know

(ii) It is always a good idea to consult reference sources to familiarise yourself with the topic (such as encyclopaedias and dictionaries)

True            False    I DO Not Know

(iii) You can also consult specialists who deal with that particular subject for advice and guidance before actually consulting sources that can provide relevant/detailed information to answer the question or problem

True            False    I DO Not Know

(iv) Reference sources can also be used to identify terms/words to be used for searching electronic sources to make information easier

True            False    I DO Not Know

(v) In order to save time, it is always recommended that you consult your tutor who will tell you exactly what to do, rather than developing your topic yourself.

True            False    I DO Not Know

### **Information sources skills**

14. State whether the following statements are TRUE or FALSE (If you do not know the meaning of the terms used in the following questions in this section, select the NO COMMENT option).

(i) Reference books include dictionaries, magazines, encyclopedias, text books and periodicals

True            False    No comment

(ii) Reference books may be borrowed from the library for five days by staff or students having valid identification

True            False    No comment

(iii) Reference books often provide a good introduction to a topic

True            False    No comment

(iv) A full-text database includes the entire text of some articles.

True            False    No comment

(v) News papers contain information that is factual, well researched, always verified and peer-reviewed

True            False    No comment

(vi) Most of the information produced by the government is kept in the National Central library and is free to the public

True            False    No comment

(vii) Encyclopaedias are often good places to begin your research because they provide you helpful background information on a topic and are written with the lay reader in mind.

True            False    No comment

(viii) Primary sources of information include original art work, interview, patent, poem, un-edited personal diary and pictorial works

True            False    No comment

(ix) One can use a textbook to find out about new research findings reported in the last week..

True            False    No comment

(x) Online library catalogues, electronic periodical indexes, and Internet search engines are all examples of databases

True            False    No comment

### **Skills of Internet resources**

15. State whether the following statements are TRUE or FALSE (If you do not know the meaning of the terms used in the following questions in this section, select the NO COMMENT option):

(i) The Internet is a collection of interconnected computer networks around the world that make it possible to share information almost instantly

True            False    No comment

(ii) The Internet is able to send information back and forth to different types of computers

True            False    No comment

(iii) Internet can also be used as a tool for teaching and learning

True            False    No comment

(iv) Search engine is a tool that enables users to locate information on the World Wide Web

True            False    No comment

(v) Search engines are updated by people who are employed to feed information on computer databases, on regular basis

True            False    No comment

(vi) Search engines such as AltaVista, Alltheweb and Google use keyword searching facility

True            False    No comment

(vii) Yahoo Directory arranges materials by subject

True            False    No comment

(viii) The World Wide Web, Email, Newsgroups, and Telnet are all subsystems of the Internet

True            False    No comment

### **Internet searching skills**

16. State whether the following statements are TRUE or FALSE (If you do not know the meaning of the terms used in the following questions in this section, select the NO COMMENT option):

(i) You can search for images on the internet

True            False    No comment

(ii) Stop words are short and frequently occurring words such as *the, on, in, of*, that are often ignored by the search engine when used in a search

True            False    No comment

(iii) Search engines find websites by trying to match the words contained in the search box

True            False    No comment

(iv) Search engines list sites found by ranking their relevance to the search

True            False    No comment

(v) To complete a phrase search you need to enclose the keywords in quotation marks

True            False    No comment

(vi) Phrase searching means that all the keywords are searched as a single entity

True            False    No comment

(vii) The term OR is used to narrow search

True            False    No comment

(viii) The term AND is used to combine two terms together so that the search engine retrieves site containing both terms (although these are not necessarily placed sequentially)

True            False    No comment

(ix) The term NOT is used to broaden search

True            False    No comment

(x) Incorrect spelling will not limit your search

True            False    No comment

(xi) Search engine (such as Google) can propose an alternative term

True            False    No comment

(xii). Some of the search engines allow you to limit your search by date

True            False    No comment

### **Skills of library and database searching**

17. State whether the following statements are TRUE or FALSE (If you do not know the meaning of the terms used in the following questions in this section, select the NO COMMENT option):

(i) You can find various printed journal titles by using the online library catalogue

True            False    No comment

(ii) You can view a full text article on the University's catalogue

True            False    No comment

(iii) The University library has CD-ROMs for various subject disciplines

True            False    No comment

(iv) You can find titles of important reports, pamphlets, theses and dissertations which are stored in special collections by using University's online catalogue

True            False    No comment

(v) You need to know the exact title of a book in order to find it by using the online catalogue

True            False    No comment

(vi) All items searched by online catalogue can be borrowed from the library

True            False    No comment

(vii) To locate books in a library you must search in Yahoo

True            False    No comment

(viii) Materials not available in the library can be obtained through an Inter-library loan system

True            False    No comment

### **Skills of evaluating information and sources**

18. State whether the following statements are TRUE or FALSE (If you do not know the meaning of the terms used in the following questions in this section, select the NO COMMENT option):

(i) All the information published on the Internet is sound

True            False    No comment

(ii) You can always tell who published a site by looking at the domain name

True            False    No comment

(iii) URL (Uniform Resource Locator) is a string of characters used to exclusively identify a page of information on the World-wide Web

True            False    No comment

(iv) To evaluate a website, you only need to check the date it was produced

True            False    No comment

(v) Articles published in academic journals are not as reliable as books

True            False    No comment

(vi) Websites are always more informative academically than periodicals

True            False    No comment

(vii) All information found on a university website is academically sound

True            False    No comment

(viii) Skim reading is when you read the whole text very quickly

True            False    No comment

(ix) Scan reading involves only reading first and last paragraphs of text

True            False    No comment

(x) To see whether a book is relevant you need to read it from cover to cover

True            False    No comment

(xi) One way of evaluating information sources such as books is to find out whether the author's name has been cited in other sources or bibliographies

True            False    No comment

(xii) Other factors to consider when evaluating information in a source is whether the information covered is a piece of evidence, opinion, or propaganda

True            False    No comment

(xiii) It is always advised to explore enough sources to obtain a variety of viewpoints

True            False    No comment

### Referencing skills

19. State whether the following statements are TRUE or FALSE (If you do not know the meaning of the terms used in the following questions in this section, select the NO COMMENT option):

(i) A bibliography is required for every academic essay

True            False    No comment

(ii) A bibliography is a list of citations that appear at the end of a paper, article, chapter or book

True            False    No comment

(iii) Plagiarism means using a textbook or journal article as a source of information in writing a research paper without referencing the author(s).

True            False    No comment

(ix) If you have a bibliography you can not be accused of plagiarism

True            False    No comment

(v) You only need to reference a source of information if you copy from it word for word

True            False    No comment

(vi) Direct quotations should be enclosed in "inverted commas"

True            False    No comment

(vii) In addition to providing a site address when quoting Internet sources, you also need to indicate the date the site was accessed

True            False    No comment

(viii) You can copy and paste information found on the Internet without having to reference it because the Internet is not protected by copyright

True            False    No comment

(ix) Authors must be listed alphabetically in a bibliography

True            False    No comment

(x) A site address alone is accepted as reference in a bibliography

True            False    No comment

### **Skills of combining information**

20. State whether the following statements are TRUE or FALSE (If you do not know the meaning of the terms used in the following questions in this section, select the NO COMMENT option):

(i) Synthesizing information is a process of finding logical groupings of ideas and facts that can be put together and developed as points in your work

True            False    No comment

(ii) Several ways of combining information from different sources include summarizing, note-taking and annotating

True            False    No comment

(iii) Whereas summarising several chapters in a book is one way of combining information, taking notes from a lecture is not a way of combining information

True            False    No comment

(iv) You can combine information by using tables, charts or graphs

True            False    No comment

(v) A journal abstract is a synthesized piece of information since it is a summary of ideas from a particular journal

True            False    No comment

(vi) It is not always advisable to compare and contrast ideas from various sources as this may lead to biased piece of information

True            False    No comment

## Information presentation skills

21. State whether the following statements are TRUE or FALSE (If you do not know the meaning of the terms used in the following questions in this section, select the NO COMMENT option):

(i) When planning your presentation, it is always important to know your target audience

True            False    No comment

(ii) Information can be presented in writing, orally, visually or by audio formats

True            False    No comment

(iii) Communication skills are not essential in making presentation of information more effective and meaningful

True            False    No comment

(iv) There are different ways of presenting information; these include using posters, black/white board, PowerPoint, graphics, charts or discussion forum

True            False    No comment

(v) Computer-based graphic presentation programs allow you to create a presentation to show the results of your research or answers to issues addressed in your topic.

True            False    No comment

(vi) The following are not ways of presenting information: writing a journal article, submitting a research report and giving a lecture

True            False    No comment

(vii) While presenting information, one has to choose presentation format (whether written, oral etc), however, it is not important to determine whether the information has answered the question because this can be judged by the audience.

True            False    No comment

(viii) Information should be presented without quoting sources used

True            False    No comment



## Appendix G: Quizzes for librarians

### Quiz A: Define a topic or research problem

Answer the following questions:

1. One of the most difficult aspects of writing a research paper is determining how narrow to focus your topic.  
True  
False
2. Why are Encyclopaedias good starting point for getting information on a topic? .....
3. One way to help focus your question in an assignment or research topic is to state your topic in the form of a question and isolate the key ideas or concepts. What are other questions you could ask yourself before you begin your assignment or research? .....
4. It is not always a good idea to consult a subject specialist to assist define a topic or research problem as they may provide very technical/complicated alternatives  
True  
False
5. What are possible online sources to consult to familiarise yourself with the topic or research problem? .....
6. You can consult your lecturer/tutor for help with defining your topic or provide with a background information about a topic, who else could you consult? (1)..... (2)..... (3).....
7. You can also consult reference lists provided by your lecturer/tutor for further assistance on how to formulate your thesis statement or research problem  
True  
False
8. Indicate below main uses for each of the following tool/source  
1. Encyclopaedia 2. Dictionary 3. Yellow Book 4. Almanac

### Quiz B: Locate & access information

Provide answers to the following questions by checking/ticking one answer only in each question.

- |   |
|---|
| 1. List 3 reasons why the Internet may <u>NOT</u> be the best or easiest way to find information on a topic |
| a..... b..... c.....  |

2. The advantages of searching for information online include?

- a) it is usually faster, especially when you search across multiple years
- b) you can combine search terms
- c) the information is updated more frequently
- d) the information is more accurate

3. Research produced by faculty at the universities is most often published

- a) On the Internet
- b) In general interest magazines
- c) In books and scholarly journals

4. One way to limit your search results in Web directories and search engines so that the results better reflect your topic is to use phrase searching. To search for words as a phrase, what do you do?

- a) put question marks around the words
- b) put asterisks around the words
- c) put quotation marks around the words

5. Online library catalogues, electronic periodical indexes, and Internet search engines are all examples of databases

- a) True
- b) False

6. Which of the following is not considered a reference source?

- a) A periodical
- b) A directory
- c) An encyclopaedia
- d) A dictionary

7. All material published on the Internet has not gone through the editorial process, therefore you should take special care in determining its quality and authenticity

- a) True
- b) False

8. Truncation, or wild card searching, allows you to locate words with variations in spelling and with different endings. To perform truncation searching in most Web Search Engines you use which one of the following symbols?

- a) # (pound symbol)
- b) \* (asterisk symbol)
- c) + (plus symbol)

d) & (ampersand symbol)

9. The World Wide Web, Email, Newsgroups, and Telnet are all subsystems of the Internet

- a) True
- b) False

10. Which of the following statement is true?

- a) By using Boolean operator AND you can broaden your search
- b) By using Boolean operator NOT, you make your search more specific
- c) By using Boolean Operator OR, you can narrow your search

11. The Internet's Google is best described as an example of

- a) An online catalogue
- b) A search engine
- c) A Boolean Operator
- d) A Web domain

12. In which information source would you find a definition of a subject?

- a) A journal
- b) A dictionary
- c) The Internet

13. In which information source would you find an address?

- a) A statistical table
- b) A discussion list
- c) A directory

14. In which information source would you find statistical information?

- a) A dictionary
- b) A statistical table
- c) A professional colleague

15. In which information source would you find a well established insight into a subject?

- a) An electronic journal
- b) A dictionary
- c) A textbook

16. In which information source would you find up to date, peer-reviewed research?

- a) A journal
- b) A book

c) The Internet

17. In which information source would you find the latest discussion on a recently aired piece of research?

- a) The Internet
- b) A discussion list
- c) A statistical table

18. What can you do to try and establish the validity and reliability of an Internet site that has some information that you think may be useful for including in your essay?

*(Choose 3 of the following options).*

- a) Read other people's comments on the website.
- b) Establish the source of the material.
- c) Find out what else the author has published.
- d) See how well laid out the material is on the site.
- e) Look for the Last Updated date.

19. The largest unit of a database is:

- a) record
- b) a field
- c) a subfield

20. Yahoo! is organized into subject categories which allow you to browse similar to a print index.

- a) True
- b) False

### Quiz C: Communicate & use information

Answer the following questions:

1. When presenting information, the following should be considered:

- a) Intended audience, influence, and attention
- b) Techniques of presenting, product and intended audience
- c) Time management, Intended audience and format

2. While presenting, you need to consider whether your presentation is a one way or two way communication. Which of the following are two way communication categories?

- a) Lecture, tutorial, public speech
- b) Tutorial, seminar, quiz

c) Public speech, interrogation, sermon

3. List down what you consider to be the main formats of presenting information.

4. The intended purpose of copyright law is:

- a) to provide an author or publisher with the incentive to produce a work by granting them a limited monopoly over the use of the work
- b) to dissuade other people from plagiarizing the work
- c) to make authors rich
- d) to make sure that authors and publishers make a fair return on the investment of time and money that they have put into the creation of a work

5. Read the following paragraphs and answer the questions below:

**Paragraph A:** *"In research writing, sources are cited for two reasons: to alert readers to the sources of your information and to give credit to the writers from whom you have borrowed words and ideas."*<sup>1</sup>

1. Diana Hacker, *A Writer's Reference* (St. Martin's Press, 1995).

**Paragraph B:** *In research writing, sources are cited to alert readers to the sources of your information and to give credit to the writers from whom you have borrowed words and ideas*

**Paragraph C:** *In research writing, we cite sources for a couple reasons: to notify readers of our information sources and give credit to those from whom we have borrowed. (Hacker).*

**Paragraph D:** In her book *A Writer's Reference*, Diana Hacker notes, "In research writing, sources are cited for two reasons: to alert readers to the sources of your information and to give credit to the writers from whom you have borrowed words and ideas." (1995, p. 260).

**Questions:**

- a. Identify paragraphs whose information has been plagiarized
- b. State why do you think it is plagiarism

## Appendix H: Quizzes for students

### Quiz A: Define a topic or research problem

Answer the following questions:

1. One of the most difficult aspects of writing a research paper is determining how narrow to focus your topic.
  - a) True
  - b) False
2. Why are Encyclopaedias good starting point for getting information on a topic? .....
3. One way to help define your topic is to ask yourself what the topic is all about. What are other questions you could ask yourself before you begin your assignment or research?.....
4. It is not always a good idea to consult a subject specialist to assist define a topic or research problem as they may provide very technical/complicated alternatives
  - a) True
  - b) False
5. What are possible online sources to consult to familiarise yourself with the topic or research problem?.....
6. You can consult your lecturer/tutor for help with defining your topic or provide with a background information about a topic, who else could you consult? (1)..... (2)..... (3).....
7. You can also consult reference lists provided by your lecturer/tutor for further assistance on how to formulate your thesis statement or research problem
  - a) True
  - b) False
8. Indicate below main uses for each of the following tool/source  
Encyclopaedia .....Dictionary .....Thesaurus .....

### Quiz B: Locate & access information

Provide answers to the following questions by checking/ticking one answer only in each question.

1. Give three reasons why the Internet may NOT be the best or easiest way to find information on a topic

1.....2.....3.....

2. The advantages of searching for information online include?

- a) it is always faster
- b) you can combine search terms and use various techniques
- c) the information is always up to date
- d) the information is not biased

3. Research produced by faculty at the universities is most often published

- a) On the Internet
- b) In general interest magazines
- c) In books and scholarly journals

4. One way to limit your search results in Web directories and search engines so that the results better reflect your topic is to use phrase searching. To search for words as a phrase, what do you do?

- a) put question marks around the words
- b) put asterisks around the words
- c) put quotation marks around the words

5. Online library catalogues, electronic periodical indexes, and Internet search engines are all examples of databases

- a) True
- b) False

6. Which of the following is not considered a reference source?

- a) A periodical
- b) A directory
- c) An encyclopaedia
- d) A dictionary

7. Information searching process is considered iterative: you can repeat the same process over and again until you are satisfied with your results

- a) True
- b) False

8. Truncation, or wild card searching, allows you to locate words with variations in spelling and with different endings. To perform truncation searching in most Web

Search Engines you use which one of the following symbols?

- a) # (pound symbol)
- b) \* (asterisk symbol) or \$ (Dollar symbol)
- c) + (plus symbol)
- d) & (ampersand symbol)

9. The World Wide Web, Email, Newsgroups, and Telnet are all subsystems of the Internet

- a) True
- b) False

10. Which of the following statement is true?

- a) By using Boolean operator AND you can broaden your search
- b) By using Boolean operator NOT, you make your search more specific
- c) By using Boolean Operator OR, you can narrow your search

11. The Internet's Google is best described as an example of

- a) An online catalogue
- b) A search engine
- c) A Boolean Operator
- d) A Web domain

12. In which information source would you find a definition of a subject?

- a) Guide book
- b) A dictionary
- c) The OPAC

13. In which information source would you find an address?

- a) A statistical table
- b) A discussion list
- c) Telephone directory

14. In which information source would you find statistical information?

- a) A dictionary
- b) A statistical table
- c) A professional colleague

15. Which description does NOT apply to reference books:

- a) Books that include dictionaries, encyclopaedias, almanacs, atlases, handbooks.
- b) Books that may be checked out for 4 weeks by those having valid ID.



c) Books that are used to find introductory or background information on a subject.

16. In which information source would you find up to date, peer-reviewed research?

- a) A journal
- b) A book
- c) The Internet

17. In which information source would you find the latest discussion on a recently aired piece of research?

- a) The Internet
- b) A discussion list
- c) A statistical table

18. Give two examples on how information is generated in the society

1. .... 2. ....

19. The largest unit of a database is:

- a) record
- b) a field
- c) Subject

20. Yahoo! is organized into subject categories which allow you to browse similar to a print index.

- a) True
- b) False

### Quiz C: Communicate & Use information

Answer the following questions:

1. How would you get relevant ideas from information presented in the following ways:

- News broadcast on a radio .....
- Lecture presentation.....
- Research paper.....
- TV show.....
- Poster session .....
- Election results on the Government Website.....

2. Explain briefly, why is it necessary to apply reasoning skills when using information? .....

3. List down any two formats of presenting information:

- (i) .....
- (ii) .....

4. List down two reasons for using citations in your research work

- (i).....
- .....
- (ii).....
- .....

5. The following are examples of plagiarism:

- a) Cut and paste information from the web or other resources without acknowledging the source
- b) Copying lists of citations/references at the end of an article or
- c) of a book without citing them in a work
- d) Genuinely forgetting that you had downloaded or otherwise copied
- e) the material and thought you'd come up with the text yourself
- f) (d) All the above

6. Read the following paragraphs and answer the questions below:

**Paragraph A:** " In research writing, sources are cited for two reasons: to alert readers to the sources of your information and to give credit to the writers from whom you have borrowed words and ideas." <sup>1</sup>

1. Diana Hacker, *A Writer's Reference* (St. Martin's Press, 1995).

**Paragraph B:** *In research writing, sources are cited to alert readers to the sources of your information and to give credit to the writers from whom you have borrowed words and ideas*

**Paragraph C:** *In research writing, we cite sources for a couple reasons: to notify readers of our information sources and give credit to those from whom we have borrowed. (Hacker).*

**Paragraph D:** *In her book A Writer's Reference, Diana Hacker notes, "In research writing, sources are cited for two reasons: to alert readers to the sources of your information and to give credit to the writers from whom you have borrowed words and ideas." (1995, p. 260).*

**Questions:**

- c. Identify paragraphs whose information has been plagiarised
- d. State why do you think it is plagiarism

## **Appendix I: Reflective exercises at the end of each lesson**

(Applied to both, librarians and students)

Basing on a topic or research problem defined in you group, answer the following questions:

1. Give a brief explanation of what you did in this lessons
2. Which new skills did you gain in this lesson? (If you did not gain any skills then answer question number 7 below)
3. What happened after being taught all the skills in this lesson? Were you able to apply the skills to your work? Provide your answers with a brief explanation on how the skills gained assisted you work on your topic
4. If you were not able to apply the skills to your work, what could be the reasons? Please explain briefly
5. Do you think that the skills you have learned in this lesson what you had defined in your information seeking goals? Please explain briefly the extent to which your goal/goals have been fulfilled
6. Determine how much new information you would require to solve the problem by providing a brief outline of what information you needed
7. If you did not gain any skills in this lesson, explain what could be the reasons
8. Outline main problems (if any) that you face this lesson, and whether or not you were able to solve them. Explain briefly
9. Do you think that the knowledge acquired in this stage would apply to other situations? If so, what is one thing that you learned in this lesson that you will use in your next assignment or research problem?
10. Explain briefly, which other skills you had expected to learn in this lesson but were not covered?
11. Give your general comments about this lesson and if possible your recommendations to improve the skills taught.

## **Appendix J: Reflective exercise questions at the end of the course**

(Applied to both, librarians and students)

Answer the following questions by referring to what you have learned in information literacy course:

1. What were the major activities that you performed in this course?
2. After having studied all the lessons in information literacy course, have you acquired any skills? State briefly the most important skills which you have acquired in this course.
3. To what extent do you think that the skills taught in this course assisted you meet your information seeking goals?
4. State what are your major achievements for attending this course by referring to the activities carried out in your group
5. What do you consider to be your major weaknesses that made you not able to effectively catch up with what was being taught? What do think are the solutions to your weaknesses
6. Do you think that you have acquired enough skills to solve any information related problems in your future assignments or academic work? State briefly what you would consider to be the most important and relevant skills to use in your future activities
7. In general what were the major problems that you encountered in this course?
8. Has the course met your expectations? State briefly your expectations for this course and indicate whether or not they have been met
9. What are your general comments about this course, what could be done to improve it?

| IL PROCESS DAY I                   | TIME                  | SKILLS TO TEACH   | ACTIVITIES   | DURATION                                    | TEACHING/LEARNING METHOD  |
|------------------------------------|-----------------------|---|--|---|---|
| Introduction to IL programme       | 08:00-08:20           | Introduction to IL course   | <ul style="list-style-type: none"> <li>• Definition of IL by students through brainstorming (What is IL and who is an IL person?)</li> <li>• Course aims, objectives and anticipated outcomes</li> </ul>   | 20 minutes                                  | Presentations/discussion on Introduction to IL course   |
| <b>Fifteen minutes break</b>       |                       |   |  |   |   |
| Define a problem or research topic | 09:30-10:00           | Knowledge of the topic  | <ul style="list-style-type: none"> <li>• Students describe their topics and also formulate discussion groups for their topics</li> <li>• Course instructor explains the need and importance of defining a problem or research topic</li> <li>• Course instructor demonstrates an example of a topic as a statement</li> <li>• Students are asked to construct different statements basing on their topics</li> <li>• Course instructor demonstrates to students how to formulate questions about their topic</li> <li>• Students do as demonstrated by course instructor focusing on their topics</li> </ul> | 30 minutes                                  | Lecture/discussion on determining knowledge of a topic  |
|                                    | 10:00-10:20           | Knowledge of information need   | <ul style="list-style-type: none"> <li>• Course instructor explains a need and importance of defining information needs</li> <li>• Course instructor discusses with students information needs</li> </ul>  | 20 minutes                                  | Lecture/discussion on determining information needs   |
|                                    | 10:20-10:40           | Defining goals for information seeking process                            | <ul style="list-style-type: none"> <li>• Find out from students their perceptions of the training course and what they expect to achieve</li> <li>• Course instructor explains the need and importance of defining goals for information seeking process</li> <li>• Carry out discussions with students about their short and long term goals with regards to the information seeking activity</li> </ul>  | 20 minutes                                  | Lecture/discussion on goals for information seeking process                                     |
|                                    | 10:40-11:30           | Knowledge of sources/tools to find background information about the topic | <ul style="list-style-type: none"> <li>• Find out from students their prior knowledge about previously used sources/tools that would help familiarize them with the topic or research problem</li> <li>• Introduce students to the range of useful tools or sources for familiarisation with the topic such as reference sources</li> <li>• Demonstrate to students the range of useful tools/sources</li> <li>• Course instructor explains to students why it is important to consult sources/tools to find background information about the topic</li> </ul>   | 50 minutes                                  | Lecture/discussion on knowledge of sources/tools to find background information about the topic |
|                                    | 11:30-12:30           | Applying the skills of defining information needs                         | <ul style="list-style-type: none"> <li>• In their groups students define what the topic is about</li> <li>• Students determine the purpose for which the information is needed (and type of information needed)</li> <li>• Students determine information already known relevant to their questions and establish the information needed/gap (through brainstorming)</li> <li>• Students identify possible sources to find background information about their topics</li> </ul>  | 1 hour                                      | Lab session   |
|                                    | <b>One Hour Break</b> |   |  |   |   |
|                                    | 13:30-14:00           | Preparations for group presentations                                      | <ul style="list-style-type: none"> <li>• Students prepare presentations on defining information needs</li> </ul>   | 30 minutes                                  |   |
|                                    | 14:00-15:20           | Group presentations   | <ul style="list-style-type: none"> <li>• Group presentations on defining information needs (to reflect the above aspects)</li> </ul>   | 1 hour, 20 minutes (20 min. for each group) | Presentations   |
|                                    | 15:20-16:00           | Quiz A  | <ul style="list-style-type: none"> <li>• Quiz with results at the end</li> </ul>   | 40 Min.                                     | Lab session   |
|                                    | 16:00-17:00           | Hands on activities   | <ul style="list-style-type: none"> <li>• Group work using sources to become familiar with a topic</li> </ul>   | 1 hour                                      | Lab session   |

| <b>DAY 2</b>                               |                             |   |  |  |   |
|--|-----------------------------|---|--|--|---|
| Define a problem or research topic (cont.) | 08:00-09:00                 | Terms/words identification when defining a problem or research topic (Mind mapping) | <ul style="list-style-type: none"> <li>• Introduce to students the idea of terms/words identification and demonstrate mind mapping</li> <li>• Demonstrate to students how to use various tools to find relevant terms related to a topic</li> <li>• Course instructor explains to students why it is important to identify terms/words</li> </ul>  | 1 hour                                     | Lecture/discussion on concepts identification in defining tasks       |
|  | 09:00-09:25                 | Organize terms/words  | <ul style="list-style-type: none"> <li>• Introduce students to the idea of organizing terms related to a topic or research problem and the need to do so</li> <li>• Demonstrate briefly to students how to organise their ideas related to a topic or research problem</li> </ul>  | 25 minutes                                 | Lecture/discussion on concepts organizing ideas in defining a problem |
|  | <b>Twenty minutes break</b> |   |  |  |   |
|  | 09-45-1200                  | Mind mapping activity   | <ul style="list-style-type: none"> <li>• Students identify terms suitable to their topics using various tools and based on their experience</li> <li>• Students formulate and build vocabularies from terms by finding suitable labels/terms/words</li> <li>• Students draw mind maps based on the chosen topic or research question</li> <li>• Students organise terms/words based on their similarities and differences</li> </ul> | 2 hour, 15 minutes                         | Group work<br>Lab session   |
|  | <b>One hour break</b>       |   |  |  |   |
|  | 13:00-14:20                 | Group presentations   | <ul style="list-style-type: none"> <li>• Group presentations on mind mapping: students present their mind maps and discuss how they organize ideas for defining tasks</li> </ul>   | 1 hour, 20 minutes (20 minutes each group) | Presentations and discussions   |
|  | 14:20-15:15                 | Reflective thinking about defining task and problem definition                      | <ul style="list-style-type: none"> <li>• Students reflect on what they have learnt when defining a problem or research topic.</li> <li>• Students answer reflection questions in <i>EXERCISE A2</i></li> </ul>   | 30 minutes                                 | • Discussions   |
| 15:15-16:00                                | Hands on activities         | Using tools to find search terms  | 25 minutes   | • Exercise                                 |   |
|  |                             |   | 45 minutes   | Lab session                                |   |

| <b>Day 3</b>                  |                             |  |  |  |   |
|-------------------------------|-----------------------------|--|--|--|---|
| Locate and Access Information | 08:00-08:40                 | Knowledge of categories of sources of information                      | <ul style="list-style-type: none"> <li>Find out from students their knowledge of categories of information sources</li> <li>Introduce students to categories of information sources</li> <li>Demonstrate how to identify/choose information sources</li> </ul>   | 40 minutes                                     | Lecture/discussion on categories of information sources                                   |
|                               | 08:40-09:00                 | Knowledge of location and access tools                                 | <ul style="list-style-type: none"> <li>Find out from students their knowledge search tools</li> <li>Introduce students to defining a range of search tools</li> <li>Demonstrate how to identify/describe search tools</li> <li>Course instructor should explain to students why such tools are used and their importance in the information seeking process</li> </ul>   | 20 minutes                                     | Lecture/discussion on locating/finding tools  |
|                               | <b>Twenty minutes break</b> |  |  |  |   |
|                               | 09:20-10:00                 | Knowledge of the structure of information sources                      | <ul style="list-style-type: none"> <li>Course instructor finds out from students their knowledge of information generation and structure of information sources</li> <li>Introduce students to how knowledge is generated and organized</li> <li>Course instructor explains why it is important to know the structure of information sources and how it facilitates the information seeking process</li> </ul>               | 40 minutes                                     | Lecture/discussion on information generation and organization of knowledge                |
|                               | 10:00-11:15                 | Knowledge of information retrieval systems and search strategies       | <ul style="list-style-type: none"> <li>Demonstrate how to formulate search strategies and how to use them in an information retrieval system</li> <li>Demonstrate how to retrieve information by using various methods and explain the reasons for developing search strategies and importance of using different search techniques (narrow, broaden etc.)</li> </ul>  | 1 hour 15 minutes                              | Lecture/discussion on information retrieval systems and search strategies<br>Lab sessions |
|                               | 11:15-11:30                 | Affective states associated with location and access                   | <ul style="list-style-type: none"> <li>Create awareness of the likely confusions and uncertainties during location and access</li> <li>Emphasize the need to take a positive problem-solving approach to searching and information retrieval</li> </ul>  | 15 minutes                                     | Lecture/discussion on affective states when locating and accessing information            |
|                               | 11:30-12:30                 | Applying location and access skills                                    | <p>In their groups students should:</p> <ul style="list-style-type: none"> <li>Identify major tasks that they experienced during location and access of information</li> <li>Identify possible problems when searching, locating and accessing information</li> <li>Identify ways of overcoming the obstacles</li> <li>Course instructor should explain to students why they have to carry out the above activity</li> </ul> | 1 hour   | Group work  |
|                               | <b>One hour break</b>       |  |  |  |   |
|                               | 13:30-14:00                 | Applying location and access skills                                    | Preparing presentations  | 30 minutes                                     | Group work  |
|                               | 14:00-15:20                 | Group presentations  | Group presentation: Students present their plans for locating and accessing information  | 1 hour, 20 minutes (20 minutes for each group) | Presentations and discussions   |
| 15:20-16:00                   | Quiz B                      | Quiz with results at the end   | 40 Min.  | Lab session                                    |   |
| 16:00-17:20                   | Hands on activities         | Information searching – students start the information seeking process | 1 hour, 20 minutes   | Lab sessions                                   |   |

| <b>Day 4</b>                          |                             |  |  | <b>METHOD</b>                              |                               |
|---------------------------------------|-----------------------------|--|--|--|-------------------------------|
| Locate and Access Information (cont.) | 08:00-10:00                 | Information searching and capture ( <i>continued</i> )   | <ul style="list-style-type: none"> <li>• Students continue the information seeking process:</li> <li>• Identify and familiarise with search tool's functionality</li> <li>• Construct search strategies</li> <li>• Use a variety of search techniques to perform searches</li> <li>• Retrieve and review the results</li> <li>• Refine/modify searches by either repeating some or all of the above processes or using alternative/related words/terms or sources including people and organizations or strategies/techniques</li> <li>• Capture and organise sources retrieved</li> </ul> | 2 hours                                    | Group work<br>Lab sessions    |
|                                       | <b>Twenty minutes break</b> |  |  |  |                               |
|                                       | 10:20-12:00                 | Information searching and capture  | <ul style="list-style-type: none"> <li>• Continue with the above exercise</li> </ul>   | 1 hour, 40 minutes                         | Lab session<br>Group work     |
|                                       | <b>One hour break</b>       |  |  |  |                               |
|                                       | 13:00-14:20                 | Group presentations  | Students present their search results  | 1 hour, 20 minutes (20 minutes each group) | Presentations and discussions |
|                                       | 14:20-15:15                 | Reflective thinking during locating and accessing information  | <ul style="list-style-type: none"> <li>• Students asked to reflect on what they have learnt in locating and accessing information</li> <li>• Students should answer reflection questions in <i>EXERCISE B2</i></li> </ul>  | 30 minutes                                 | Discussions                   |
| 15:15-17:00                           | Hands on activities         | <ul style="list-style-type: none"> <li>• Continue with information seeking activities in groups</li> </ul> | 25 minutes   | Exercise                                   |                               |
|                                       |                             |  | 1 hour, 45 minutes   |  |                               |



| <b>DAY 5</b>                        |                         |  |   |  |   |
|-------------------------------------|-------------------------|--|---|--|---|
| Synthesize and evaluate information | 08:00-08:30             | Ways of capturing information from sources                         | <ul style="list-style-type: none"> <li>Find out from students how they capture information from sources</li> <li>Discuss and demonstrate to students various techniques of capturing information from sources (skimming and scanning, reading introductions and conclusions)</li> <li>Course instructor explains to students why it is important to capture information from sources</li> </ul>   | 30 minutes                                 | <b>G METHOD</b>   |
|                                     | 08:30-09:15             | Knowledge of various techniques of synthesizing information        | <ul style="list-style-type: none"> <li>Course instructor finds out from students their knowledge of synthesizing information</li> <li>Discuss and demonstrate to students, various techniques of capturing and synthesizing information (develop notes of important concepts, paraphrasing, outlining, summarizing, annotations, using charts, maps, graphs, note cards, note taking sheets, audio and video, databases, spreadsheets, timelines etc)</li> <li>Course instructor explains why they should know different ways of combining information</li> </ul> | 45 minutes                                 | Lecture/discussions on determining knowledge of a topic                 |
|                                     | <b>20 minutes break</b> |  |   |  |   |
|                                     | 09:35-10:05             | Knowledge of evaluation criteria of information                    | <ul style="list-style-type: none"> <li>Find out from students their knowledge of evaluation criteria for information</li> <li>Discuss and demonstrate to students various evaluation criteria of information and sources (reliability, validity, accuracy, authority, timeliness, point of view or bias etc)</li> <li>Course instructor introduces students to various logical fallacies found in educational theory</li> <li>Course instructor explains why they should know criteria for evaluating information and sources</li> </ul>                          | 30 minutes                                 | Lectures/discussions on evaluation criteria for information and sources |
|                                     | 10:05-12:00             | Applying synthesis and evaluation skills                           | <ul style="list-style-type: none"> <li>Evaluate information and sources using defined criteria such as reliability, validity, accuracy, authority, timeliness, point of view or bias etc</li> <li>Students synthesize information from various sources to get information relevant to their topic</li> <li>Organize information in a meaningful way</li> </ul>  | 1 hour, 55 minutes                         | Lab sessions<br>Group work  |
|                                     | <b>One hour break</b>   |  |   |  |   |
|                                     | 13:00-13:30             | Preparation for presentations                                      | <b>Preparation for group presentations</b>  | 30 minutes                                 | Group work  |
|                                     | 13:30-14:50             | Group presentations  | <ul style="list-style-type: none"> <li>Group presentations: students make their group presentations on criteria used to evaluate information and sources used</li> </ul>  | 1 hour, 20 minutes (20 minutes each group) | Presentations and discussions   |
|                                     | 14:50-15:45             | Reflective thinking during synthesizing and evaluating information | <ul style="list-style-type: none"> <li>Students asked to reflect on what they have learnt in synthesizing and evaluating information</li> <li>Students answer reflection questions in <i>EXERCISE C2</i></li> </ul>   | 30 minutes                                 | Discussions   |
|                                     | 15:45-17:00             | Hands on activities  | <ul style="list-style-type: none"> <li>Continue with evaluation of information and sources and synthesis of information</li> </ul>  | 25 minutes                                 | Exercise  |
|                                     |                         |  | 1 hour, 15 minutes  | Lab sessions                               |   |

| DAY 6                               |                        |  | METHOD   |                      |   |
|-------------------------------------|------------------------|--|--|----------------------|---|
| Communicating and using information | 08:00-09:00            | Knowledge of presentation techniques of information                    | <ul style="list-style-type: none"> <li>Find out from students their knowledge about information presentation techniques</li> <li>Discuss with students and demonstrate different ways of presenting (communicating) information by defining the purpose of information, intended audience, format, product and presentation techniques</li> <li>Course instructor explains why they should know different ways of presenting information</li> </ul>  | One hour             | Lecture/discussion on presentation techniques and using information |
|                                     | 09:00-09:15            | Ways of using information  | <ul style="list-style-type: none"> <li>Find out from students and discuss different ways of using information (listening, seeing, touching) information to get relevant information</li> </ul>   | 15 minutes           |   |
| <b>Fifteen minutes break</b>        |                        |  |  |                      |   |
|                                     | 09:30-10:00            | Reasoning skills in communicating and using information                | <ul style="list-style-type: none"> <li>Introduce to students inductive and deductive reasoning by using examples from a chosen topic (use examples to show how to use data (evidence) to get ideas (information); use examples to show how to use ideas (information) to get evidence to prove a case)</li> <li>Course instructor explains why it is important to apply reasoning skills in using information</li> </ul>   | 30 minutes           | Lecture/discussion on concepts formation in reasoning               |
|                                     | 10:00-10:20            | Bibliographic citations  | <ul style="list-style-type: none"> <li>Find out from students their knowledge of referencing and citing</li> <li>Discuss with students various systems of bibliographic citations</li> <li>Course instructor should explain why they should know different ways of citing and the importance of citing</li> </ul>  | 20 minutes           | Lecture/discussion on Bibliographic citations                       |
|                                     | 10:20-11:00            | Knowledge of ethical and legal issues of using information             | <ul style="list-style-type: none"> <li>Find out from students their knowledge of the ethical and legal issues of using information</li> <li>Discuss with students ethical and legal issues surrounding the effective use of information and information technology</li> <li>Discuss with students different laws, regulations and institutional policies related to the access and use of information resources</li> <li>Course instructor explains the ethical and legal issues of using information</li> </ul> | 40 minutes           | Lecture/discussion on ethical and legal issues of using information |
|                                     | <del>10:00-10:30</del> | <del>Quiz C</del>  | <del>Quiz with results at the end</del>  | <del>30 Min</del>    | <del>Lab session</del>  |
|                                     | 11:30-12:30            | Applications of information communicating and use skills               | <ul style="list-style-type: none"> <li>Students prepare presentations that include answers to their research questions and also reflection on the research process</li> </ul>  | 1 hour               | Lecture/discussion on behaviour on presenting and using information |
| <b>One hour break</b>               |                        |  |  |                      |   |
|                                     | <del>13:30-14:25</del> | <del>Reflective thinking during presenting and using information</del> | <ul style="list-style-type: none"> <li>Students asked to reflect on what they have learnt in communicating and using information</li> <li>Students should answer reflection questions in <b>EXERCISE D2</b></li> </ul>   | <del>30 minute</del> | <del>Exercises</del>  |
|                                     |                        |  |  | 25 minutes           | Discussions   |
|                                     | 14:25-16:25            | Preparations for presentations   | Students prepare for the overall group presentations   | 2 hours              | Group work<br>Lab sessions  |

| <b>DAY 7</b>                        |             |  |   |                                 | <b>METHOD</b>   |
|-------------------------------------|-------------|--|---|---------------------------------|---|
| Communicating and using information | 08:00-09:00 | Preparations for Presentations               | • Students prepare their presentations  | 1 hour                          | Lab sessions: Preparations for presentations                    |
| <b>30 minutes break</b>             |             |  |   |                                 |   |
| Communicating and using information | 09:30-11:30 | Presentations                                | • Students present their findings on their chosen topics and also their reflections on the research process                         | 2 hours (30 minutes each group) | Presentations/discussion on communicating and using information |
| <b>Ten minutes break</b>            |             |  |   |                                 |   |
| Post Test                           | 11:40-12:30 | Information literacy skills test             | • Information literacy skills test to determine skills gained by students during the course   | 50 minutes                      | Test  |
| <b>One hour break</b>               |             |  |   |                                 |   |
| Reflections                         | 13:30-14:30 | Reflective thinking for the entire programme | • Students reflect on what they have learnt during the entire course<br>• Students answer reflection questions in <i>EXERCISE F</i> | 40 minutes<br>20 minutes        | Discussions<br>Exercise   |
| <b>Course Closure</b>               |             |  |   |                                 |   |

| IL PROCESS Day 1                | TIME                     | SKILLS TO TEACH   | ACTIVITIES   | DURATION   | TEACHING/LEARNING METHOD  |  |
|---------------------------------|--------------------------|---|--|------------|---|--|
| <b>Introducing IL programme</b> | 09:00-09:20              | Introduction to IL course   | • Course aims, objectives and anticipated outcomes   | 20 minutes | Presentations/discussion on Introduction to IL course   |  |
| <b>Fifteen minutes break</b>    |                          |   |  |            |   |  |
| Define Task                     | 10:30-11:00              | Knowledge of the topic  | <ul style="list-style-type: none"> <li>• Librarians should select the topic of their interest (or an assignment provided by subject instructor)</li> <li>• Course instructor should determine their prior knowledge about the topic</li> <li>• Demonstrate how to express a topic as statement</li> <li>• Librarians asked to construct different thesis statements of the topic</li> </ul>  | 30 minutes | Lecture/discussion on determining knowledge of a topic  |  |
|                                 | 11:00-11:30              | Knowledge of the information need   | Course instructor should demonstrate to librarians on how to think about the information needed in the topic. Librarians need to: <ul style="list-style-type: none"> <li>• Determine the purpose for which the information is needed</li> <li>• Formulate questions from the topic:</li> <li>• Identify the main question that needs information.</li> <li>• Identify/determine information already known relevant to answer the question and information needed (gap).</li> </ul> | 30 minutes | Lecture/discussion on determining information needs   |  |
|                                 | 11:30-11:50              | Defining goals for information seeking process                            | <ul style="list-style-type: none"> <li>• Find out from librarians their desired or needed result to be achieved when seeking information to meet their information needs</li> <li>• Carry out discussions with librarians about their short and long term goals with regards to information seeking activity</li> </ul>  | 20 minutes | Lecture/discussion on goals for information seeking process                                     |  |
|                                 | <b>ten minutes break</b> |   |  |            |   |  |
|                                 | 12:00-12:40              | Knowledge of sources/tools to find background information about the topic | <ul style="list-style-type: none"> <li>• Find out from librarians their prior knowledge about previously used sources/tools to use to familiarize with the topic or research problem</li> <li>• Introduce to librarians range of useful tools or sources to use for familiarity with the topic such as reference sources, accessions lists etc</li> <li>• Demonstrate to librarians range of useful tools/sources of information to familiarise with a topic</li> </ul>            | 40 minutes | Lecture/discussion on knowledge of sources/tools to find background information about the topic |  |
|                                 | 12:40-13:00              | Knowledge of sources/tools  | <ul style="list-style-type: none"> <li>• Hands on activity on tools/sources</li> </ul>   | 20 minutes | Group work  |  |
| <b>One Hour Break</b>           |                          |   |  |            |   |  |
|                                 | 14:00-14:20              | Quiz  | • Librarians should answer questions in <i>Quiz A</i>  | 20 minutes | Short quiz  |  |
|                                 | 14:20-15:20              | Hands on activities   | • Hands on activities  | 1 hour     | Lab sessions  |  |

|                        |                             |  |   |   |   |
|------------------------|-----------------------------|--|---|---|---|
| Define Task<br>(cont.) | 09:00-10:00                 | Creative thinking related to defining a task                   | <ul style="list-style-type: none"> <li>• Introduce to librarians, a general concept of creative thinking</li> <li>• Describe with examples different types of creative thinking in defining a topic or research problem as follows: <ul style="list-style-type: none"> <li>• <b>Creative thinking through synthesis</b></li> <li>• Demonstrate to librarians how to combine two or more ideas to get a new one</li> <li>• Creative thinking through Revolution</li> <li>• Demonstrate to librarians how to define a topic or research problem by using the existing ideas in different ways to get a new or more meaningful one</li> <li>• <b>Creative thinking through evolution</b></li> </ul> </li> <li>• Demonstrate to librarians how to define a topic or research problem by creating new ideas from the existing ones, or from other ideas</li> </ul> | 1 hour                                    | Lecture/discussion on creative thinking in defining tasks             |
|                        | <b>Twenty minutes break</b> |  |   |   |   |
|                        | 10:20-11:10                 | Concept formation in defining a task                           | <ul style="list-style-type: none"> <li>• Introduce to librarians a general idea of concept formation and demonstrate on concept mapping</li> <li>• Demonstrate to librarians how to organise their ideas related to a topic or research problem</li> </ul>  | 50 minutes                                | Lecture/discussion on concepts formation in defining tasks            |
|                        | 11:10-11:30                 | Organize ideas in defining tasks                               | <ul style="list-style-type: none"> <li>• Introduce to librarians a general idea of organizing ideas related to a topic or research problem</li> <li>• Demonstrate briefly to librarians how to organise their ideas related to a topic or research problem</li> </ul>   | 20 minutes                                | Lecture/discussion on concepts organizing ideas in defining a problem |
|                        | 11:30-1300                  | Concept mapping in defining task                               | <ul style="list-style-type: none"> <li>• Ask librarians to draw a concept map basing on a chosen topic or research question,</li> <li>• Ask librarians to identify concepts they already understood or known in relation to a topic or research problem.</li> <li>• Ask librarians to note similarities and differences of the concepts</li> <li>• Ask librarians to formulate and build vocabularies from concepts by finding labels/terms/words for concepts which are already understood</li> <li>• Ask librarians to comprehend new concepts</li> </ul>   | 1 hour 30 minutes                         | Group work  |
|                        | <b>One hour break</b>       |  |   |   |   |
|                        | 14:00-15:15                 | Presentations  | <ul style="list-style-type: none"> <li>• Group presentations: concept mapping and organizing ideas: <i>Librarians should go back to class and present their concept maps and how they organize ideas for defining tasks</i></li> </ul>  | 1 hour 15 minutes (15 minutes each group) | Presentations and discussions   |
|                        | 15:15-15:45                 | Reflective thinking during defining task or problem definition | <ul style="list-style-type: none"> <li>• Librarians asked to answer questions in <i>EXERCISE A2</i></li> </ul>  | 30 minutes                                | Exercise  |

| IL PROCESS Day 3              | TIME  | SKILLS TO TEACH  | ACTIVITIES  | DURATION                      | TEACHING/LEARNING METHOD   |  |
|-------------------------------|---|--|---|-------------------------------|--|--|
| Locate and Access Information | 09:00-09:40   | Knowledge of information generation and organization of knowledge  | <ul style="list-style-type: none"> <li>Course instructor should find out from librarians their general knowledge about information generation and organization of knowledge</li> <li>Introduce librarians into General knowledge of generating information and organization of knowledge</li> </ul>   | 40 minutes                    | Lecture/discussion on information generation and organization of knowledge     |  |
|                               | 09:40-10:20   | Knowledge of broad categories of sources of information  | <ul style="list-style-type: none"> <li>Find out from librarians their general knowledge about broad categories of information sources</li> <li>Introduce librarians to defining broad categories of information sources</li> <li>Demonstrate on how to identify/define information sources</li> </ul>   | 40 minutes                    | Lecture/discussion on broad categories of information                          |  |
|                               | <b>Twenty minutes break</b>                               |  |   |                               |  |  |
|                               | 10:40-11:00   | Knowledge of locating/finding tools  | <ul style="list-style-type: none"> <li>Find out from librarians their general knowledge about locating tools</li> <li>Introduce librarians to defining a range of locating tools</li> <li>Demonstrate on how to identify/describe locating tools</li> </ul>   | 20 minutes                    | Lecture/discussion on locating/finding tools                                   |  |
|                               | 11:00-11:55   | Knowledge of information retrieval systems and search strategies   | <ul style="list-style-type: none"> <li>Demonstrate on how to formulating search strategies and how to apply it to an information retrieval system</li> <li>Demonstrate on how to retrieve information by using various methods</li> </ul>   | 55 minutes                    | Lecture/discussion on information retrieval systems and search strategies      |  |
|                               | 11:55-12:05   | Behaviour exhibited when locating and accessing information  | <ul style="list-style-type: none"> <li>Find out from librarians their general knowledge about behaviour exhibited while locating and accessing information</li> <li>Introduce to librarians behaviour exhibited while locating and accessing information through reading, writing or taking notes, discussing, listening, consulting etc</li> </ul>   | 10 minutes                    | Lecture/discussion on behaviour for locating and accessing information         |  |
|                               | 12:05-12:15   | Characteristics and behaviour of sources located and accessed  | <ul style="list-style-type: none"> <li>Discuss with librarians how to identify value and differences of potential resources in a variety of formats (e.g., websites, printed sources, multimedia, database, data set, audio/visual) and behaviour (accessibility, user-friendliness)</li> </ul>   | 10 minutes                    | Lecture/discussion on characteristics and behaviour of sources of information  |  |
|                               | 12:15-12:25   | Affective states in locating & accessing information   | <ul style="list-style-type: none"> <li>Create awareness to librarians about all likely confusions and uncertainties arising during locating and accessing information</li> <li>Ask librarians to carefully consider employing the best search and retrieval techniques to obtain information that will boost their work to success</li> </ul>   | 10 minutes                    | Lecture/discussion on affective states when locating and accessing information |  |
|                               | 12:25-13:00   | Problem solving approach in locating and accessing information   | <ul style="list-style-type: none"> <li>Librarians should:</li> <li>Identify major tasks involved in order to locate and access information from sources, basing on a topic or subject of their choice</li> <li>Identify constraints in searching, locating and accessing information</li> <li>Ask librarians to identify ways of overcoming the obstacles</li> <li>Select suitable approaches to providing solutions and test the solutions to see whether they work</li> <li>Evaluate how effective is the solution opted</li> </ul> | 30 minutes                    | Group work   |  |
|                               | <b>One hour break</b>                                     |  |   |                               |  |  |
| 14:00-14:20                   | Problem solving approach to locate and access information | <ul style="list-style-type: none"> <li>Problem solving activities &amp; preparing presentations</li> </ul>   | 20 minutes  | Group work                    |  |  |
| 14:20-15:35                   | Presentations   | <ul style="list-style-type: none"> <li>Group presentation: problem solving plans: <i>Librarians should come back to class and present their problem solving plans in locating and accessing information</i></li> </ul> | 1 hour 15 minutes (15 minutes for each group)   | Presentations and discussions |  |  |
| 15:35-16:00                   | Comprehension   | <ul style="list-style-type: none"> <li>Librarians should answer questions in <i>EXERCISE B</i></li> </ul>  | 20 minutes  | Short answers                 |  |  |

| IL PROCESS<br>Day 4                   | TIME                        | SKILLS TO TEACH   | ACTIVITIES  | DURATION                                  | TEACHING/LEARNING METHOD  |  |
|---------------------------------------|-----------------------------|---|---|---|---|--|
| Locate and Access Information (cont.) | 09:00-10:00                 | Creative thinking: information searching techniques           | <ul style="list-style-type: none"> <li>• Librarians should brainstorm potential sources of information (inside and outside library)</li> <li>• Librarians should use location tools to locate appropriate resources from varieties of source types and formats</li> <li>• They should use information tools, technologies etc, to locate relevant resources</li> <li>• They should apply search strategies (keyword, Boolean etc) to locate the resources</li> <li>• They should access information from sources by using various techniques</li> <li>• They refine searches or select alternative sources to get more precise results</li> </ul> | 1 hour                                    | <ul style="list-style-type: none"> <li>▪ Group work</li> <li>▪ Lab sessions</li> </ul>    |  |
|                                       | 10:00-10:30                 | Concept formation in locating and accessing information       | <ul style="list-style-type: none"> <li>• Identify sources located and associate with meaningful terms, synonyms, etc, with citations used, to access information from sources</li> </ul>  | 30 minutes                                | <ul style="list-style-type: none"> <li>• Group work</li> <li>• Lab sessions</li> </ul>    |  |
|                                       | <b>twenty minutes break</b> |   |   |   |   |  |
|                                       | 10:50-11:20                 | Organize ideas in locating and accessing information          | <ul style="list-style-type: none"> <li>• Find out from librarians about different ways of organizing information located and accessed</li> <li>• Discuss with librarians about various system of organizing sources located (book marks, files and folders, portals)</li> </ul>   | 30 minutes                                | Lecture/discussion on different ways of organizing information sources located & accessed |  |
|                                       | 11:20-11:50                 | Reasoning in locating and accessing information               | <ul style="list-style-type: none"> <li>• Ask librarians to march information from one source to that found in a different source by noting their similarities</li> <li>• Use existing knowledge from one set of information sources to understand other sources</li> <li>• Logically compare sources located, with the search query formulated</li> <li>• Determine whether the sources located make any sense to what you anticipated</li> </ul>   | 30 minutes                                | <ul style="list-style-type: none"> <li>• Group work</li> <li>• Lab sessions</li> </ul>    |  |
|                                       | 11:50-12:50                 | Preparations for presentations                                | <ul style="list-style-type: none"> <li>• Librarians to finalize the search process and prepare presentations</li> </ul>   | 1 hour                                    | <ul style="list-style-type: none"> <li>▪ Lab session</li> <li>▪ Group work</li> </ul>     |  |
|                                       | <b>One hour break</b>       |   |   |   |   |  |
|                                       | 14:00-15:15                 | Presentations   | Group presentations: <i>Librarians should go back to class and present their search results, how they formed concepts how they organize ideas and used reasoning skills for materials located and accessed</i>  | 1 hour 15 minutes (15 minutes each group) | Presentations and discussions   |  |
|                                       | 15:15-15:45                 | Reflective thinking during locating and accessing information | Librarians asked to answer questions in <i>EXERCISE B2</i>  | 30 minutes                                | Exercise  |  |

|                                     |                         |   |   |                   |  |
|-------------------------------------|-------------------------|---|---|-------------------|--|
| Synthesize and evaluate information | 09:00-09:30             | Knowledge of various techniques of combining (synthesizing) information | <ul style="list-style-type: none"> <li>Course instructor should find out from librarians their general knowledge about synthesizing information</li> <li>Discuss and demonstrate to librarians, various techniques of synthesizing information (develop notes of important concepts, paraphrasing, outlining, summarizing, annotations, using charts, maps, graphs, note cards, note taking sheets, audio and video, databases, spreadsheets, timelines etc)</li> </ul>             | 30 minutes        | Lecture/discussion on determining knowledge of a topic |
|                                     | 09:30-10:00             | Knowledge of evaluation criteria of information                         | <ul style="list-style-type: none"> <li>Find out from librarians their general knowledge about evaluation criteria for information</li> <li>Discuss and demonstrate to librarians various evaluation criteria of information and sources (reliability, validity, accuracy, authority, timeliness, point of view or bias etc)</li> </ul>  | 30 minutes        |  |
|                                     | 10:00-10:15             | Behaviour exhibited when synthesizing and evaluating information        | <ul style="list-style-type: none"> <li>Find out from librarians how they synthesize and evaluate information</li> <li>Discuss and demonstrate to librarians various behaviours expressed in synthesis and evaluation of information (reading, viewing, listening, consulting)</li> </ul>  | 15 minutes        |  |
|                                     | <b>20 minutes break</b> |   |   |                   |  |
|                                     | 10:35-11:05             | Problem solving approach to synthesize and evaluate information         | <ul style="list-style-type: none"> <li>Identify tasks to be accomplished in synthesis and evaluation of information</li> <li>Identify constraints associated with synthesis and evaluation of information</li> <li>Decide ways of overcoming the obstacles</li> <li>Select and try the best alternative</li> <li>Evaluate the alternative chosen</li> </ul>   | 30 minutes        | Group work   |
|                                     | 11:05-11:50             | Evaluation of information   | <ul style="list-style-type: none"> <li>Evaluate information and sources based on defined criteria (reliability, validity, accuracy, authority, timeliness, point of view or bias etc)</li> </ul>  | 40 minutes        | Group work   |
|                                     | 11:50-12:05             | Concepts formation for information synthesis                            | <ul style="list-style-type: none"> <li>Describe/identify concepts from information located and accessed</li> <li>Create labels/terms or words from major concepts and sub topics to assist in information synthesis</li> </ul>  | 15 minutes        | Group work   |
|                                     | 12:05-12:20             | Organize information for synthesis                                      | <ul style="list-style-type: none"> <li>Select the most suitable way of extracting information from sources</li> <li>Classify information on the basis of its attributes</li> <li>Compare information in terms of its similarities and differences</li> <li>Order/sequence information according to a given criteria</li> <li>Devise systems of organizing information retrieved</li> <li>Use various techniques of managing information retrieved</li> </ul>                        | 15 minutes        | Group work   |
|                                     | 12:20-12:35             | Creative thinking in synthesizing and evaluating information            | <ul style="list-style-type: none"> <li>Synthesize information evaluated in a group by combining, modifying or changing various ideas or concepts to get a meaningful information</li> <li>Evaluate synthesized information in order to get more valid and concrete information</li> </ul>   | 15 minutes        | Group work   |
|                                     | 12:35-12:55             | Reasoning in synthesis and evaluation of information                    | <ul style="list-style-type: none"> <li>Draw conclusion from information retrieved based on evaluation criteria</li> <li>Determine the coherence of synthesized information</li> <li>Determine the structure of the information to see whether it is valid or make sense</li> <li>Decide whether information synthesized differs or matches with information retrieved</li> <li>Integrate synthesized information with the information already known, based on experience</li> </ul> | 15 minutes        | Group work   |
|                                     | <b>One hour break</b>   |   |   |                   |  |
|                                     | 14:00-14:30             | Preparations for presentations  | Preparations for group presentations  | 30 minutes        | Group work   |
|                                     | 14:30-15:45             | Presentations   | Group presentations: librarians should go back to class and make their group presentations on concept formation, organizing ideas, reflective thinking and reasoning in relation to synthesis and evaluation of information   | 1 hour 15 minutes | Presentations and discussions                          |
|                                     | 15:45-16:15             | Reflective thinking during synthesizing and evaluating information      | Librarians asked to answer questions in <b>EXERCISE C2</b>  | 30 minutes        | Exercise   |



|                                     |   |  |   |            |   |
|-------------------------------------|---|--|---|------------|---|
| Communicating and using information | 09:00-10:00   | Knowledge of presentation techniques and using information       | <ul style="list-style-type: none"> <li>Find out from librarians their general knowledge about presentation techniques of information</li> <li>Discuss with librarians and demonstrate different ways of presenting (communicating) information by defining the purpose of information, intended audience, format, product and presentation techniques</li> <li>Discuss with librarians different ways of integrating prior and new knowledge to come up with the most relevant information to solve an information problem</li> <li>Find out from librarians and discuss different ways of using information, engaging (hearing, viewing, touching, reading) information and extracting information presented (take notes, copy, cite etc)</li> </ul> | 1 hour     | Lecture/discussion on presentation techniques and using information |
|                                     | 10:00-10:15   | Bibliographic citations  | <ul style="list-style-type: none"> <li>Find out from librarians their knowledge of referencing and citing</li> <li>Discuss with librarians various systems of bibliographic citations</li> </ul>  | 15 minutes | Lecture/discussion on Bibliographic citations                       |
|                                     | <b>Twenty minutes break</b>                                 |  |   |            |   |
|                                     | 10:35-11:15   | Knowledge of ethical and legal issues of using information       | <ul style="list-style-type: none"> <li>Find out from librarians their general knowledge about ethical and legal issues of using information</li> <li>Discuss with librarians ethical and legal issues surrounding the effective use of information and information technology</li> <li>Discuss with librarians different laws, regulations and institutional policies related to the access and use of information resources</li> </ul>   | 40 minutes | Lecture/discussion on ethical and legal issues of using information |
|                                     | 11:15-11:30   | Behaviour exhibited when communicating and using information     | <ul style="list-style-type: none"> <li>Find out from librarians how they communicate or use information</li> <li>Introduce to librarians different categories of behaviour in communicating and using information</li> </ul>  | 15 minutes | Lecture/discussion on behaviour on presenting and using information |
|                                     | 11:30-12:00   | Problem solving approach for communicating and using information | <ul style="list-style-type: none"> <li>Identify tasks associated with communicating and using information</li> <li>Identify possible constraints associated with communicating and using information</li> <li>Look for ways of overcoming identified obstacles</li> <li>Select and test the alternative</li> <li>Evaluate the alternative</li> </ul>  | 30 minutes | Group work  |
|                                     | 12:00-12:15   | Organize ideas in communicating and using information            | <ul style="list-style-type: none"> <li>Ask librarians to classify the information to be presented basing on content, format and presentation technique</li> <li>Ask librarians to order/sequence ideas to be presented in the appropriate format</li> <li>Ask librarians to select and adapt a suitable presentation technique of information.</li> </ul>   | 15 minutes | Group work  |
|                                     | 12:15-12:30   | Concept formation in communicating and using information         | <ul style="list-style-type: none"> <li>Ask librarians to identify and describe concepts to be used as key points while presenting and engaging information</li> <li>Ask librarians to provide references or acknowledgements as appropriate to concepts used.</li> </ul>  | 15 minutes | Group work  |
|                                     | 12:30-12:45   | Creative thinking in communicating and using information         | <ul style="list-style-type: none"> <li>Ask librarians to decide the present technique of information by combining, changing, or reapplying various techniques</li> <li>Ask librarians to apply different referencing styles when presenting information</li> </ul>  | 15 minutes | Group work  |
|                                     | 12:45-13:00   | Reasoning for communicating and using information                | <ul style="list-style-type: none"> <li>Ask librarians to identify similarities among different techniques and use existing knowledge about the first set of techniques to understand the others</li> <li>Ask librarians to assess information presented to determine whether it complies with ethical and legal use of information.</li> <li>Ask librarians to conclude from what they prepare for presentation through determining presentation technique and the type of information to be presented</li> </ul>   | 15 minutes | Group work  |
| <b>One hour break</b>               |   |  |   |            |   |
| 14:00-15:00                         | Preparations for presentations                              | Librarians to prepare for the over all group presentations       | One hour  | Group work |   |
| 15:00-15:30                         | Reflective thinking during presenting and using information | Librarians asked to answer questions in <i>EXERCISE D2</i>       | 30 minutes  | Exercises  |   |

|                                     |             |  |  |            |   |
|-------------------------------------|-------------|--|--|------------|---|
| Communicating and using information | 09:00-10:00 | Presentations                                | • Librarians should present their products as described in activities for day 5    | 1 hour     | Presentations/discussion on communicating and using information |
| <b>Twenty minutes break</b>         |             |  |  |            |   |
| Communicating and using information | 10:20-11:00 | Presentations                                | • Librarians should present their products as described in activities for day 5    | 40 minutes | Presentations/discussion on communicating and using information |
| <b>Ten minutes break</b>            |             |  |  |            |   |
| Post Test                           | 11:00-11:30 | Information literacy skills test             | • Information literacy skills to determine if users skills gained after the course | 30 minutes | Test  |
| <b>Twenty minutes break</b>         |             |  |  |            |   |
|                                     | 12:30-13:00 | Reflective thinking for the entire programme | Librarians asked to answer questions in <i>EXERCISE F</i>                          | 30 minutes | Exercise  |
| <b>Course Closure</b>               |             |  |  |            |   |

**Appendix M: Information literacy presentation recording sheet**

Day..... Activity's name..... Name of recorder.....

Date..... Group..... Duration.....

| Group's Topic | Logical sequence of presenting ideas | Accuracy of the information presented | Indications of information analysis | Demonstration of skills gained |
|---------------|--------------------------------------|---------------------------------------|-------------------------------------|--------------------------------|
|               |                                      |                                       |                                     |                                |

*NB: Provide your recording by indicating both strong and weak points about each group presentations under the above headings*

**Appendix N: Information literacy lectures/demonstrations recording sheet**

Day..... IL Activity..... Name of recorder.....

Date..... Duration.....

| Module Taught | Aspects covered | Remarks  |   |
|---------------|-----------------|--|---|
|               |                 | Indications of skills transferability by instructor(s) | Indications of learners acquisition of skills and participation in the learning process |
|               |                 |  |   |

*NB: Provide your recording by indicating both strong and weak points about each group presentations under the above headings*

**Appendix O: Interview schedules with lecturers and librarians, University of Dar es Salaam**

**(From February to April 2005)**

| <b>Respondent's description</b> | <b>Faculty/Institution</b>                  | <b>Department/section</b> | <b>Date of interview</b> |
|---------------------------------|---|---------------------------|--------------------------|
| Assistant librarian             | University library                          | Reference Services        |                          |
| Lecturer                        | Arts & Social Sciences                      | Literature                | 22/02/2005               |
| Associate Professor             | Education                                   | Educational Foundations   | 28/02/2005               |
| Senior Librarian                | University Library                          | East Africana             | 04/03/2005               |
| Senior Library Assistant        | University Library                          | Arts & Social Sciences    | 10/03/2005               |
| Senior Lecturer                 | Sciences                                    | Chemistry                 | 15/03/2005               |
| Lecturer                        | Institute of Development Studies            | Development Studies       | 18/03/2005               |
| Senior Lecturer                 | Civil Engineering and the Built Environment | Structural Engineering    | 21/03/2005               |
| Senior Librarian                | University Library                          | Information Studies       | 24/03/2005               |
| Senior Library Assistant        | University Library                          | Science & Engineering     | 28/03/2005               |
| Lecturer                        | Commerce & Management                       | Business Administration   | 31/03/2005               |
| Library Assistant               | University Library                          | Law                       | 18/04/2005               |
| Principal Library Assistant     | University Library                          | East Africana             | 21/04/2005               |
| Library Assistant               | University Library                          | Reference Services        | 25/04/2005               |



